

Analysis of the Factors for Sustainable Development of Oil and Gas Resources in Tanzania

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Abstract

Oil and natural gas have increasingly become potential resources for the socio-economic development of Tanzania. Understanding the factors on its sustainability remains of critical importance. This study intended to analyze the factors for the sustainable development of oil and gas resources in Tanzania. We collected quantitative data from 250 participants through a questionnaire, whereas data collected were analyzed using descriptive and inferential statistics. Results show that institutional development, enterprise development, and good governance are pertinent factors for the sustainable development of oil and gas resources in Tanzania. The study offers the implication that to realize the benefits of oil and gas resources for the long-term development of Tanzania, policymakers should ensure institutional and enterprise development, and promotion of governance framework to enhance transparency and accountability in the oil and gas sector. Moreover, we recommend that the realization of long-term extraction and sustainable development of oil and gas resources in Tanzania, robust policies, strategies, good governance frameworks and combined efforts of the government, oil companies, and private sector, civil organizations, and citizens' participation in the management of oil and gas resources is of critical importance.

Keywords: sustainable development, oil, gas, Tanzania

1. Introduction

Oil and natural gas have been potential resources for economic and social development among countries across the world. For years, countries endowed with, have been struggling to sustain them for the long-term benefits of their nations. (Rosiek (2016) and (Schneider et al. (2015) argue that the oil and gas sector is the largest in the world as it generates many revenues that its effective use may provide the population with required socio-economic development. Studies in countries like the USA, Canada, Norway, and Mexico (Holden, 2013 and Williams, 2011) suggest that effective management of oil and natural gas resources has contributed to their success. Extraction of oil and gas resources in countries of Malaysia (Doraisami, 2015), Indonesia (Batubara, Purwanto, & Fauzi, 2016), and the Middle East and North Africa (MENA) (Badeeb et al., 2017; Arezki & Nabli, 2012) has positively transformed the economy of these countries and enabled them to escape the resource curse phenomenon.

Africa is the continent that is endowed with huge reserves of oil and natural gas, unfortunately, the continent is the poorest one in the world (Anyanwu, 2009). One reason associated with this situation is the poor management of oil and gas resources, which have constituted obstacles to long-term development reflecting economic stagnation and political turmoil instead of pleasing economic performance. Countries like Nigeria, Angola, Zambia, Sudan, Ghana, Congo DRC, Egypt, Algeria, South Africa, Libya, Tunisia, Ivory Coast, and Equatorial Guinea have huge reserves of oil and natural gas (De Vita, Lagoke, & Adesola, 2016; Hammond, 2011; Itriago, 2009; Obeng-Odoom, 2013; Ohno, 2010; Zeng & Zhan, 2015). Instead of being the main contributors to social and economic development, oil and gas have turned to be the main source of conflicts and civil wars leaving the population poor as reflected by limited access to basic social services like transport, health, education, and employment opportunities (Afrika, 2014).

The East African Countries, Tanzania, Kenya, Uganda, Rwanda, Burundi, and South Sudan are all endowed with abundant reserves of oil and gas and recently have experienced huge discovery and extraction of oil and natural gas. However, they remain the poorest countries in the world (Gasiorek, Byiers, & Rollo, 2016). South Sudan in particular, the extraction of oil and gas has resulted in the eminent social and political turmoil (Johannes, Zulu, et al. 2015; Johnson, 2014). Generally, the major reason for this situation is the lack of robust institutions, policies, legal frameworks, and strategies required to ensure the appropriate distribution of oil and natural gas benefits across the country (Goumandakoye, 2016).

Over recent years, Tanzania has experienced massive discovery of natural gas and exploration of oil along the coastal regions underway. The discovery of natural gas and exploration of oil has essentially attracted attention and optimistic views among different scholars, economists, and citizens on the prospect that oil and gas may boost the national economy and improve citizens' social welfare (Lange & Kinyondo, 2016). The massive discovery and exploitation of natural gas and oil mark Tanzania on the world map as a potential player of the global oil and gas business (Poncian, 2013). Since 2010 major discovery of natural gas and its subsequent explorations have brought much excitement among Tanzanians (Bofin & Pedersen, 2017).

After the discovery of natural gas and the exploration of oil, the government of Tanzania has done enormous efforts for the management of the resources. The efforts include the establishment of institutions and legal frameworks (policies and regulations). Despite the undertaken steps, the potential challenge is how Tanzania will manage and sustain these resources to benefit the entire Tanzanian generations in a short and long-term period while managing the mixed feelings among Tanzanians; optimistic, pessimistic, blessing or curse (Poncian, 2013). Also, robust policies and implementation strategies are not well known among different stakeholders. Additionally, Tanzania faces other challenges, which can add effect to the potential challenges; they include inadequate human resources capacity in the area, limited ability to negotiate contracts with multinational oil companies, and inadequate availability of technology and the limited capacity local firms to participate in the supply and value chain. The prevalence of these problems manifests in ineffective resource planning, development, and policy strategies for enhanced sustainability of oil and gas resources. Besides, there exist undeniable facts that the oil and gas business is still emerging in the country and that Tanzania has not yet accumulated experiences on how to effectively reap potential benefits from it. Therefore, to ensure the sustainability of these resources, proper management including adequate policy strategies, institutional development, enterprise development, and good governance efforts are imperative in sustaining the resources for the long-term benefits of the present and future Tanzanian generations.

2. The Management of Oil and Gas Resources in Tanzania

The management of oil and gas resources in Tanzania receives its mandate from the Constitution of the United Republic of Tanzania of 1977. The Constitution stipulates that all petroleum and petroleum products such as crude oil and natural gas are Union Matters (Article 4 (3) read together with item 15 of the First Schedule to the Constitution of the United Republic of Tanzania 1977). The Constitution further requires every person in the united republic of Tanzania to protect the natural resources of the country including petroleum and gas. Some of the laws in place to guide and regulate oil and/or gas in Tanzania are as indicated in table 1.

Table 1. Laws governing the Management of Oil and Gas in Tanzania

S/N	Law/Policy	Focus in relation to Oil and Gas
1.	The Petroleum Act, 2015	Provide for regulation of upstream, midstream, and downstream petroleum activities, the establishment of the Petroleum Upstream Regulatory Authority (PURA), to provide for the National Oil Company, to secure the accountability of petroleum entities and to provide for other related matters.
2.	The National Natural Gas Policy of Tanzania, 2013	Provides guidelines for the development of the natural gas industry to ensure optimal benefits to Tanzanians and the national economy in the short, medium, and long- term.

3.	The Local Content Policy for Tanzania oil and gas Industry, 2014	Provides guiding principles for the participation and transformation of Tanzanians in the development of the oil and gas industry.
4.	The Oil and Gas Revenues Management Act, 2015	Provides for the establishment and management of the Oil and Gas Fund and the framework for fiscal rules and management of oil and gas revenues and other related matters
5.	The Extractive Industry (Transparency and Accountability) Act, 2015	Provides for the establishment of the Extractive Industries (Transparency and Accountability) Committee for purposes of ensuring transparency and accountability in extractive industries.

Moreover, the institutional set up for the oil and gas sector in Tanzania provides for various institutions vested with the responsibility of managing the resources. Under the current institutional setup, the Ministry of Energy is the Policymaker, mandated to administer all exploration and exploitation of petroleum resources including oil and gas. Besides, the Minister on behalf of the United Republic of Tanzania is mandated to issue licenses to that effect as well as issuing regulations for governing the entire process. The Tanzania Petroleum Development Corporation (TPDC) is a state-owned corporation established under government notice No.40 of 30th May 1969 under the Public Corporations Act No.17 of 1969 and officially started its operation in 1973. The main reason for the TPDC establishment was to regulate oil and gas functions in the country. The corporation is also charged with overseeing oil and gas operations as well as representing the Government in the oil and/or gas undertakings. TPDC as the national oil company of Tanzania is mostly used by the Ministry of Energy to implement its oil and gas exploration and policies. EWURA is mandated to regulate down and midstream petroleum activities; Petroleum Upstream Regulatory Authority (PURA) regulates the upstream activities, and Tanzania Extractive Industries Transparency Initiative (TEITI) is responsible for Transparency initiatives in extractive industries in Tanzania.

Along with institutions, policies and legal frameworks aligned to the management of oil and gas resources, the governance of the oil and gas sector involves overarching decision-making processes undertaken through various forms by decision-making actors. These include the Government, Multinational Oil and Gas companies, the sector regulators, civil societies, research and training institutions, media, political parties, the private sector, and citizens.

2.1 Conceptual Framework

Figure 1 provides the conceptual framework illustrating important variables and their effects on the sustainable development of oil and gas resources in Tanzania.

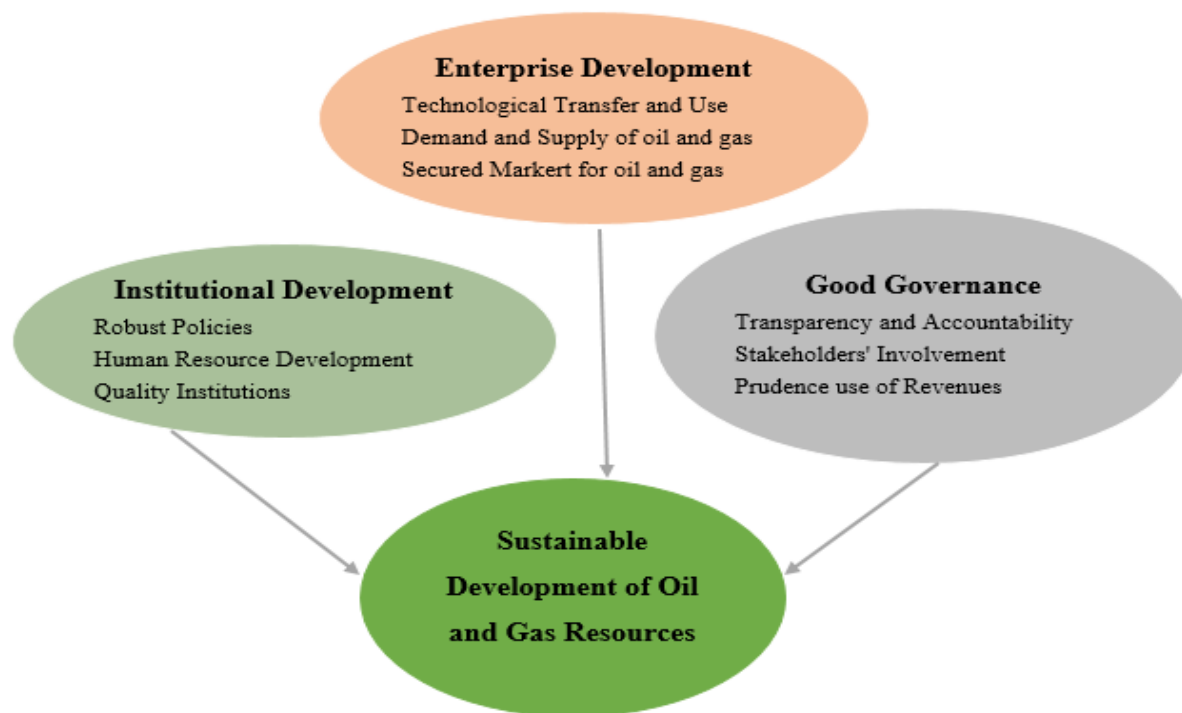


Figure 1. Conceptual Framework Developed by Researchers (2020)

The conceptual framework (figure1) shows the relationship between variables. Institutional development, enterprise development, and good governances are independent variables and sustainable development is a dependent variable. Institutional Development is looked upon robust Policies and Regulations, human resource development, and competent institutions. The dimensions for enterprise development are technological transfer and use, the demand and supply of oil and gas, and a secure market for oil and gas resources. Good Governance, on the other hand, is assessed based on transparency and accountability, stakeholders' involvement and participation, and effective use and management of oil and gas revenues. This means that the Sustainable development of oil and gas resources in Tanzania depends on the three components of the model.

3. Material and Methods

3.1 Sampling

Two hundred and fifty (250) participants were drawn from the Mistry of Energy, TPDC, PURA, and TEITI. Others were obtained from Mtwara Municipal Council, Mtwara District Council including Msimbati Village, Oil Companies, academicians, and civic organizations. The sampling method employed was simple random sampling to the majority of participants, which gave an equal chance for every member of the population included in the sample (Gravetter & Forzano, 2011). Purposeful sampling was employed to heads of institutions.

3.2 Data Collection, Processing, and Analysis

Data were collected through structured questionnaires that contained closed-ended questions. The questionnaire items were designed in a Likert scale style 1-4 (Strongly Agree, Agree,

Disagree, and Strongly Disagree) respectively. Closed-ended questions were used since they are simple in performing the preliminary analysis and ideal for calculating statistical data (John Dudovskiy, 2016; Siniscalco & Auriat, 2012). Questionnaire items were administered in both English and Swahili Language. To ensure the validity of instruments, questionnaire items were administered to five (5) experts, as a result, necessary modifications and refinement (Cohen, Manion, & Morrison, 2013) to questions were made accordingly. Ten (10) key informants who did not form part of the respondents were then engaged in the pretest of the questionnaire before being distributed to participants. Completeness and consistency of the information were checked where the collected data were finally processed and analyzed using SPSS v. 20.0.

Moreover, the Cronbach Alpha test using the SPSS instrument (Saunders et al., 2012) was performed on the independent variables and the dependent variable. The results revealed that all variables were reliable as the average index of 0.762 exceeded the prescribed threshold of 0.7 advocated by Mugenda & Mugenda (2003). Thus, none of the variables were dropped from the data collection instrument. Data Screening was performed to determine the accuracy of data before conducting statistical analysis; the process involved identifying missing values and outliers. Descriptive and inferential statistics (Regression and correlation analysis) were used to analyze and present the data. Analysis of variance ANOVA was employed to determine the significance of the data. Also, Pearson Moment Correlation Analysis was used to determine the association between independent variables (Institutional Development, Enterprise Development, and good governance) and the dependent variable (Sustainable development of oil and gas resources). Prior data collection permission was requested from the Ministry of Energy, to TPDC, PURA, TEITI, Mtwara Municipal, and Mtwara District councils.

4. Results

4.1 Demographic Characteristics

Two hundred and Fifty thousand (250) respondents participated in the study, of which 131 were male and 119 were female representing the balanced participation of both genders. The majority of participants were aged 20-29, 30-39, and 40-49 years as indicated in table 2.

Table 2. Demographic Characteristics of the Respondents (N=250)

<i>Variable</i>	<i>Frequency (n)</i>	<i>Percentage (%)</i>
Gender of Respondents		
Male	131	52.4
Female	119	47.6
Total	250	100
Age of Respondents		
16-19	24	9.6
20-29	65	26
30-39	102	40.8
40-49	42	16.8

50-59	10	4
60-69	5	2
70-80	2	0.8
Total	250	100

The overall results demonstrate that majority of participants were aged 18 to 50 years.

Composition of participants

Participants were drawn from nine (9) categories as shown in Table 3. Most participants were from Mtwara Municipal and Mtwara district councils where the natural gas is being extracted and most oil explorations are mostly taking place. Participants from the Ministry of Energy, TPDC, PURA, and TEITI were many based on their daily involvement in managing oil and gas resources.

Table 3. Composition of participants to the study

<i>Composition of Participants</i>		
	<i>n</i>	<i>%</i>
Ministry of Energy	30	12
TPDC	35	14
PURA	20	8
TEITI	20	8
IOCs	10	4
Mtwara Municipal Council	55	22
Mtwara District Council (Including Msimbati village)	60	24
Academicians	10	4
Civil Organizations	10	4
Total	250	100

4.2 Descriptive Statistics

Institutional Development

The Respondents were asked to indicate their level of agreement on whether institutional development may ensure the sustainability of oil and gas resources in Tanzania. Besides, they were asked to indicate their agreement level on the presented variables regarding Institutional Development as a way of managing oil and natural gas resources sustainably in Tanzania. The summary of the respondents is provided in Figure 2.

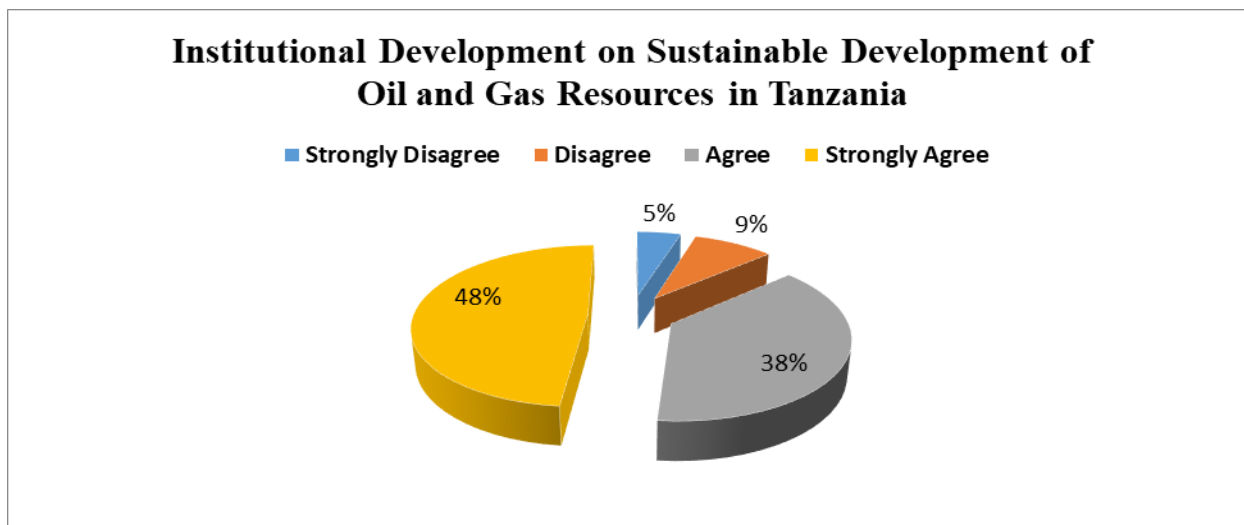


Figure 2. Institutional Development on Sustainable Development of Oil and Gas Resources in Tanzania

The findings indicate that majority of the participants (48%) selected strongly agree, (38%) agree, (9%) disagree, and (5%) strongly disagree. This is an indication that the respondents agreed that Institutional Development is imperative for the sustainability of oil and gas resources in Tanzania. In summary, 'agree' and 'strongly agree' meant that participants had the consensus that institutional development is significant to the sustainability of oil and gas resources in Tanzania, while "disagree" and "strongly agree", indicated participants' disapproval on the opinion. Also, the respondents' views regarding the performance of the institutional development aspects in enhancing sustainable development of oil and gas were sought. The respondents' level of agreement regarding the performance of each aspect and its effects on sustainable development of oil and gas is provided in Table 4.

Table 4. Institutional Development as a way of managing oil and gas resources

Institutional Development	1	2	3	4	Mean	Stdv
1a1. Formulating and implementing robust policies and strategies	12	17	82	139	3.392	1.010
1a2. Strengthening the institutional frameworks (Laws, policies, and Regulations)	12	16	99	123	3.332	0.918
1a3. Developing competent regulatory and oversight institutions to manage oil and natural gas resources	11	26	102	111	3.252	0.827
1a4. Assurance of devised oil and gas Local Content Policy and its implementation strategies	14	27	90	119	3.256	0.855
a5. Generating and promoting an adequate supply of Local workforce with the necessary knowledge and skills to take charge of the oil and gas sector	12	22	97	119	3.292	0.876

1a6.	Enhancing the capacity of Tanzania training institutions to provide professional courses related to oil and gas to increase the pool of local workforce in the sector	13	16	98	123	3.324	0.915
1a7.	Capacitating the National Oil Company and other institutions charged with the responsibility of managing oil and gas resources	11	27	97	115	3.264	0.842
Aggregate Score						3.302	0.892

From the findings, participants agreed on the listed aspects of institutional development that if fulfilled, Tanzania will realize sustainable management of oil and gas resources as shown by mean aggregate score (M=3.302) and standard deviation (STD=0.892). These results imply that participants agreed with the presented variables that they guarantee the manner through which oil and gas resources in Tanzania should be managed.

Enterprise Development

Moreover, data were sought on whether enterprise development is an important factor for the sustainable development of oil and gas resources in Tanzania. The summary of the responses is presented in Figure 3.

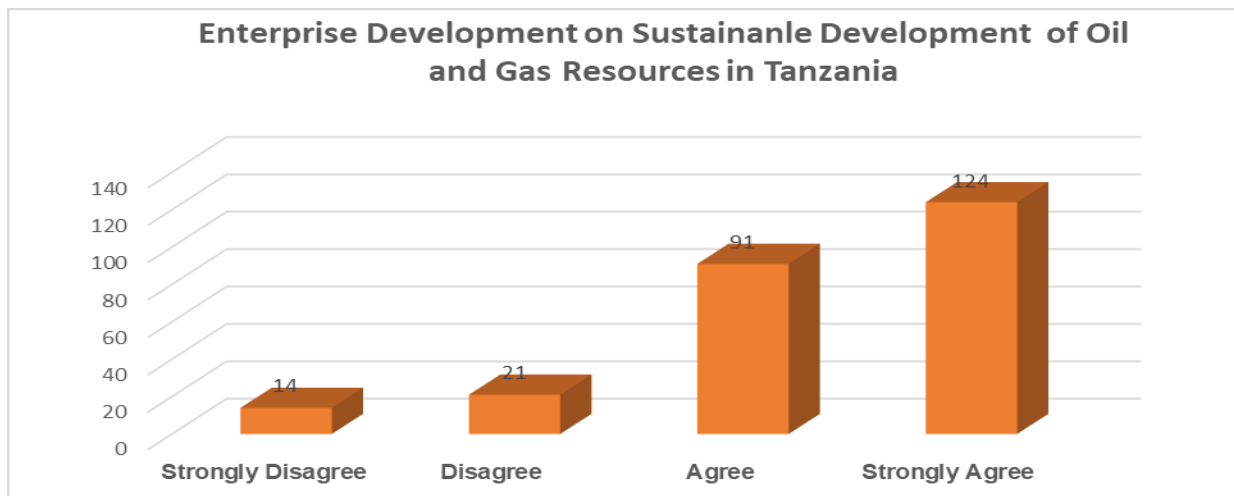


Figure 3. Enterprise Development on Sustainable development of Oil and Gas Resources

The findings indicate that majority of the participants (124) selected strongly agreed, (91) agree, (21) disagree, and (14) indicated strongly disagree. This is an indication that the respondents agreed that enterprise development is imperative for the sustainability of oil and gas resources in Tanzania. Likewise, responses regarding how the enterprise development aspects are carried out in managing oil and gas and its effects on sustainability are presented in Table 5.

Table 5. Enterprise Development as a Way of Managing Oil and Gas Resources

Enterprise Development	1	2	3	4	Mean	Std. Dev.
1b1. Implement flexible Tax regimes and contractual terms to attracting necessary investment	16	11	98	125	3.328	0.936
1b2. Involvement of the government, gas and oil companies, businessmen and the local community in oil and gas enterprise development	12	29	85	124	3.284	0.883
1b3. Connecting supply and demand in the gas and oil market to promote industry operation	13	20	98	119	3.292	0.881
1b4. Investing heavily and ensure the progression of technology transfer and use	11	27	91	121	3.288	0.873
1b5. Ensuring that utilization of oil and gas stimulates oil and gas enterprises	18	18	82	132	3.312	0.951
Aggregate Score					3.301	0.190

Table 5 shows the positive response of participants on the variables by mean aggregate score ($M=3.301$), and Standard Deviation ($STD=0.190$). The results implied that most participants agreed that the presented variables best fits how oil and gas resources should be managed sustainably.

Good Governance

Respondents were asked to indicate their level of agreement on statements regarding good governance as a way of managing oil and gas resources sustainably. The responses are summarized in Figure 4.

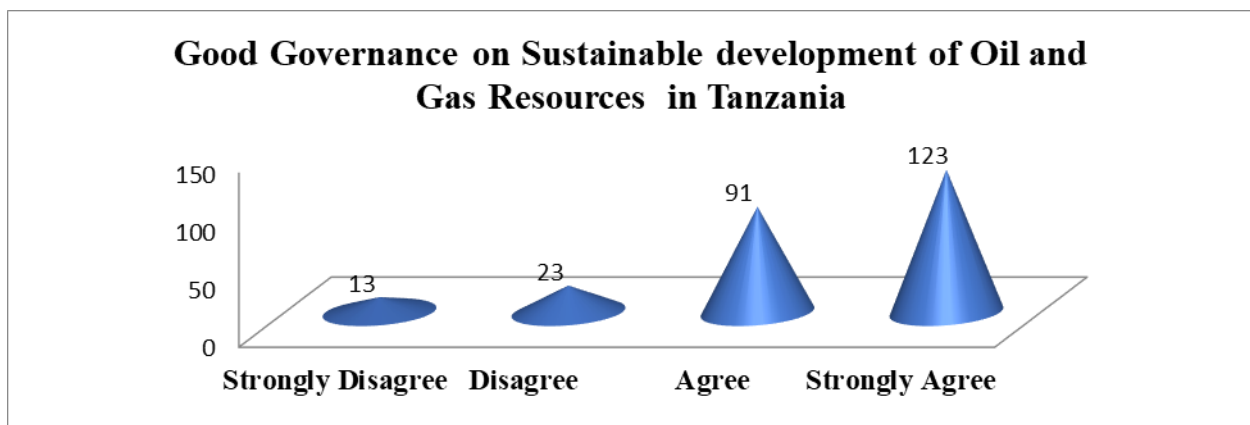


Figure 4. Good Governance for Sustainable Development of Oil and Gas Resources in Tanzania

The findings indicate that majority of the participants (123) selected strongly agreed, (91) agree, (23) disagree, and (13) strongly disagree. This is an indication that the respondents agreed that good governance is imperative for the sustainability of oil and gas resources in Tanzania. Regarding the respondents' perceptions of the role of different aspects of good

governance in managing oil and gas, the summary is provided for in Table 6.

Table 6. Good Governance as a way of Managing Oil and Gas Resources

Good Governance		1	2	3	4	Mean	Std. Dev.
1c1	Transparency and Accountability in the management of oil and gas resources is important for the sustainability of oil and gas resources	12	29	85	124	3.284	0.883
1c2	Oil and gas negotiations contractual agreements should be made public	13	20	98	119	3.292	0.881
1c3	The public should have access to necessary information related to oil and gas	11	27	91	121	3.288	0.873
1c4	Participation of Tanzanian citizens and businessmen in the oil and gas sector is important	18	18	82	132	3.312	0.951
1c5	Efficient and effective use of oil and gas revenues for the development of Tanzania	12	16	99	123	3.332	0.918
1c6	Revenues accrued from oil and gas should support the social and economic development of Tanzania	11	26	92	121	3.292	0.876
1c7	Equal distribution of oil and gas revenues across the country	14	27	86	123	3.272	0.878
1c8	Effective and regular audit and reporting systems to mitigate corruption	12	22	97	119	3.292	0.876
Aggregate Score						3.296	0.892

The findings show the aggregate mean score ($M=3.296$), and standard deviation ($STD=0.892$). This implies that participants agreed with the presented variables of good governance that they enlighten how Tanzania should sustainably manage oil and gas resources.

Correlation Analysis

Table 7. Correlation Coefficient

		1	2	3	4
1 Sustainable Development of Oil and Gas	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	250			
2 Institutional Development	Pearson Correlation	.745**	1		
	Sig. (2-tailed)	.003			
	N	250	250		
3 Enterprise Development	Pearson Correlation	.781**	.136	1	
	Sig. (2-tailed)	.001	.000		
	N	250	250	250	
4 Good Governance	Pearson Correlation	.775**	.214	.163	1

	Sig. (2-tailed)	.002	.000	.000	
	N	250	250	250	250

The results revealed that there was a strong positive correlation between Institutional Development and Sustainable Development of Oil and Gas in Tanzania as shown by ($r = 0.745$), statistically significant ($p = 0.003 < 0.01$). Enterprise Development and Sustainable Development of Oil and Gas resources in Tanzania as shown by ($r = 0.781$), statistically significant ($p = 0.001$), and Good Governance and Sustainable Development of Oil and Gas resources in Tanzania as shown by ($r = 0.775$), statistically significant ($p = 0.002$). The results imply that Institutional Development, Enterprise Development, and Good Governance are imperative for the Sustainable Development of Oil and Gas Resources in Tanzania.

Regression Analysis

Model Summary

The model summary was used to analyze the variation of a dependent variable (Sustainable development of oil and gas) due to the changes in independent variables (Institutional Development, Enterprise Development, and Good Governance)

Table 8. Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. The error of the Estimate
1	.854 ^a	0.729	0.726	0.024

The study analyzed the variations of Sustainable Development of Oil and Gas due to the changes in Institutional Development, Enterprise Development, and Good Governance. Adjusted R squared was 0.726 implying that 72.6% of the variations in Sustainable Development of Oil and Gas were due to the changes in institutional development, enterprise development, and good governance. The remaining 27.4% variations in the Sustainable Development of Oil and Gas were due to the factors other than those included in this study. R is the correlation coefficient, which shows the relationship between the study variables. From the findings, there was a strong positive relationship between the study variables as shown by 0.854. R-Square is the proportion of variance in the dependent variable (Sustainable development of oil and gas resources) which can be predicted from the independent variables (Institutional development, enterprise development, and good governance). This value indicates that 72.9% of the variance in sustainable development can be predicted from institutional development, enterprise development, and good governance.

Analysis of Variance

From the ANOVA statistics, the processed data (population parameters) had a significance level of 0.002. This shows that the data were ideal for making conclusions on the population's parameter, as the value of significance (p-value) is less than 5%. The F calculated was greater than the F-critical ($220.940 > 2.641$). This shows that Institutional Development, Enterprise Development, and Good Governance significantly influence the Sustainable Development of Oil and Gas.

Table 9. Analysis of Variance

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	36.245	3	12.082	220.940	.002 ^b
Residual	13.452	246	0.055		
Total	49.697	249			

Beta Coefficients of the Study Variables

The regression equation was

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon, \text{ where, } \beta_0 = 1.354, \beta_1 = 0.421, \beta_2 = 0.396, \beta_3 = 0.402$$

$$\text{Thus, } Y = 1.354 + 0.421 X_1 + 0.396 X_2 + 0.402 X_3 + e$$

The equation above reveals that holding Institutional Development, Enterprise Development, and Good Governance constant, the variables will significantly influence Sustainable Development of Oil and Gas represented by constant = 1.354 as shown in Table 10.

Table 10. Coefficients

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
1 (Constant)	1.354	0.198		6.838	0.000
Institutional Development	0.421	0.101	0.377	4.168	0.002
Enterprise Development	0.396	0.113	0.452	3.504	0.003
Good Governance	0.402	0.127	0.513	3.165	0.002

Institutional Development is statistically significant to the Sustainable Development of Oil and Gas as shown by ($\beta = 0.421$, $P = 0.002$). This shows that Institutional Development had a significant positive relationship with the Sustainable Development of Oil and Gas. Therefore, a unit increase in Institutional Development will result to increase in Sustainable Development of Oil and Gas.

Enterprise Development is statistically significant to the Sustainable Development of Oil and Gas as shown by ($\beta = 0.396$, $P = 0.003$). This shows that Enterprise Development had a significant positive relationship with the Sustainable Development of Oil and Gas. Consequently, a unit increase in Enterprise Development will result to increase in Sustainable Development of Oil and Gas. Good Governance is statistically significant to the Sustainable Development of Oil and Gas as shown by ($\beta = 0.402$, $P = 0.002$). This shows that Good Governance had a significant positive relationship with the Sustainable Development of Oil and Gas. Therefore, a unit increase in Good Governance will result to increase in Sustainable Development of Oil and Gas.

5. Discussion

The study contributes to policy options and strategies to enhance the sustainable development

of oil and gas resources in Tanzania. Results demonstrate the value of the key factors in consideration towards sustainable development of oil and gas resources, institutional development, enterprise development, and good governance. The study stands on the position that if these factors will be seriously worked upon, oil and gas will have an extended benefit to the socio-economic development of Tanzania.

For instance, institutional development is the heart of the development of the oil and gas sector. It involves institutions, legal frameworks, and human resource capacity to take charge of the sector. Initially, policy formulation and implementation are the main tools for sustained oil and gas benefits. In this endeavor sustainability of oil and gas resources in Tanzania solely depends on good policies with sound implementation strategies. Scholars argue that Policy formulation and implementation strategies are critical for sustainable extraction and management oil and gas resources. (Vernon, 2017) argues that policy formulation, law enactment, and implementation of the same is potentially important for building a vibrant oil and gas sector. Similarly, (Apere, 2017) claims that policy formulation and its implementation strategies engender the development of the oil and gas sector and sustainable economic growth. Likewise, (Greenstone, Koustas, Looney, Li, & Marks, 2012) echo that, robust policies with good implementation strategies facilitate proper management of oil and gas resources to produce desirable benefits to the community. The development of robust policies and implementation strategies, therefore, requires the commitment of the government and support from different stakeholders.

Besides, the sustainable development of the oil and gas sector in Tanzania requires qualified staff in all areas of production, exploration, processing, and transportation. Without a pool of human resources with the requisite knowledge, skills, and competencies in oil and gas fields, sustainable extraction and extended benefits of the resources to the socio-economic development of Tanzanian will not be realized. Gberevbie (2012) and Marcel (2016) argue, that achieving competitive advantage and enhancing sustainable organizational growth, human resource development is obligatory. Anjo et al. (2017) submit that investing in human capital is essential for building a competitive oil and gas sector. Hodgson (2014) and Obeng-Odoom (2015) explain that investing in human capital is profoundly crucial to sustained employment and returns. (Brown (2015) advances that human resource development is imperative to sustain the four phases surrounding the oil and gas extraction namely exploration, appraisal, development, and production. Equally, (Abdulai, 2013) argues that training local human resources enable them to engender their participation in the oil and gas sector hence realizes sustainable benefits to the nation. Furthermore, (Kinyondo & Villanger, 2017) asserts that human resource development is an investment rather than a cost as local skilled workforce participation in the oil and gas employment will generate experience and bring high income to the country.

Further, the necessary efforts the government should take in ensuring competency and skills in the oil and gas sector is to enhance the capacity of the local training institutions to deliver courses in the field of oil and gas. The government can increase the number of competent and skilled local personnel in the field, and avoid reliance on foreign expertise even on the posts that need recruitment from within. In this case, many Tanzanians will be recruited in the oil

and gas and enjoy the benefits from their resources. Ayonmike (2012) echoes that vocational and technical training institutions are important for bridging skills gaps and increasing the number of local staff with the skills and knowledge employed in the oil and gas sector. Thus integrating the oil and gas curriculum and courses into Technical and Vocational Education and Training (TEVT) Programmes may warrant enhanced practical skills development. In line with this, enhancing the capacity of the National Oil Company, in this case, TPDC in terms of financial, technical, and human resources is instrumental to the realization of sustainable development of oil and gas resources in Tanzania.

Melyoki (2017) & Yusuph (2019) disclose that given the huge responsibilities vested, the government shall consider issues related to capital adequacy, governance, and policies to focus on building the capacity of TPDC and allocate resources to facilitate effective execution of those roles. Similarly, Iledare (2008) & Marcel (2016) suggest that the development of the oil and gas sector will depend on building the capacity of the National Oil Company including institutional empowerment and having the right skilled personnel in the key positions. Correspondingly, Heller & Schreuder (2014) and Roe (2016) suggest that given the overarching roles vested to TPDC, much attention needs to be redirected towards strengthening its capacity in terms of finance, human resources, and technical capacities.

Oil and gas enterprise development in Tanzania would depend on investing and ensuring the progression of technology transfer and use. The government should strategically invest in science and technology and have customized modern technology in the oil and gas sector. This might ease the exploration, production, refining, and branding of the oil and gas to the market. Simbakalia (2013) notes, technology is imperative for the transformative progression of the oil and gas sector for wealth creation and value addition. Dong et al. (2015) argue that the progression of technology is pertinent to the sustainability of oil and gas resources as it increases extraction and production efficiency.

Similarly, transparency and accountability is a precondition for the sustainability of oil and gas resource. Making oil and gas revenues, contracts, and negotiations between the government and the Multinational Companies open and transparent as something crucial for the realization of long-term benefits of the resources. Transparency and accountability, especially in contracts and revenues obtained from the extraction of oil and gas be made public and prudently accounted for, may ensure the sustainability of the resources. Abdulai (2013) argues that oil and gas revenue transparency and accountability in the oil and gas business is a pre-requisite for ensuring sustainable development. Moshi (2014) attests that for the sustainability of oil and gas resources, all extraction activities including negotiations, contracting, and signing of an agreement between Tanzania and multinational companies should be transparent.

Besides, the disclosure of information on extracted volumes, prices of sold items, and revenues generated out of it are significant to the sustainability of oil and gas resources. Participation of businessmen as suppliers of goods and services in the oil and gas sector and citizens for the supply of labor, security of infrastructures and ownership of decisions reached regarding oil and gas, is crucial to the sustainable growth of the oil and gas sector. Schwarte

(2008) believes that citizen participation in the oil and gas sector guarantees peace and security so it enables international companies to operate in a very harmonious environment. Effective and prudent use of oil and gas revenues is fundamental to realizing sustainable development of the resources. When revenues are effectively and prudently used, it will carter for socio-economic development hence benefit the present and future Tanzanian generations. Abdulai (2013) states that accountability and effective use of revenues from oil and gas enables the country to measure its optimum gains to realize its contributions to national growth. In this regard, the government should strive to make sure that revenues obtained from oil and gas are not squandered, as such, be wisely used to support social-economic development. The imposition of strict rules, regulations, and strong oversight institutions to monitor, report and or propose legal actions against misappropriations of the oil and gas revenues or any deal set forth, deems necessary.

6. Conclusions

Having abundant oil and gas resources is not a problem, but how to exploit it so that it brings benefits to the community is the critical challenge that for years has confronted resource-rich countries in Africa. Tanzania is at the early stages of exploitation of oil and gas resources, its effective management may contribute to social-economic development as stipulated in the national development plan 2016/2017-2020/2021 and the country's Development vision 2025. Thus, effective management of these resources largely depends on the establishment and adherence to strong institutional and legal frameworks, prudent and sound fiscal and monetary policies. The study has put forward the discussions on how best to manage the oil and gas resources to sustain higher national growth and avoid the possibility of the paradox of plenty.

Moreover, enforcement of sound fiscal framework, legal, regulatory and institutional arrangements for the development of the sector, and effective implementation strategies of the same is significant. To ensure the benefits of oil and gas resources for the long-term development of Tanzania, the government should do all the best to ensure institutional and enterprise development, and promotion of overall governance framework to enhance transparency and accountability as the critical factors to consider. In addition, the realization of long-term extraction and sustainable development of oil and gas resources in Tanzania, the discovered reserves of oil and gas, and the ongoing explorations might be the cornerstone to the Tanzania economy. Robust policies, strategies, good governance frameworks, and combined efforts of the government, oil, companies, and private sector, civil organizations, and citizens in the management of oil and gas resources are preferred.

Further, the study informs policymakers that the sustainable development of oil and gas resources at the initial stage requires deliberate planning involving the entire value chain. This may comprise all necessary processes from making decisions on contracting out for exploration, exploitation, and production to dealing with the revenues obtained from oil and or gas business. This implies that policy and decision-makers should not start the processes without adequate preparations, as the results might be mismanagement of the resources. Consequently, policymakers are alerted that effective management of the oil and gas sector

does not come overnight and is not spontaneous, but rather it takes a series of processes and choices, which needs to be considered and immediately taken care of. However, decisions to extract or not have to be determined after a thorough analysis of the internal capacity.

Lastly, this study has come up with important findings of the management of oil and gas resources for the sustainable development of Tanzania. However, the findings are vivid but not entirely enough to explain the sustainability of oil and gas resources in Tanzania. The study was limited to three variables, institutional development, enterprise development, and good governance. In some instances, conducting further studies to capitalize on these findings is imperative. Therefore, the study serves as a springboard for further scholars and researchers to investigate other factors, policy options, and strategies that may harness the sustainability of oil and gas resources in Tanzania. The conducted studies perhaps may come up with concrete solutions that may refine and enrich theoretical frameworks and experiences badly needed in the management of the oil and gas sector in Tanzania and beyond.

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