

# The Role of the Procurement Function in Realising Sustainable Development Goals: An Empirical Study of an Emerging Economy's Oil & Gas Sector

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## Abstract

This research is motivated by the unsustainable nature of some oil and gas (O&G) firms' activities, especially in developing countries and the dearth of research works about sustainable procurement (SP) within these countries. The O&G sector is characterized by complexity known to generate several negative impacts on humans and the environment. Our literature review reveals how SP practices can help improve the environmental, social and economic performance of practising firms, thereby leading to sustainable development of their immediate communities and the society in general. The aim of this research is to explore SP practices within the Nigerian O&G sector and to investigate how these practices can help firms achieve sustainable development goals. A questionnaire was used to collect primary data, which was analysed using exploratory factor analysis to ascertain the level of relationship between the research variables, consisting of environmental, social and economic aspects of sustainability. The research findings did not only indicate that some sustainable development goals (SDGs) can be achieved through the adoption of SP practices, but it also shows that the adoption of SP practices can help improve the performance of O&G companies. The result further indicates that government policies and regulations constitute a key driving force for firms to adopt sustainable practices.

*Keywords: Sustainable development, corporate sustainability, sustainable procurement, Oil & Gas, firm performance, Nigeria, developing countries.*

## 1. Introduction

Sustainable development has received and still receiving a lot of attention from the media, practitioners, researchers, government agencies, stakeholders and individuals around the world (Meehan and Bryde, 2015; Thøgersen, 2006). The importance accorded to the sustainable development concept has helped to shape the way firms think and carry out their day-to-day business activities. Nowadays, more firms take extra care of their decision-making processes especially when these have an impact on the environment and society. Sustainable development according to the original Brundtland definition is the *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"* (WCED, 1987, p. 43). While this definition seems simple and straight-forward, implementing sustainable development initiatives has remained a challenging task for many firms, due to the coexistence of the three pillars, i.e. economic, environment and social (hereinafter called triple bottom line - TBL) (Junior et al., 2017; Matos and Hall, 2007). However, stakeholders' pressure forces firms to seek for unconventional approaches in achieving SDGs; a set of objectives adopted to help attain sustainable development. Literature suggests that the procurement function

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plays an essential role in the realisation of SDGs (Crespin-Mazet and Dontenwill, 2012; Nijaki and Worrel, 2012). This is because the procurement function has direct access to the supply base and can influence, therefore, the entire supply base towards a common sustainability goal (Mena et al., 2014). The literature postulates that focal firms are accountable for the activities of supply chains and made to suffer any damages caused by suppliers (Huq et al., 2014). Hence, the effective, cooperative and collaborative management of suppliers is expected to reduce supply chain risk and also fast-track partners' commitment towards sustainability goals (Gimenez and Tachizawa, 2012).

This paper presents an empirical analysis of SP practices of firms within the Nigerian O&G sector (hereinafter called the sector), in terms of the environment, social and economic well-being of stakeholders in their procurement decisions. In particular, the principal aim of this empirical study is to assess the role of the procurement function in the actualisation of SDGs. This is necessary and important assuming that the O&G sector is one of the leading perpetrators of environmental degradation and air, land and water pollution because of oil spillages, deforestation and gas flaring.

In 2010, the oil spillage in the Gulf of Mexico, which claimed eleven lives, raised many concerns regarding the sufficient management of the activities of BP's contractors and suppliers. Thus, this research is valid, as it evaluates all necessary measures that firms have adopted to reduce or eliminate risks within their supply chains. In 2015, the sector recorded 753 oil spill incidents against 537 and 673 oil gushes recorded in 2010 and 2011, respectively indicating a lack of commitment by the sector's players (Department of Petroleum Resource (DPR), 2015). Last, this paper provides useful insights into the realities of SP practices in the sector, and the perspective of a developing country, which lacks attention and related research works (Walker and Brammer, 2009; Walker et al., 2012).

This paper, therefore, strives at meeting the following objectives:

- (1) Explore the contextual definitions of SP in relation to SDGs
- (2) Ascertain which SP practices have a direct link with SDGs
- (3) Investigate the impact of SP practices on SDGs

To help achieve these objectives, we obtained data from firms within the upstream sector. We focused on the upstream sector because it involves critical activities, which often result in greater benefits (Al-Naumani and Rossiter, 2015). Musa et al. (2013) suggest that this sector is presumed more destructive to its host communities and records the highest level of incidents as shown in Figure 1 (DPR, 2015).

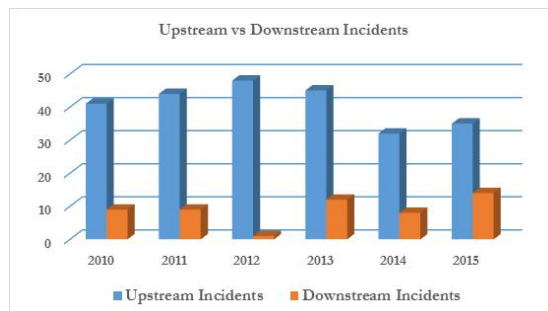


Figure 1: Downstream and upstream incidents (DPR, 2015, p. 65)

## 2. Literature Review

### 2.1 Sustainable development

Sustainable development concept has received huge attention across the globe as it centres on the continuity of human existence, which can only be achieved through the preservation of natural resources for future generations (WCED, 1987). Hence, sustainable development should not only provide the framework on how to protect the environment but also the mindset on how to preserve the earth's natural resources and improve the quality of human lives (Orji, 2013). As a result, any development that lacks the principles of sustainable development should be considered as unsustainable, which, however, may tend to mislead regarding the efforts made by the sector to achieve the SDGs. The SDGs, which are meant to substitute the millennium development goals (MDGs), are integrated and inseparable. They balance essentially the TBL of sustainable development and seek to realise the human rights by aspiring gender equality and the empowerment of all women and girls (United Nations, 2015). These goals are produced in Table 1 for emphasis.

**Table 1:** Sustainable development goals

S/n	Sustainable development goals
SDG1	End poverty in all its forms everywhere
SDG2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
SDG3	Ensure healthy lives and promote well-being for all at all ages
SDG4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
SDG5	Achieve gender equality and empower all women and girls
SDG6	Ensure availability and sustainable management of water and sanitation for all
SDG7	Ensure access to affordable, reliable, sustainable and modern energy for all
SDG8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
SDG9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
SDG10	Reduce inequality within and among countries
SDG11	Make cities and human settlements inclusive, safe, resilient and sustainable
SDG12	Ensure sustainable consumption and production patterns
SDG13	Take urgent action to combat climate change and its impacts
SDG14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
SDG15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
SDG16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
SDG17	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

It is expected that the implementation of the new SDGs would move the world towards a more sustainable path. Orji (2013) investigated the implementation of sustainable development in Nigeria. Their study postulates that the Nigerian government played a major role in the failures encountered in the quest for sustainable development. Examining the SDGs and the research conducted by Orji (2013) we revealed common objectives, i.e. poverty and education which constitute major concerns affecting

sustainable development in Nigeria.

## 2.2 Sustainable procurement

The adoption of sustainability measures within the procurement function is referred to as '*sustainable procurement*'. A concept focused on how firms can implement sustainability measures in their sourcing and purchasing decisions while also using their buying power to engage suppliers in adopting and implementing sustainability measures, aimed at reducing the environmental, social and economic impacts of firms' activities to the society and environment (Erridge and Hennigan, 2012; Hughes and Laryea, 2013). SP also seeks to tackle critical issues of sustainable development, i.e. the SDGs, climate change, environmental degradation, resources depletion, air pollution and other social and ethical issues. Several definitions of SP exist in the literature, mainly because different industries are trying to link SP to their operational processes. An examination of these definitions verifies the complex and heterogeneous nature of SP. However, given the context of this study, Rice (2009, p. 38) definition that states thus: "*Sustainable procurement is about understanding the three pillars of sustainable development (environment, society and economy) and using this knowledge to make better informed, ethical choices about the products that we buy*" is adopted in this study. This definition also aligns with the broader sustainable development agenda, a condition accentuated in the SP literature (Meehan and Bryde, 2011; Young et al., 2016).

To achieve sustainability, the procurement function is expected to examine, evaluate and address some key scales, drawn from the TBL. These scales are (1) *environment*, (2) *product responsibility*, (3) *health and safety*, (4) *human rights*, (5) *diversity*, (6) *philanthropy*, (7) *procuring from small and local suppliers*, (8) *community development*, and (9) *sustainable economic development* (Brammer and Walker, 2011; Mansi, 2015; McMurray et al., 2014; Walker and Brammer, 2009). The application of the above scales can also help firms achieve greater profitability, better market share, reduce their environmental risk and impacts and increase their eco-efficiency (Zhu et al., 2008; Aragão and Jabbour, 2017). Besides benefits, some drivers and barriers of SP were noted within the literature (Walker and Jones, 2012). For instance, McMurray et al. (2014) found that passion for improving working conditions, firms' reputations, organisational efficiency and transparency were the drivers for implementing SP, while a lack of awareness was noted to be the most significant barrier to SP implementation. However, costs was observed to be the main barrier, while top management support the main driver for implementing SP practices (Walker and Brammer, 2009). Lund-Thomsen and Costa (2011) also asserted that cost was a major barrier to SP practices.

In a similar study, Yusuf et al. (2013) acknowledged firms still lack the financial capability to implement sustainability measures. However, there is an emphasis on training procurement personnel and commitment from senior management to attain SP goals (Bowen et al., 2001; Carter and Dresner, 2001; Walker and Philips, 2008). Due to the risks, contractions and complexity involved in implementing sustainability measures (Carter and Roger, 2008), some firms adopt greenwashing practices just to boost their public image while responding to the need for sustainable development (Crespin-Mazet and Dontenwill, 2012). An assumption that there is low awareness of SP practices in developing countries is not far-fetched from available SP literature (Brammer and

Walker, 2011; Kalubanga, 2012; Lund-Thomsen and Costa, 2011; McMurray et al., 2014). The role of the procurement function in managing operations environmental and social issues is notable within the literature. So also is the role of the O&G sector in energy-related projects and the development of Nigeria. Yet, there remains a dearth of empirical and theoretical research, which assessed the role of SP practices in realising SDGs in the present context. This research, is, therefore, aimed to fill this gap.

### 2.3 Sustainable development measures in the Nigerian O&G sector

The sector plays a major role in the Nigerian economy, as it accounts for about 83 percent of the nation's revenue and also one of the leading employers in the country. Although this sector has created wealth to Nigeria as a nation, it has also led to awful results on aquatic and domestic animals, the environment, and humans thereof (Ako, 2012; Amujo et al., 2015; Odoeme, 2013). Similarly, issues of health and safety, oil spillage, gas flaring, salinization, environmental degradation, air pollutions, corruption, and other problems resulting from the activities in the O&G sector has been observed in the literature (Ambituuni et al., 2014; Dode, 2012; Ismail and Umukoro, 2012; Ihua, 2010). These acts have attracted global attention and led to series of lawsuits between individuals, host communities and oil firms and the Nigerian government, agitations and militancy in the oil region. In response to this, the Nigerian government and oil firms made efforts to engage stakeholders by introducing different initiatives. Firms' commitment to sustainable development has also created avenues for the application of sustainability measures in their operations. For example, with regards to gas flaring, which has been accentuated for its negative environmental impact (Dode, 2012), the published 2015 O&G industry annual report, revealed huge improvements, i.e. about 50% reduction in gas flaring between 2001 to 2015 (DPR, 2015).

Although the society trusts that the O&G sector cannot be sustainable due to the impacts of its activities, the society must not fail to consider the benefits derived from the O&G sector. For this reason, any effort towards minimising the impact of the O&G sector are encouraged no matter how little. Emphasising this point, George et al. (2016, p. 197) noted thus: *"...in view of human dependence on non-renewable energy, which leads to the oil industry's continued existence, any effort to reduce the negative impact of such a destructive industry, however minimal, should not be undermined"*.

Efforts have been made to examine and evaluate sustainability practices within the sector in the past (see, Alabi and Ntukekpo, 2012; Ambituuni et al., 2014; Felix and Ogbor, 2014; Fossgard-Moser, 2003; Ingelson and Nwapi, 2014; Ite, 2007; Odukoya, 2006). However, none of them specifically examined sustainability measures of the procurement function. Thus, this present study is specifically geared towards sustainability measures of the procurement function of firms within the O&G upstream sector. This study collected primary data to establish the efforts of firms within the sector and to validate published data in other contexts. This research framework, therefore, takes the steps shown in Figure 2.

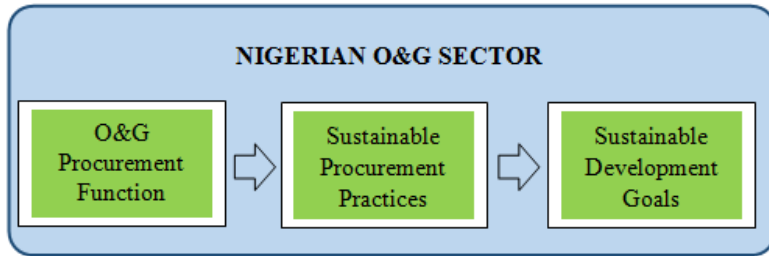


Figure 2: Research framework

### 3. Methodology

This research utilised standard questionnaire to gather information from the research respondents who are operators within the Nigerian O&G upstream sector. The questionnaire was produced based on SP and sustainability literature and modified using contextual recommendations from a pilot study involving academics and professional experts in the field. The known SP scales highlighted earlier on, which had previously been utilised by renowned authors are used in this present study (Mansi, 2015; Meehan and Bryde, 2015; Walker and Brammer, 2009).

The questionnaire predominantly utilised a Likert scale (strongly agree = 5, agree = 4, not sure = 3, disagree = 2 and strongly disagree = 1), with a few open-ended questions. This is consistent with other sustainability research (Ahmad et al., 2016a; Meehan and Bryde, 2015; Musa et al., 2013; Yusuf et al., 2013). The questionnaire was sent via e-mail to procurement professionals within the sector. This method is considered one of the fastest, efficient and most cost-effective ways of collecting data compared to other methods (Alan, 1998; Fricker and Schonlau, 2002; Meehan and Bryde, 2015; Sue and Ritter, 2007). This method is also more environmentally friendly.

Out of 118 firms that could be validated as operators within the upstream sector, the questionnaire was sent out to 96 who had earlier on been contacted using convenient sampling technique, after permission was sought and obtained from DPR, the regulatory body in charge of the sector. To reduce non-representative sample bias, only one respondent who is procurement professional within participating firms was asked to complete the questionnaire. 74 questionnaires were returned from the 96 sent out, but only 51 were deemed useful, representing a response rate of 53%. This response rate is considered high and acceptable especially in this field of study and context (Ahmad et al., 2016b; Meehan and Bryde 2015; Musa et al., 2013; Yusuf et al., 2013). To achieve this rate, the researchers made extra efforts like those highlighted in Bryman and Bell (2007) by sending out reminder emails to respondents and making follow-up phone calls to encourage completion as practised by other known authors (McMurray et al., 2014; Yusuf et al., 2013). While we acknowledge the limitations of using survey questionnaire – lack of in-depth information and low response rate, we argue that this method gave us the opportunity to access more people to obtained diverse opinions on the issues raised.

**Respondents' profiles:** In defining the respondents' profiles, the researchers included the respondent's position. This is essential to exhibit potential respondents' procurement backgrounds. In this regard, three variables were used, as shown in Table 2.

**Table 2:** Profile of the respondents

<b>Variables</b>	<b>Percentage</b>
<b>Respondent's position</b>	
Procurement Officer	35.3
Procurement Manager	27.4
Procurement Specialist	7.8
Procurement Executive	9.8
Head of procurement/logistics	9.8
Senior Buyers	3.9
Contract Analyst	2.0
Purchasing Manager	3.9
<b>Total</b>	<b>100.0</b>
<b>Approximate number of employees</b>	
1 - 50	14.3
51 - 250	22.4
251 - 500	22.4
501 and above	40.9
<b>Total</b>	<b>100.0</b>
<b>Firm's approximate yearly turnover</b>	
<\$5m	5.9
\$5m - \$20m	11.8
\$21m - \$50m	11.8
\$51m - \$100m	13.7
>\$100m	56.9
<b>Total</b>	<b>100.0</b>

Table 2 shows that procurement officers dominate the respondents with 35%, followed by the procurement managers with 27%, and procurement specialists with 8%. While procurement executives and heads of procurement account for 10% each. Senior buyers and purchasing managers account for 4% respectively, and contract analysts make up 2% of the respondents. The above scores iterate the research design, which utilises only procurement professionals. From Table 2 it is also evident that the majority of the respondents (70%) are employed by firms with a yearly turnover of above \$50m, a fact indicating that the bulk of the sample firms are large and multi-national in size (Yusuf et al., 2013). The respondents are also well distributed among the business sectors, except for consultancy, which constitutes only 7%. For example, operators account for 25%, servicing firms for 15%, logistics & transport for 16%, exploration and production for 27%, and marine engineering and construction for 12%.

#### 4. Findings and Analysis

As noted above, steps were made to reduce representative bias. In addition, formal invitation letters to participate in this research were sent out to respondents before the questionnaires were distributed to potential respondents who showed interest. The 51 useful questionnaires were arrived at after careful scrutiny in terms of complete information and position of respondents.

## 4.1 Contextual definitions of sustainable procurement

### 4.1.1 Explore the contextual definitions of SP in relation to SDGs:

To achieve this, the questionnaire sought a definition of SP and, as expected, there were diverse opinions, but all were geared towards the TBL or aspect of the TBL. A notable and encompassing definition was given by a head of the procurement department who noted:

*"It is a process whereby organizations meet their demand and need for goods and services in a way that it achieves value for money on a whole life-cycle basis thereby generating benefits not only to the organization, but also to the economy, while also reducing any negative impacts on our environment"*

The above definition in every guise represents the definition of SP given by Naoum and Egbu (2015). It also corroborates the definition of SP as defined by Meehan and Bryde (2011) and DEFRA (2006). Another respondent defined SP as:

*"Sourcing and obtaining goods and services that are not only environmentally friendly but also satisfy economic, legal, moral and philanthropic requirements"*

While a third respondent in defining SP stated:

*"It is the procurement that is consistent with sustainability goals, such as considering the environmental, economic and social effects of procurement decisions"*

The above-cited definitions and seven others explicitly incorporated the triple bottom line suggesting it is a well-understood concept within the sector. These definitions clearly consider the TBL aspect and epitomise the definition of Rice (2009) adopted in this research.

The second most considered sustainability issue when defining SP was the 'environment'. One respondent defined SP as:

*"It is the procurement of goods and services that meet environmental standards"*

Another respondent held the same view by defining SP as:

*"Buying goods and provide services with minimum environmental impact"*

Another important discovery of the definitions obtained is the link between SP and SDGs. The definition of SP by several respondents clearly suggest that SP means achieving SDGs. For instance, they noted:

*"Giving consideration to sustainable development goals in procurement activities"*

*"Procurement of goods and services that are consistent with sustainable development goals"*

The above definitions corroborate the existing SP literature, which considers both organisational and stakeholder goals. The above contextual definitions no doubt provides an answer to OB1. The above findings also depict the changing role of the procurement function in achieving not just the TBL, but also the SDGs as outlined by the UN.

## 4.2 Statistical analysis

### 4.2.1 Ascertain which SP practices have a direct link with SDGs:

Factor analysis was performed using SPSS to reduce the data and provide a clear representation of the selected correlated variables of SP practices (Doloi et al., 2012; Wiredu, 2016). A KMO measure of 0.865 (referred to as meritorious by Hutcheson and Sofroniou, 1999) and Bartlett's test of sphericity of 480.043 with  $df = 105$  and  $p = 0.000$  were attained (Field, 2013). The fifteen correlated variables used have factor loadings greater than 0.50 (Caniëls et al., 2013). In addition, Cronbach alpha ( $\alpha$ ) of 0.926, was achieved for scale validity test, which indicates excellent reliability as shown in Table 3.



**Table 3:** Factor loadings of SP practices

SP practices (KMO measure = 0.865 and $\alpha = 0.926$ )	Factor loadings
Policy to enhance transparency	0.818
Policy on ethical practices	0.787
Policy to ensure sustainable economic development in areas of operation	0.785
Engages in social activities to support socio-economic and community development	0.765
Donate to communities to enhance the well-being of local people	0.737
Your firm sources from local suppliers in order to provide economic benefit to the community	0.733
Policy to provide Education and training for social development of communities	0.715
Ensures safe movement of products to facilities	0.696
Ensures suppliers abide by minimum standards and laws	0.668
Policy for workers with disabilities	0.639
Policy to improve living conditions and economy of communities	0.632
Checks and prevents pollution	0.628
Purchase from MWBE suppliers	0.613
Policy to respect the diversity and differences of employees	0.579
Project locations are operated in a safe manner	0.572

Table 3 provides useful insights on the most prevalent aspect of SP practices implemented by firms within the sector, i.e. social aspects. This finding is the resultant effect of progress made within the sector by incorporating CSR initiatives as a result of stakeholder pressure (Ako, 2012; Hilson, 2012; Musa et al., 2013). An alarming discovery, which collaborates the literature, is the low factor loading (0.572) of *'project locations are operated in a safe manner'*. The high level of incidents recorded within this sector can, therefore, be associated with this outcome (DPR, 2015). The above results highlight the SP practices with a direct link with SDGs. Considering the inequality crusade envisaged by the SDGs, the above results can be considered as significant.

#### 4.2.2 Investigate the impact of SP practices on SDGs:

To achieve OB3, we classified the SDGs into the three pillars of sustainable development. Thereafter, factor analysis of these three pillars was performed separately, regarding the three different factors, with loadings greater than 0.50. The factor loadings, KMO measure and ( $\alpha$ ) for this analysis are shown in Table 4. The ( $\alpha$ ) and KMO measure values are well above the acceptable limits (Fields, 2013; Flynn et al., 1990).

**Table 4:** Factor analysis of SP impact on SDGs

Factors	SDG Variables	Factor loadings	KMO Measure	Cronbach ( $\alpha$ )
<i>Factor 1: Environment</i>	SDG-13	0.876	0.785	0.811
	SDG-14	0.835		
	SDG-15	0.717		
	SDG-6	0.707		
	SDG-7	0.690		
	SDG-12	0.590		
<i>Factor 2: Social</i>	SDG-4	0.869	0.705	0.747
	SDG-5	0.705		
	SDG-3	0.672		
	SDG-16	0.671		
	SDG-1	0.670		
<i>Factor 3: Economic</i>	SDG-9	0.817	0.671	0.715
	SDG-11	0.814		
	SDG-8	0.763		

The above loadings indicate a positive significance in the SDGs analysed (Hair et al., 2010). It also denotes a positive relationship between the adoption of SP practices and SDGs. Explained variance of 55%, 52% and 63%, respectively were achieved for each of the factors retained, demonstrating good level as noted by Reio and Shuck (2015) who argued that anything greater than 0.40 is acceptable. The above analysis suggests that the environmental aspect of SDGs (Factor 1) has received more attention in the sector. This factor contains six variables (SDG-13, SDG-14, SDG-15, SDG-6, SDG-7 and SDG-12). Factor 3 has three variables within it (SDG-9, SDG-11 and SDG-8) with high factor loadings of 0.817, 0.814 and 0.763, respectively. Factor 2 has five variables (SDG-4, SDG-5, SDG-3, SDG-16 and SDG-1) with high loadings. From the above, it is convincingly clear that SP practices have a positive impact on SDGs. We excluded two variables (SDG-2 and SDG-10) from this analysis because they had factor loadings below 0.50 (Ahmad et al., 2016a). In addition, SDG-17 was deliberately not included in the data collection phase because it was addressed in the body of the questionnaire. Respondents were asked if they participate in UN global compact programmes, 24.5% confirmed their participation against 75.5% who do not.

To ascertain the impact of SP practices on firms' performance, our data collection instrument seeks contextual data as shown in Table 5. Empirically evidence is essential to establish SP impacts, this way recommendation on its implementation can be guided accordingly. Table 5 shows that SP has a positive impact on the key performance measures used in this study with scores (>50%). For example, 92% noted SP has a positive impact on the *quality of products & services* they provide, against 8% who recorded no impact. On *net profit*, 75% recorded positive impact, 21% recorded no impact while 4% recorded some negative impact. Our results demonstrate the necessity to support the use of innovative methods, as against conventional hegemonic approaches.

**Table 5:** Impact of SP practices on key performance measures (%)

Performance measures	Very positive impact	Some positive impact	No impact	Some negative impact	Very negative impact
Quality of products/services	29.4	62.7	7.8	-	-
Net profit	13.7	60.8	21.6	3.9	-
Procurement lead times	14.3	36.7	40.8	6.1	2.0
Reduced costs	20.0	40.0	24.0	16.0	-
Sales/turnover/revenue	16.0	62.0	16.0	6.0	-
Market share	14.9	68.1	8.5	6.4	2.1
Customer loyalty	36.7	51.0	6.1	-	6.1
Reduced risks	35.3	51.0	2.0	9.8	2.0
Innovation	25.5	58.8	5.9	3.9	5.9
Use of advanced technology	14.0	54.0	20.0	10.0	2.0
Competitive advantage	19.6	60.8	13.7	2.0	3.9
Flexibility of processes	12.0	48.0	28.0	2.0	10.0
Internal rate of return	7.8	47.1	29.4	9.8	5.9

## 5. Discussion and Conclusion

The SDGs discourse, although new to the mainstream, has attracted growing interest, mainly because it was implemented as a continuation of the MDGs, a concept adopted in 2000. The efforts of the Nigerian government to achieving these goals or implementing sustainable development remain scanty in all aspect. Growing levels of unemployment, corruption, poverty levels, environmental degradation, social inequalities amongst others has remained prevalent in a country that is blessed with abundant natural resources. Studies, which examined the implementation of sustainable development in Nigeria exist (Adejumo and Adejumo 2014), however, there is a lack of empirical research exploring the role of the procurement function of Nigerian O&G firms with regards to the SDGs. This research addresses this gap and contributes to the growing body of SP and SDGs research especially from a developing country perspective.

The aim of this research was to establish if the procurement function could help in realising the SDGs. Early insights were deduced from the SP definitions provided by respondents. For instance, the respondents made explicit emphasis on economic efficiency as well as minimising the environmental impact of their operations. In addition, findings indicate low consideration of whole-life-costing concept. An explanation for this could be nature of activities within the sector because whole-life-costing is given substantial attention (Young et al., 2016). However, the findings indicated a high level of SP awareness and implementation across the sector. This finding is consistent with other SP research where the adoption of SP practices was evidence (Brammer and Walker, 2011; McMurray et al., 2014; Meehan and Bryde, 2015). The factor loadings in Table 3 clearly shows in hierarchical order, the SP practices with a direct link with SDGs. It is worth noting also that, most of the items in Table 3 are socially associated with the SDGs.

Regarding the impact of SP on SDGs, our findings indicate high co-efficiency as shown in Table 4. The factor loadings for the fourteen SDGs selected for further analysis range between 0.876 – 0.590. The findings demonstrate close links between implementing SP practices and achieving SDGs. Our research framework, which proposed that the adoption of sustainable practice within the procurement function of Nigerian O&G firms could lead to the realisation of SDGs is therefore validated with the research findings, as provided above. Like findings in other studies (Lund-Thomsen and Costa, 2011; McMurray et al., 2014; Walker and Brammer, 2009; Young et al., 2016), our findings demonstrate a positive impact on firm performance as a result of SP implementation. However, some authors are of the opinion that the achievement of the SDGs will exacerbate the challenges currently faced as a result of unsustainable production and consumption patterns (Kopnina, 2016, McKenzie et al., 2015). Kopnina (2016, p. 114) argued that the achievement of the SDGs “...is unlikely to lead to greater social equality and economic prosperity...”. However, this view is far from being conventional (Freistein and Mahler, 2016; United Nations, 2015). Having said this, our principal contribution to the extant literature as envisioned is that the procurement function can help in the pursuit of SDGs by implementing sustainable practices.

## References

- Adejumo, A. V. and Adejumo, O. O. (2014). Prospects for achieving sustainable development through the millennium development goals in Nigeria. *European Journal of Sustainable Development*, 3(1), 33-46. Doi: 10.14207/ejsd.2014.v3n1p33
- Ahmad, W. N. W., Rezaei, J., Tavasszy, L. A. and de Brito, M. P. (2016a). Commitment to and preparedness for sustainable supply chain management in the oil and gas industry. *Journal of Environmental Management*, 180, 202 – 213.
- Ahmad, W. N. W., Rezaei, J., de Brito, M. P. and Tavasszy, L. A. (2016b). The influence of external factors on supply chain sustainability goals of the oil and gas industry. *Resources Policy*, 49, 302–314.
- Ako, R. T. (2012). Re-defining corporate social responsibility (CSR) in Nigeria's post-amnesty oil Industry. *African Journal of Economic and Management Studies*, 3(1), 9 – 22.
- Alabi O. F. and Ntukekpo, S. S. (2012). Oil companies and corporate social responsibility in Nigeria: an empirical assessment of Chevron's community development projects in the Niger delta. *British Journal of Arts and Social Sciences*, 4(2), 361 – 374.
- Alan, C. B. (1998). Comparing the response rate, response speed and response quality of two methods of sending questionnaires: e-mail vs. mail. *International Journal of Market Research*, 40(4), 353.
- Al-Naumani, Y. H. and Rossiter, J. A. (2015). Distributed MPC for upstream oil & gas fields - a practical view. *9th International Symposium on Advanced Control of Chemical Processes, The International Federation of Automatic Control*, June 7-10, Whistler, British Columbia, Canada.
- Ambituuni, A., Amezaga, J. and Emeseh, E. (2014). Analysis of safety and environmental regulations for downstream petroleum industry operations in Nigeria: problems and prospects. *Environmental Development*, 9, 43–60.
- Amujo, O. C., Laninhun, B. A., Otubanjo, O. and Ajala, V. O. (2015). Impact of corporate social irresponsibility on the corporate image and reputation of multinational oil corporations in Nigeria. *Critical Studies on Corporate Responsibility, Governance and Sustainability*, 4, 263-293.
- Aragão, C. G. and Jabbour, C. J. C. (2017). Green training for sustainable procurement? Insights from the Brazilian public sector. *Industrial and Commercial Training*, 49(1), 48-54.
- Bowen, F., Cousins, P., Lamming, R. and Faruk, A. (2001). The role of supply management capabilities in green supply. *Production and Operations Management*, 10(2), 174 - 189.
- Brammer, S. and Walker, H. (2011). Sustainable procurement in the public sector: an international comparative study. *International Journal of Operations & Production Management*, 31(4), 452 – 476.
- Caniëls, M. C.J., Gehrsitz, M. H. and Semeijn, J. (2013). Participation of suppliers in greening supply chains: An empirical analysis of German automotive suppliers. *Journal of Purchasing & Supply Management*, 19, 134–143.
- Carter, C. R. and Dresner, M. (2001). Purchasing's role in environmental management: cross-functional development of grounded theory. *Supply Chain Management*, 37(3), 12-26.
- Carter, C. R. and Rogers, D. S. (2008). A framework of sustainable supply chain management: moving toward new theory. *International Journal of Physical Distribution & Logistics Management*, 38(5), 360-387.
- Crespin-Mazet, F. and Dontenwill, E. (2012). Sustainable procurement: building legitimacy in the supply network. *Journal of Purchasing & Supply Management*, 18(4), 207–217.
- DEFRA (2006). Procuring the future – the sustainable procurement task force national action plan. Retrieved from: <http://www.sustainable-development.gov.uk/publications/procurementactionplan/documents/full-document.pdf>.
- Dode, R. O. (2012). The political economy of resource curse and the Niger Delta crisis in Nigeria: matters arising. *European Journal of Sustainable Development*, 1(2), 235 -247.
- Doloi, H., Sawhney, A., Iyer, K. C. and Rentala, S. (2012). Analysing factors affecting delays in Indian construction projects. *International Journal of Project Management*, 30, 479 – 489.
- DPR (2015). Oil & gas industry annual reports (OGIAR) 2015. Retrieved from <https://dpr.gov.ng/index/>.
- Energy Information Administration (2016). Crude oil disruptions in Nigeria increase as a result of militant attacks. Retrieved from: <https://www.eia.gov/todayinenergy/detail.php?id=27572>.
- Erridge, A. and Hennigan, S. (2012). Sustainable procurement in health and social care in Northern Ireland. *Public Money & Management*, 32(5), 363-370.

- Felix, O. and Ogbor, J. O. (2014). The quest for sustainable development: strategies for managing stakeholder relationships. *European Journal of Business and Management*, 6(35), 179 – 187.
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. 4th Edition, London: Sage Publications Ltd.
- Flynn, B. B., Sakakibara, S., Schroeder, R. G., Bates, K. A. and Flynn, E. J. (1990). Empirical research methods in operations management. *Journal of Operations Management*, 9(2), 250–284.
- Fossgard-Moser, T. (2003). Promoting sustainable development through the enhancement of local employment and supply chain opportunities generated by energy companies: the case of the Shell group. *Greener Management International*, 43, 79-92.
- Freistein, K. and Mahlert, B. (2016). The potential for tackling inequality in the sustainable development goals. *Third World Quarterly*, 37(12), 2139-2155.
- Fricker, R. D. and Schonlau, M. (2002). Advantages and disadvantages of internet research surveys: evidence from the literature. *Field methods*, 14(4), 347-367.
- George, R. A., Siti-Nabihah, A. K., Jalaludin, D. and Abdalla, Y. A. (2016). Barriers to and enablers of sustainability integration in the performance management systems of an oil and gas company. *Journal of Cleaner Production*, 136, 197 – 212.
- Gimenez, C. and Tachizawa, E. M. (2012). Extending sustainability to suppliers: a systematic literature review. *Supply Chain Management: An International Journal*, 17(5), 531 – 543.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E. and Tatham, R. L. (2010). *Multivariate data analysis*. 7th ed. Upper Saddle River (NJ): Prentice-Hall, Inc.
- Hilson, G. (2012). Corporate Social Responsibility in the extractive industries: Experiences from developing countries. *Resources Policy*, 37, 131-137.
- Hughes, W. and Laryea, S. (2013). *Organizing for sustainable procurement: theories, institutions, and practice*. In R. Yao (ed.), *Design and Management of Sustainable Built Environments*, London: Springer-Verlag.
- Hutcheson, G. and Sofroniou, N. (1999). *The multivariate social scientist*. London: Sage Publication Ltd.
- Huq, F. A., Stevenson, M. and Zorzini, M. (2014). Social sustainability in developing country suppliers. *International Journal of Operations & Production Management*, 34(5), 610 – 638. <http://dx.doi.org/10.1108/IJOPM-10-2012-0467>
- Ihuan, U. B. (2010). Local content policy and SMEs sector promotion: The Nigerian oil industry experience. *International Journal of Business and Management*, 5(5), 3-13.
- Ingelson, A. and Nwapi, C. (2014). Environmental impact assessment process for oil, gas and mining projects in Nigeria: a critical analysis. *Law, Environment and Development Journal*, 10(1), 33 – 56.
- Ismail, S. O. and Umukoro, E. G. (2012). Global Impact of Gas Flaring. *Energy and Power Engineering*, 4, 290-302. DOI.org/10.4236/epe.2012.44039.
- Ite, U. E. (2007). Changing times and strategies: Shell's contribution to sustainable community development in the Niger Delta, Nigeria. *Sustainable Development*, 15, 1–14.
- Junior, F. H., Galleli, B., Gallardo-Vázquez, D. and Sánchez-Hernández, M. I. (2017). Strategic aspects in sustainability reporting in oil & gas industry: The comparative case-study of Brazilian Petrobras and Spanish Repsol. *Ecological Indicators*, 72, 203–214.
- Kalubanga, M. (2012). Sustainable procurement: concept, and practical implications for the procurement process. *International Journal of Economics and Management Science*, 1(7), 1–7.
- Kaplan, R. S. (1990). *Measures for Manufacturing Excellence*. Boston: Harvard Business School Press.
- Klassen, R. D. and Whybark, D. C. (2007). Environmental management in operations: the selection of environmental technologies. *Decision Sciences*, 30(3), 601-631.
- Kopnina, H. (2016). The victims of unsustainability: a challenge to sustainable development goals. *International Journal of Sustainable Development & World Ecology*, 23(2), 113-121, DOI: 10.1080/13504509.2015.1111269
- Lund-Thomsen, P. and Costa, N. (2011). Sustainable procurement in the United Nations. *The Journal of Corporate Citizenship*, 42, 55-72.
- Maignan, I., Hillebrand, B. and Mcalister, D. (2002). Managing socially-responsible buying: how to integrate non-economic criteria into the purchasing process. *European Management Journal*, 20(6), 641-648.
- Mansi, M. (2015). Sustainable procurement disclosure practices in central public sector enterprises: evidence from India. *Journal of Purchasing & Supply Management*, 21(2), 125–137.
- Markkanen, P., Galligan, C., Laramie, A., Fisher, J., Sama, S. and Quinn, M. (2015). Understanding sharps injuries in home healthcare: The Safe Home Care qualitative methods study to identify pathways for injury prevention. *BMC Public Health*, 15, 359.

- Matos, S. and Hall, J. (2007). Integrating sustainable development in the supply chain: The case of life cycle assessment in oil and gas and agricultural biotechnology. *Journal of Operations Management*, 25, 1083–1102.
- McKenzie, M., Bieler, A. and McNeil, R. (2015). Education policy mobility: reimagining sustainability in neoliberal times. *Environ Educ Res*, 21, 319–337.
- McMurray, A. J., Islam, M. M., Siwar, C. and Fien, J. (2014). Sustainable procurement in Malaysian organizations: practices, barriers and opportunities. *Journal of Purchasing and Supply Management*, 20(3), 195–207.
- Meehan, J. and Bryde, D. J. (2015). A field-level examination of the adoption of sustainable procurement in the social housing sector. *International Journal of Operations & Production Management*, 35(7), 982–1004.
- Meehan, J. and Bryde, D. (2011). Sustainable procurement practice. *Business Strategy and the Environment*, 20, 94 – 106.
- Mena, C., Van Hoek, R. and Christopher, M. (2014). *Leading procurement strategy: driving value through the supply chain*. London: Kogan Page Limited.
- Mohammad, M. F. (2008). Procurement strategies for the oil and gas industry: to capture changing values and dealing with multicultural complexity. *International Conference on Construction and Building Technology, UNITEN, Malaysia*, 29–38.
- Musa, A., Yusuf, Y., McArdle, L. and Banjoko, G. (2013). Corporate social responsibility in Nigeria's oil and gas industry: the perspective of the industry. *Int. J. Process Management and Benchmarking*, 3(2), 101–135.
- Naoum, S. and Egbu, C. (2015). Critical review of procurement method research in construction Journals. *8th Nordic Conference on Construction Economics and Organization. Procedia Economics and Finance*, 21, 6 – 13.
- Neely, A. D., Gregory, M. and Platts, K. (1995). Performance measurement system design – a literature review and research agenda. *International Journal of Operations and Production Management*, 15(4), 80–116.
- Nijaki, L. K. and Worrel, G. (2012). Procurement for sustainable local economic development. *International Journal of Public Sector Management*, 25(2), 133–153.
- Nwagbara, U. (2013). The effects of social media on environmental sustainability activities of Oil and Gas Multinationals in Nigeria. *Thunderbird International Business Review*, 55(6), 689–697.
- Odoeme, V. C. (2013). Corporate accountability in the Nigerian oil and gas sector: coping with uncertainties. *Commonwealth Law Bulletin*, 39(4), 741–765.
- Odukoya, A. O. (2006). Oil and sustainable development in Nigeria: a case study of the Niger Delta. *J. Hum. Ecol.*, 20(4), 249–258.
- Orji, U. J. (2013). Enhancing sustainable development in Nigeria: a discourse on the legal basis and proposals to strengthen legal and policy strategies for its implementation. *Commonwealth Law Bulletin*, 39(1), 163–197, DOI: 10.1080/03050718.2012.729338
- Reio Jr., T. G. and Shuck, B. (2015). Exploratory factor analysis: implications for theory, research, and practice. *Advances in Developing Human Resources*, 17(1), 12–25.
- Rice, S. (2009). Fair trade: not just for chocolate! *Ice: Sustainability*, 2, 38 – 39.
- Silvestre, B. S., Gimenes, F. A. and Neto, R. S. (2017). A sustainability paradox? Sustainable operations in the offshore oil and gas industry: The case of Petrobras. *Journal of Cleaner Production*, 142, 360 – 370.
- Sue, V. M. and Ritter, L. A. (2007). *Conducting online surveys*. Los Angeles: Sage Publications, Inc.
- Thøgersen, J. (2006). Media attention and the market for 'Green' consumer products. *Business Strategy and the Environment*, 15(3), 145–156.
- United Nations (2015). Transforming our world: the 2030 Agenda for Sustainable Development. *Seventieth session of the General Assembly of the united nation. A/RES/70/1*.
- Walker, H. and Brammer, S. (2009). Sustainable procurement in the United Kingdom public sector. *Supply Chain Management: International Journal*, 14(2), 128–137.
- Walker, H. and Jones, N. (2012). Sustainable supply chain management across the UK private sector. *Supply Chain Management: International Journal*, 17(1), 15–28.
- Walker, H., Miemczyk, J., Johnsen, T. and Spencer, R. (2012). Sustainable procurement: past, present and future. *Journal of Purchasing & Supply Management*, 18(4), 201 – 206.
- Walker, H. and Phillips, W. (2008). Sustainable procurement: emerging issues. *International Journal of Procurement Management*, 2(1), 41 –62. DOI: 10.1504/IJPM.2009.021729

- Wiredu, E. (2016). *Introduction to factor analysis: Factor Analysis Workbook*, Rufford: Data Solutions Services.
- World Commission on Environment and Development (1987). *Our Common Future*. Oxford: Oxford University Press.
- Young, S. Nagpal, S. and Adams, C. A. (2016). Sustainable procurement in Australian and UK universities. *Public Management Review*, 18(7), 993-1016.
- Yusuf, Y. Y., Gunasekaran, A., Musa, A., El-Berishy, N., Abubakar, T. and Ambursa, H. M. (2013). The UK oil and gas supply chains: an empirical analysis of adoption of sustainable measures and performance outcomes. *Int. J. Production Economics*, 146(2), 501 – 514.
- Zhu, Q., Sarkis, J. and Lai, K.-H. (2008). Confirmation of a measurement model for green supply chain management practices implementation. *International Journal of Production Economics*, 111(2), 261-273.