

Embedding Sustainability in the Public Procurement Framework of Developing Countries- An Empirical Analysis of the Lagos State Government

Victor Olalekan Adebayo

Westminster Business School, University of Westminster, London, United Kingdom.

Research Partner, Sustainable Procurement for Africa Network (SPAN), London, United Kingdom

Abstract

The impact of sustainable public procurement on the achievement of the 'triple bottom line' goals of sustainable development is getting increased global attention, however, there is still a paucity of research studies on the effect of sustainable public procurement in developing countries. Developing countries are inundated with a myriad of environmental and socio-economic issues that hamper sustainable development; the notion of sustainable public procurement aims to ameliorate the effects of unsustainable anthropogenic human activities by influencing public procurement frameworks, practices and processes to facilitate a viable and feasible sustainable future. The purpose of this paper is to examine the embedding of sustainability in public procurement decisions in a developing country; in this case, the Lagos State public procurement environment. There are a few studies on the incorporation of sustainable procurement in the public sector of developing countries, this paper contributes to this emerging literature. The paper also contributes to the concepts of sustainability, procurement, the public sector and developing countries literature by amalgamating these four areas into one study. The paper utilised a quantitative approach; specific questionnaire items were developed to collect data relevant to the outlined objectives of the study. Questionnaires were sent to selected procurement professionals in the public sector in Lagos State. 97 questionnaires were returned representing a 48% response rate. The findings of the paper show that, aggregately, there is lack of policy to address the "triple bottom lines" of sustainability. There is also an absence of sustainable procurement in state purchasing decisions and a dearth of sustainability skills across the sector. The paper recommends that the government implements a state wide strategy that will evoke a paradigm shift to greater sustainability awareness within the public sector. The government should also institute a comprehensive skills development programme while category teams could be created to focus on key sustainability areas and align them with public procurement.

Keywords: Sustainable procurement, Sustainability, Developing countries, Public sector, Lagos, Nigeria

1 Introduction

In recent times, there has been an increased universal awareness for the reconsideration of the notion of development, the reassessment of the concept of development based on industrialism, the re-energizing of public awareness on the indeterminate future of the planet and a strengthening focus on sustainability. Willard (2010) stated that the current global economic model is unsustainable and it is threatening continued human existence; according to Rees (1995), the world has reached a unique moment in human ecological history, one that requires a far-reaching realignment of planning values and goals; he further opined that while the environmental footprint of the global economy is already bigger than the planet, a quarter of humanity still lives in poverty, the world population is growing and material demands are amassing. Connelly et al. (2011) agree with Rees (1995), they state that at the root of global problems, such as peak oil supply, global climate change, increasing social exclusion, rising inequality is the failure to integrate social and environmental concerns into economic decision making.

Jacques (2015) provides a historical perspective that analogises the reasons why the notion of sustainability is vitally significant for the continued existence of the human race. He opined that the Roman Empire dominated global commerce and was the cornerstone of western society. The Romans built enormous architectural and engineering edifices; they devised an erudite social structure and imbedded a sophisticated political system. Indeed, the Roman Empire controlled large parts of Europe and its influence stretched to parts of Northern Africa and Western Asia, thereby dominating around two-thirds of global economy during that era.

However; ultimately, the Roman Empire became a victim of its own power, control and utility. Gibbon (1994) explained that as the Roman enlargement and conquest fed the imperial centre, the new territories needed more resources and this led to a convulsion of the social dynamics for governance. As time went on, these needs could not be met adequately, and this eventually led to the disintegration of the Roman Empire.

The aforementioned narrative of the rise and eventual demise of the Roman Empire is comparable to the sustainability challenges the world is facing today; because of increased economic, industrial and commercial activities, the planet is already undergoing the effects of global warming, the degradation of global ecosystems, and a depletion in non-renewable energy resources.

Jacques (2015) contended that, given our knowledge of scientific history, humans like some other previous biological organisms will eventually go extinct; however, this definitive terminal prognosis is not unanimously shared; McCarthy (2009); Change.C (2007); Clarke (1999) argued that an effectual management of nature's resources can lead to a sustainable global future. Berry (2011) postulated that a development model that promotes strong, sustainable communities and one that balances production and consumption within the environmental limits can be created. According to Beddoe et al. (2009), the world is currently experiencing a synergistic crises that is threatening the sustainable future of the world, in other words, immense social or environmental failures in one region affects the entire global system.

An example of these effects can be seen in South-East Asia where vast strips of the rainforest has been eroded using the slash and burn procedures to create palm oil plantations. The erosion of these ecosystems is irremediable and have ultimately led to the endangering of the local wildlife, especially among the Orang-utan population that are currently facing the threat of extinction (Berry, 2011). Similarly, gas flaring and oil spillages in the Niger Delta region of Nigeria has led to immutable damage to the ecosystem and landscape of the local area and environs, affecting vegetation, sea life, human and animal life.

New Copenhagen Climate deal (2009) as cited in Berry (2011) states that:

“Our civilisation is only possible if the basic resources of the atmosphere, oceans, forests and soils and fundamental processes like the climate system and hydrological cycles remain intact”.

In order to create a sustainable future for the human race, it is imperative that resources are used efficiently; there needs to be an appreciation of the impact of commercial choices and a realisation of the importance of sustainable alternatives.

The aim of this research undertaking is to examine and assess the embedding of sustainability in public procurement decisions in a developing country; in this case, the Lagos State public procurement environment.

2. Literature review

The notion of sustainability enables us to reflect on our economic, social and environmental needs. It allows us to take responsibility for how our actions affect our environment, it also requires us to take a long- term view of how our commercial and personal decision making processes to facilitate present needs, does not erode the needs of future generations.

Widely used in literature, the seminal paper by Brundtland et al. (1987) defined sustainability as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. However, Fuller (2008) provided a more encompassing depiction of the term-sustainability; he describes sustainability as making the world work for 100% of humanity, in the shortest possible time, through spontaneous cooperation, without ecological offense or the disadvantage of anyone. Whilst Brundtland et al. (1987) provides an anthropological viewpoint on sustainability which is ostensibly reactive, the description by Fuller (2008) is practical, present and proactive, and seeks to engender attitudinal change over time.

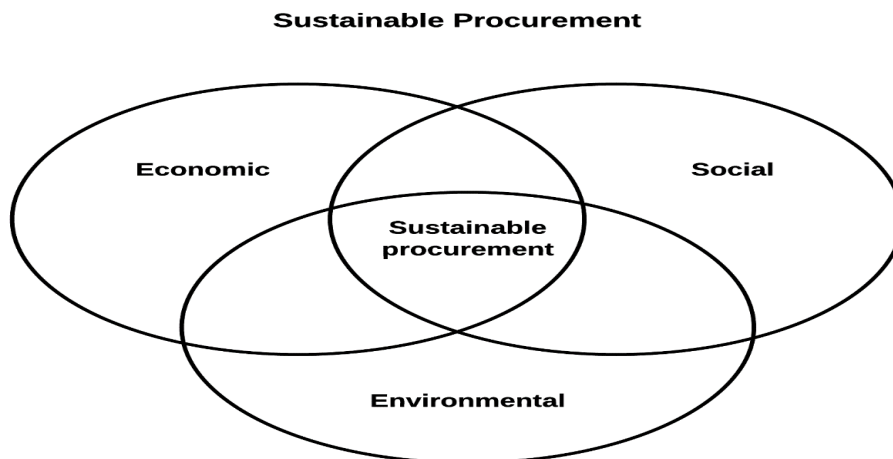
2.1. Sustainable Procurement (SP)

SP attempts to achieve a competitive, responsible and enduring approach to procuring goods and services. Walker and Brammer (2009) defined SP as procurement that is consistent with the principles of sustainable development, such as, ensuring a strong, healthy and just society, living within environmental limits and promoting good governance. Force, S. (2006) described SP as using procurement to support wider economic, social and environmental objectives in ways that offer real long term benefits. Similarly, (Walker and Philips, 2009) depicted SP as achieving development objectives by using the purchasing and supply process in balancing environmental, social and economic objectives.

Defra (2005) added the critical element of whole life cycle evaluation of public procurement decisions by describing SP as the process whereby organisations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only to the organisation but also to the society and the environment. This definition encapsulates the overall fundamentals of SP and it involves the following key elements; (1) Meeting organisational procurement needs; (2) Achieving value for money; (3) Considering whole life cycle of purchases and (4) Benefit to organisation and environment. The Brundtland Commission formerly known as the WCED was set up to further a global cause for sustainable development (Brundtland et al., 1987), the sustainability path of the Commission were driven by three pillars-economic growth, environmental protection, social quality, this is illustrated in Figure 1.

Building on these fundamental pillars of sustainability, Elkington (1998) formulated the notion of the “triple bottom line”, which explains that sustainability is the interrelationship of economic, environmental and social dimensions.

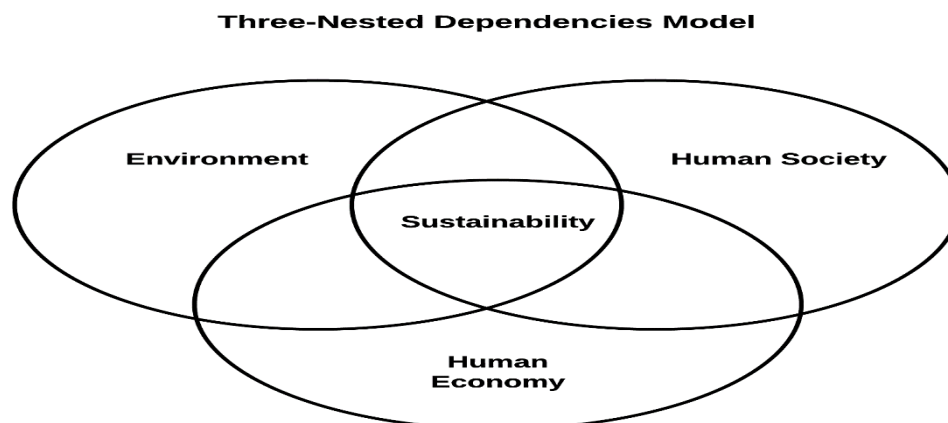
Figure 1: Triple Bottom Line of Sustainability



Source: Elkington (1998)

Senge et al. (2009) further expounded on this concept by developing the three-nested dependency model that reveals an interdependence relationship, (see Figure 2). It represents humans as a supplement of the environment where they develop economic models to improve their quality of life.

Figure 2: The Three Dependencies Model



Source: Senge et al. (2009)

2.2. Public Procurement and sustainability

Brammer and Walker (2007) emphasized the importance of national policy and sustainable procurement; McCrudden (2004) suggested public procurement can be used for (i) improving labour standards and employment; (ii) expansion of anti-discrimination; (iii) social globalisation and linkages, (iv) equality. Nijaki and Worrel (2011) inferred that public procurement can lead to economic development, economic equity and environmental benefits.

Putting these into perspective, the central question is, why is public procurement regarded as an important vehicle for entrenching and fostering global sustainability?

OECD (2013) stated that public procurement accounts for a substantial percentage of global spending and total GDP. They estimated that OECD member nations spend over 12% of GDP on public procurement (representing around \$5.026 trillion). According to the European Commission EC (2014), public procurement makes up a substantial share of world trade flows, amounting to €10 trillion per year. Public procurement in the EU area accounts for 16% of GDP (\$2.95 trillion in monetary terms).

In Nigeria, 45% of total government expenditure which is N4.45 trillion (approximately \$25 billion) will be spent on personnel, overhead and operational costs in 2015; it is estimated that over N2 trillion (equivalent of \$10 billion) will be expended on government procurement in 2015 (BudgIT, 2015). The trend is similar in most countries as governments spend a significant percentage of their national revenue on public procurement. In the Netherlands, 45% of GDP is spent on public procurement; in South Korea, it is 40% of GDP. Canada, Poland and the UK spend 33%, 32% and 31% of their GDP, in that order, on public procurement.

The USA with a GDP of \$16 trillion spends around 28% of this on Public procurement. (OECD, 2015; OGC, 2011; Trading Economics, 2015; World Bank, 2015).

Indeed, there is greater appreciation that public procurement can be a political and social apparatus for engendering sustainable goals. Governments across the world are intensifying efforts to engrain sustainability into their procurement decisions. Berry (2011) postulated that sustainable procurement can (1) Minimize negative impacts of goods, works and services across their lifecycle and throughout the supply chain; (2) Minimize demand for resources; (3) Ensure that fair contract prices are applied and certify they meet minimum ethical, human rights and employment standards and (4) Promote diversity and equality throughout the supply chain.

The prospects of public procurement decisions and activities fostering the facilitation and embedding of sustainability has led to an increased interest on how to achieve value for money, while also achieving social goals, thereby, enabling a lesser adverse impact on the environment. From the abovementioned, sustainable procurement can be a pragmatic instrument in accomplishing sustainability objectives.

2.3. SP in developing countries

Doberstein (2008) posited that with increasing environmental issues and depleting resources, the application of green procurement is needed and its impact will be greater in developing countries as it helps to enhance sustainable development and facilitates the procurement of sustainable goods and services. The paper explains that China, the largest developing country in the world, has experienced immense industrial growth and attracted huge inward foreign investment; nonetheless, there has always been concerns that the high level of industrialisation could have an environmental impact on the country's resources.

According to Ehui and Spenser (1993), SSA is the only region of the world where per-capita food production has steadily declined over the past two decades. They highlight that the challenge faced by decision makers in many nations in SSA is how to feed an increasing population without causing irremediable damage to the natural resource base.

More recently, Amigun et al. (2010) lists sustainability issues relevant to Africa as (i) food versus fuels, (ii) land use and tenure security, (iii) climate change and environment, (iv) impact on poverty alleviation, (v) biofuel policies and strategies.

However, Baptista (2014) provided a marginally dissenting, alternative perspective to the debate, he opined that demanding a sustainable future for the planet legitimizes the ideology of sustainability to provide the world with representations, values, goals and conduct. According to the author, societies have increasingly become idealised by a global elite who are using the ongoing universalisation of sustainability in conquering new territories like Africa through an intense battle taking place in the field of representations. However, this perspective disregards the definite representations of the negative impact of environmental degradation, global warming, and the rapid depletion in non-renewable energy sources. More importantly, it discounts the threat of a growing world population on the sustainability of the planet; especially in developing countries.

2.4. Increasing world population and its effects on sustainability

UNPD (2015) reported that the total world population figures reached 7.3 billion in the middle of 2015; this means that an additional 1 billion people have been born since 2003. The report also states that the vast majority of the world population live in developing countries (4.4 billion people live in Asia representing 60% of the world population; 16% live in Africa with a total population of 1.2 billion people and 634 million in Latin America and the Caribbean representing 9% of total world population).

The UNPD report projects that by 2030 (15 years from now), total world population will be between 8.4 billion and 8.6 billion, this will represent an increase of 13% to 15%, and by the beginning of next century in 2100, total global population will be between 9.5 billion and 13.3 billion (UNPD, 2015), an increase of between 23.1% and 45.1% from current figures.

This increase in human population means that there will be an intensification in industrial, commercial, financial, economic, social, and governmental activities to meet global economic and material demand. The consequential effect of this is that it will further impact on global sustainability and the future of the environment.

The impact is expected to be more pronounced in Africa. UNPD (2015) reported that over half of the total world population growth from 2015 to 2050 will occur in Africa. Actually, the continent had an average population annual growth rate of 2.55% from 2010 to 2015. Consequently, the report estimates that from 2015 to 2050, there will be an addition of 2.4 billion to world population, out of which, 1.3 billion will be Africans; this effectively indicates that the continent will be accountable for 54% of the world population growth rate between 2015 and 2050.

Table 1: Countries that will account for 75% of World Population from 2050 and 2100

Rank	Country or area	Population in 2050 (millions)	Cumulated percentage	Rank	Country or area	Population in 2100 (millions)	Cumulated percentage
1.	India	1 705	17.5	1.	India	1 660	14.8
2.	China	1 348	31.4	2.	China	1 004	23.8
3.	Nigeria	399	35.5	3.	Nigeria	752	30.5
4.	United States of America	389	39.5	4.	United States of America	450	34.5
5.	Indonesia	321	42.8	5.	Dem. Rep. of the Congo	389	38.0
6.	Pakistan	310	46.0	6.	Pakistan	364	41.2
7.	Brazil	238	48.4	7.	Indonesia	314	44.0
8.	Bangladesh	202	50.5	8.	United Rep. of Tanzania	299	46.7
9.	Dem. Rep. of the Congo	195	52.5	9.	Ethiopia	243	48.8
10.	Ethiopia	188	54.5	10.	Niger	209	50.7
11.	Mexico	164	56.1	11.	Uganda	203	52.5
12.	Egypt	151	57.7	12.	Egypt	201	54.3
13.	Philippines	148	59.2	13.	Brazil	200	56.1
14.	United Rep. of Tanzania	137	60.6	14.	Bangladesh	170	57.6
15.	Russian Federation	129	62.0	15.	Philippines	169	59.1
16.	Viet Nam	113	63.1	16.	Iraq	164	60.6
17.	Japan	107	64.2	17.	Kenya	157	62.0
18.	Uganda	102	65.3	18.	Mexico	148	63.3
19.	Turkey	96	66.3	19.	Angola	139	64.5
20.	Kenya	96	67.2	20.	Mozambique	128	65.7
21.	Iran (Islamic Republic of)	92	68.2	21.	Sudan	127	66.8
22.	Iraq	84	69.0	22.	Russian Federation	117	67.8
23.	Sudan	80	69.9	23.	Madagascar	105	68.8
24.	United Kingdom	75	70.6	24.	Viet Nam	105	69.7
25.	Germany	75	71.4	25.	Zambia	105	70.7
26.	Niger	72	72.2	26.	Côte d'Ivoire	101	71.6
27.	France	71	72.9	27.	Mali	93	72.4
28.	Mozambique	66	73.6	28.	Turkey	88	73.2
29.	South Africa	66	74.2	29.	Malawi	87	73.9
30.	Angola	65	74.9	30.	Japan	83	74.7
31.	Myanmar	64	75.6	31.	Cameroon	82	75.4

Source: United Nations Population Division UNPD, (2015)

Significantly, Nigeria is expected to top the list of the population increase in Africa. Nigeria's current population, as at July 2015, is estimated to be 183,523,432 (UN, 2015); World Population Review (2015) explained that in 1960, the Nigerian population stood at 45.2 million people, this represents an increase of almost 275% between 1960 and 2015.

It is estimated that the Nigerian population will surpass the USA by 2050 (see Table 1), when its population is expected to hit the 400 million mark; in this year, it is projected to be the third largest country in the world, closely behind China and India. By the year 2100, it is expected to have a population of almost three quarters of a billion at 725 million. Whilst this may represent promising economic opportunities for Nigeria due to the resulting increase in human capital/ resources and market size, which in the long run could improve her pecuniary conditions; however, given historical and current realities, it would create adversative sustainability challenges; most notably in terms of environmental degradation, further depletion of resources and dilapidation of the ecosystem.

In order to provide for an ever increasing population, Nigeria will have to expand its industrial base and exponentially increase economic and commercial activities.

Indeed, it is already doing that.

Rencap (2014) as cited in Oladunjoye (2014) reported that manufacturing is becoming the engine of growth, the study shows that there was an increase in manufacturing capacity utilisation from 46.3 per cent recorded in the first half of 2013 to 52.7 per cent in the 2nd half of 2013.

According to Oladunjoye (2014), after the Nigerian GDP figures were rebased in 2013, the manufacturing sector grew into a much bigger, faster-growing sector (nine per cent of GDP as against the four per cent in 2012). In 2013, it recorded substantial growth of 22 per cent (as against 14 per cent in 2012), which effectively represents 30% of total growth.

2.5. Sustainability challenges in Nigeria; the case of the Niger Delta

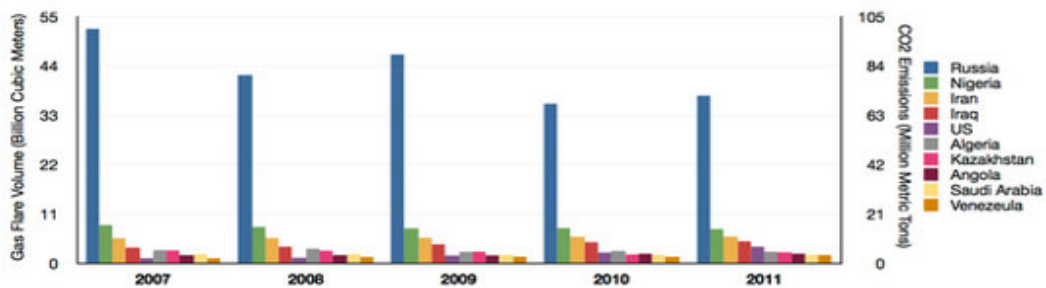
Since the discovery of oil deposits in Oloibiri, present day Bayelsa State in the Niger Delta region of Nigeria, the West African nation has made significant gains economically. After Nigeria gained independence from Britain in 1960, the country has generated a total revenue of over \$600 billion in oil proceeds (Yale, 2009), with another \$400 billion purportedly misappropriated (Economist, 2012), the aggregate of which represents an approximate

\$1 trillion in total oil revenue. Despite this huge financial proceeds, there has been a multitude of negative environmental consequences in the region, including pollution, oil spillages, salinization, alkalisation and many more negative environmental imports. These have had a damaging resultant consequence on the human population in the Niger Delta region. The effects of these damages have yet to be wholly (i.e. statistically and scientifically) quantified in economic, material and human terms.

Etuonovbe (2009) stated that there has been a proliferation of slums in urban areas, unsanitary and unsafe housing, congestion of traffic and houses. In terms of specific environmental costs, it has led to air, noise and water pollution; it has also resulted in solid waste, which leads to diseases in the local population. Uchegbu (2002) as cited in Etuonovbe (2009) explained that spillages has led to a lasting damage to the ecosystem in the Niger Delta affecting fishing grounds, rain forests, sea-life and mangroves.

Additionally, according to Ogwu et al (2015), there is substantial gas flaring in the Niger Delta; this assertion is corroborated by (AAAS.org, 2011; Tawari and Abowei; 2012, Ismail and Umukoro, 2012). Ebrahim and Freidrichs (2013), stated that Nigeria is the second highest gas flaring country in the world behind Russia (see figures 4 and 5), emitting around \$1.8 billion worth of gas annually.

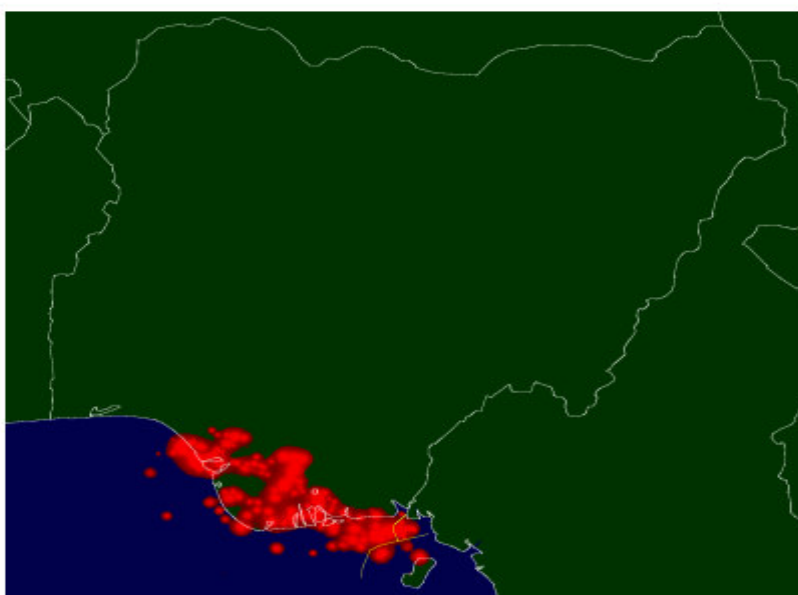
Figure 4: Volume of gas flared (Left axis) and equivalent CO₂ emissions (Right axis)



Source: Ebrahim and Freidrichs (2013)

Medical and biological scientists indicate that gas flaring leads to premature deaths, respiratory illnesses and cancerogenic diseases; it is also detrimental to vegetation and a main source of greenhouse gas emissions (Ogwu et al, 2015; Tawari and Abowei, 2012; Ismail and Umukoro, 2012; Friends of Earth, 2005; Richard.k. Lattanzio, 2013). The gas flared in Nigeria is composed of carbon dioxide, methane, nitrous oxide and chlorofluorocarbons (Adu,E.B, 2013; Umoh, V. A., & Peters, E, 2014); these gases lead to a greenhouse effect, result in global warming, rise in sea levels, soil erosion, flooding and draughts. (EPA, 2014; Brinkman, Sombroek, 1996; Corrine Kisner, 2008).

Figure 5: Satellite Picture of Gas flames in the Niger Delta of Nigeria



Source: Ebrahim and Freidrichs (2013)

Isidiho and Sabran, (2015) stated that the environmental degradation in the Niger Delta region has led to the loss of millions of lives, the dehumanisation of a large part of the Niger Delta population and has left a vast part of the area virtually unliveable.

The case of the Niger Delta is an exemplification of the effects of uncontrolled industrialisation and political let-down. It represents the failure of corporate social responsibility (private sector) on the one hand and more relevantly, immense public policy failure on the part of past Nigerian administrations on the other hand. Essentially, it epitomises the effects of the lack of importance towards sustainability and the resulting effects on both the present and the future generations.

Could a well-articulated and enforced sustainable public procurement policy have avoided or curtailed these issues?

An all-encompassing SP policy can be a tool in implanting sustainability across the supply chain of any economic and industrial sector. This is especially relevant in Oil and Gas/Petroleum contracts in Nigeria where most oil extraction, processing, refining, transportation and supply are based on joint venture agreement frameworks; principally, the Nigerian government has significant influence across the Oil and Gas/Petroleum value chain.

Going forward, the key question and the central aim of this research is to examine the current state of sustainability and sustainable procurement in Nigeria.

3. Current solutions and limitations

From existing literature, most studies mainly focus on SP in developed economies, (Brammer and Walker, 2007; McCrudden, 2004; Senge et al., 2008; Willard, 2012). There has been very little research on the incorporation of sustainability in public procurement in developing countries and little empirical research has been conducted on SP in Sub-Saharan Africa (SSA).

4. Research objectives

The main aim of this research undertaking is to examine and assess the embedding of sustainability in public procurement decisions in a developing country; with the view of understanding the level in which environmental, social and economic sustainability have been embedded in a developing country, in this case, the Lagos State public procurement environment. The paper will also measure the associated bottlenecks in implementing SP in public sector organisations in developing countries.

4.1. Research focus

This research paper will specifically focus on Lagos State in Nigeria. It was chosen for this research because it is regarded as the commercial nerve centre of Nigeria which is the largest economy in Africa by GDP figures.

Nwagwu and Oni (2015) posited that if taken as a country, Lagos would be among the largest economies in Africa. It has a diversified economy and unlike most states in Nigeria, it is less dependent on oil allocations. ADB (2011) reports that although Lagos represents a minute geographical part of Nigeria with a landmass of 3475.1 km² (representing approximately 4% of the total Nigerian land mass), it accounts for 60% of industrial and commercial activities in the country. 75% of its revenues is internally generated and as of 2010, its GDP was approximately \$80 billion which will make it the 11th largest economy in Africa. It has a population of circa 22 million (UN, 2015) which makes it the seventh fastest growing city in the world. Lagos State also dominates the manufacturing production base in Nigeria. Its manufacturing base was valued at \$600 million in the first six months of 2014 (MAN, 2014). This accounts for almost half of the production value of the entire country. Table 2 show that the manufacturing production values for industrial zones in Lagos State accounts for approximately 48% of the entire country.

Table 2: Manufacturing production values for Nigeria in the first half of 2014

Industrial Zone	1st Half 2014 (N)	
Edo/Delta	1,235,271,246.85	0.46%
Imo/Abia	1,151,836,109.28	0.43%
Oyo/Ondo/Osun/Ekiti	3,057,100,000.00	1.13%
Kano/Sharada/Challawa	31,874,458,069.70	11.77%
Kaduna	3,465,794,165.14	1.28%
Ogun	59,208,165,262.09	21.86%
Kano Bompai	8,693,574,821.74	3.21%
Apapa (Lagos)	342,000,000.00	0.13%
Ikeja (Lagos)	125,677,285,240.00	46.40%
Anambra/Enugu	5,017,286,362.70	1.85%
Bauchi/Benue/Plateau	30,404,673,240.00	11.23%
Rivers	708,700,000.00	0.26%
TOTAL	270,856,144,517.50	

Source: Manufacturing Association of Nigeria (2014)

4.2. The Lagos State public sector

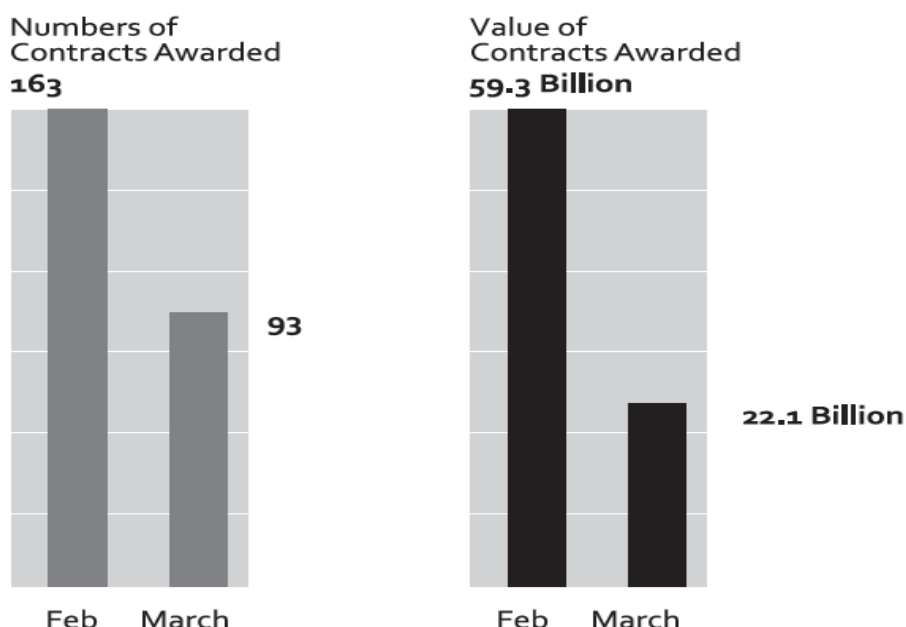
The Lagos State Civil Service Commission has 24 ministries and 107 Parastatals; latest available figures from 2012 indicates that it employs 119, 347 staff (Lagos State Government, 2012).

The state also has the largest budget of all the 36 states in Nigeria. In November 2014, the Lagos State government passed a budget estimate of \$2.46 billion for 2015 (BudgIT, 2015); this budget figure is larger than most West African nations; for instance, it is bigger than the budget of Togo in 2015 which was \$1.72 billion (Reuters, 2014) and six times greater than the 2015 budget for Sierra Leone which was \$400 million (Trading Economics, 2015).

4.2.1. Public Procurement in Lagos State

The Lagos State Public Procurement Agency (LSPPA) was established on the 2nd of April 2012 under the Lagos State Public procurement Law of 2011.

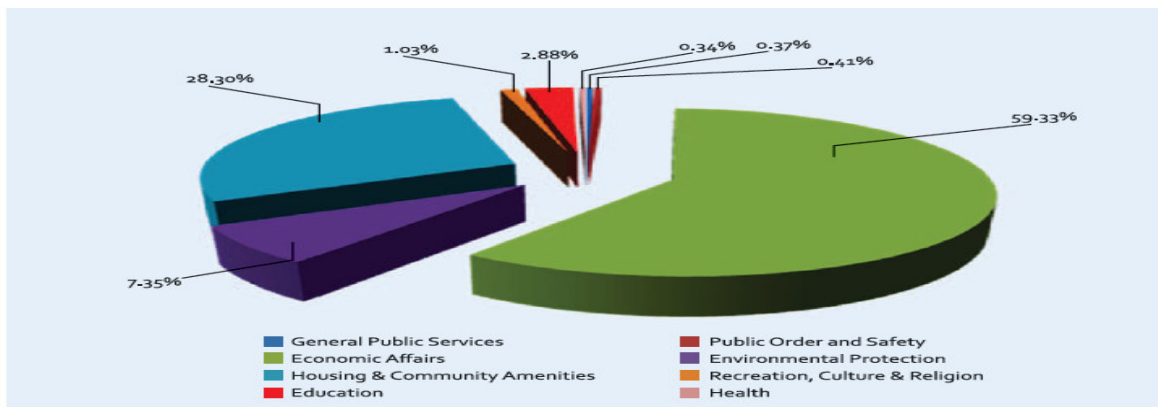
Figure 6: Number of contracts awarded and the value of contracts awarded



Source: LSPPA (2014)

Figure 6 shows that between February and March 2015, a total of 256 contracts were awarded by the LSPPA and these were valued at a combined \$407 million. Figure 7 shows a breakdown of contracts awarded and their value in Naira.

Figure 7: Breakdown of Contracts between February and March 2015



Source: LSPPA (2015)

5. Methodology

For this study, a quantitative analysis was conducted; specific questionnaire items were developed to collect data relevant to the outlined objectives of the study. Specifically, the study employed a cross-sectional field study survey method, using online questionnaires that was sent to selected professionals who work in public sector procurement in Lagos State; this consisted of staff in (Local government, State government, Federal government, Parastatals, Research organisations, External consultancies).

The questionnaires were sent to 201 selected procurement officials in Lagos State. To maintain privacy, the respondents were assured of complete confidentiality. A response of 97 was received, this represents a response rate of 48.2%. Data analysis was carried out utilising the statistical software- SPSS.

6. Results and data presentation

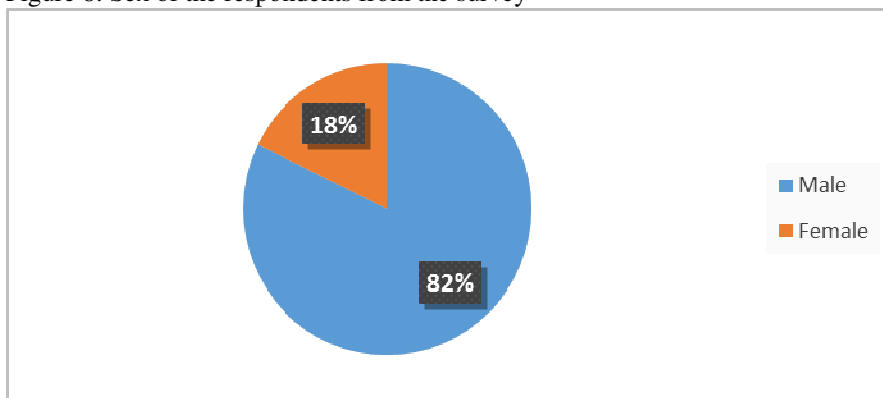
In this section, the results of the quantitative study will be expounded and analysed.

6.1. Demographic results

A total of 97 people responded to the questionnaires representing a response rate of 48.2%. The majority of the respondents, (62.5%) stated that they fall into the procurement officers/Procurement analyst/officer Level, (14.58%) specified that they are graduate/entry level staff, (13.54%) of the respondents are at the manager/senior executive cadre. 5.2% were contract or temporary staff.

45.36% of the respondents work in a state government ministry, 30.93% work in a local government office, 15.46% work in a government parastatal which is the equivalent of Quangos in Western Europe. 82.29% of the respondents were male while 17.71% were females as depicted in figure 8.

Figure 8: Sex of the respondents from the survey



Source: Author's computation from survey results

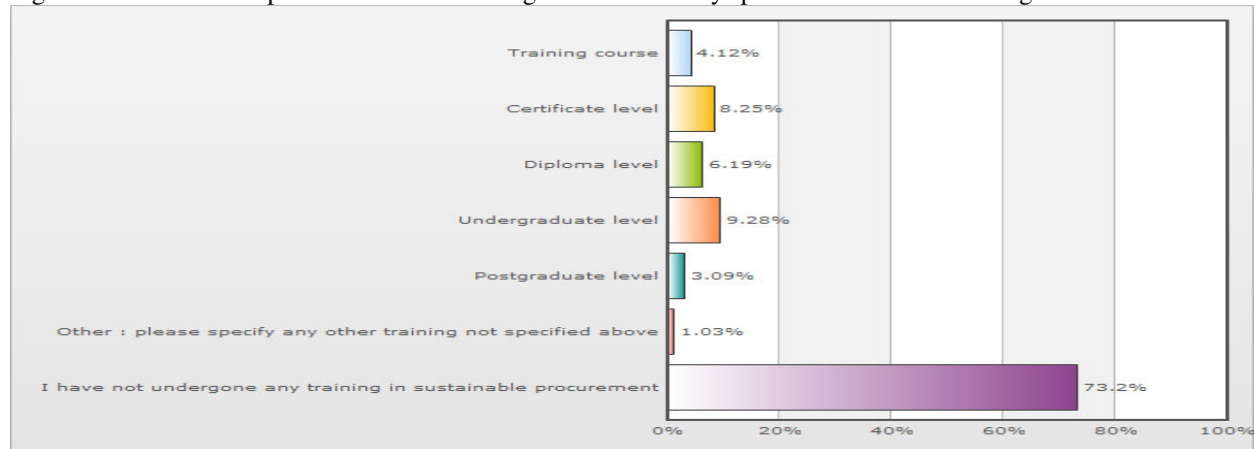
34.02% specified post-secondary/diploma as their highest educational qualification, 31.96% had HND and equivalent, 25.77% had a Bachelor's degree, and 7.22% had a master's degree while 1 of the respondents had a doctorate degree.

6.2. Sustainability training and experience

The report sought to establish the sustainability training, awareness and education of the respondents. 84.54%

indicated that they had no sustainable procurement experience, 7.22% said that they had less than 1 year experience, 7.22% had 1-2 years' experience and 1.03% had 3-5 years' experience.

Figure 9: Number of respondents that had undergone sustainability specific educational training



Source: Author's computation from survey results

The survey asked the respondents if they had undergone any specific sustainability training, as depicted in Figure 9, 73.2% said that they had not undergone any training.

Respondents were asked to score their level of awareness of sustainable procurement on a scale of 1-10, the average score was 2.1 indicating a low awareness of sustainability in the procurement departments in the Lagos State public sector.

6.3. Sustainability policy

The respondents were asked if their organisations had a sustainability policy, 80.21% of the answers were negative. The responses was similar when the survey asked respondents if their organisation had a department dedicated to sustainability, 97.89% answered in the negative.

Respondents were asked if their organisations had a sustainable procurement policy in place, 39.18% said that they had one while 58.76% said they did not.

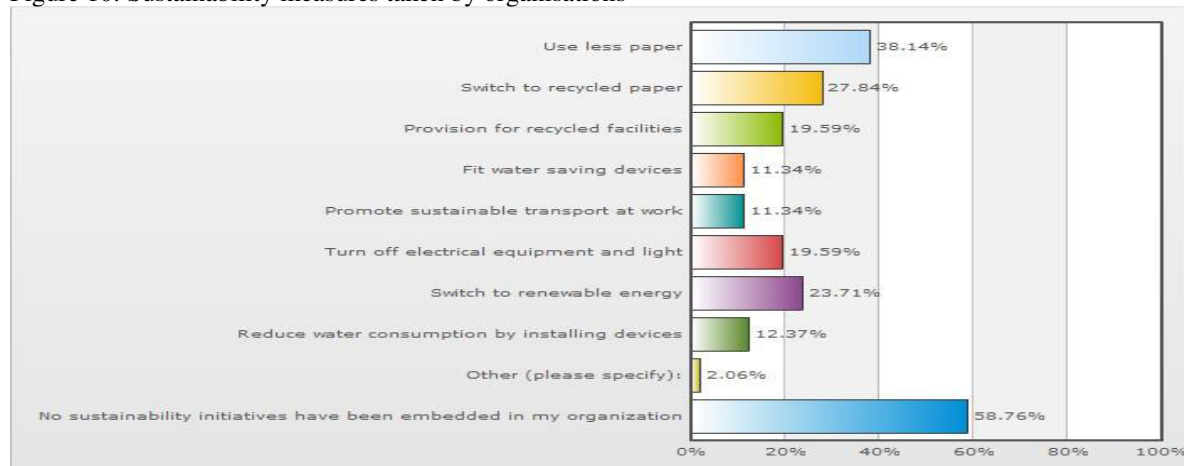
6.4. Importance of SP

When respondents asked how important sustainable procurement is within their organisation, 51.55% specified that it was not considered in their organisation, 28.87% indicated that it was not important, while 19.59% indicated that it was important.

The paper also measured the degree to which organisations have included specific sustainability criteria into the tenders, 81.44% indicated that they had not done so.

Figure 10 shows that 58.76% of the respondents said that their organisations had not embedded any sustainability policies. 38.14% indicated they had a policy of using less paper, 27.84% have switched to recycled papers, 23.71% have switched to renewable energy, 19.59% had provisions for recycled facilities, and 19% turn off electrical equipment and light.

Figure 10: Sustainability measures taken by organisations



Source: Author's computation from survey results

6.5. Lifecycle Analysis

From results from the survey, 52.6% of the respondents indicated that their organisation do not use lifecycle analysis to evaluate sustainability, 35.1% indicate that it does occur in their organisations but not consistently.

6.6. Procurement policy

The paper measured the organisation's procurement objectives and how they are developed. 55.7% of respondents say that their organisations have a formal procurement strategy but there is no consistency. 52.6% agreed that their organisations periodically review and update their policy while 32% indicated that they did not. 61.9% of the respondents indicated that they had clearly documented supplier management policies, 54.6% specified that their organisations operated a supplier appraisal performance monitoring system but that it lacks consistency, while 3.1% indicated it was fully ingrained into their daily procurement operations.

6.7. Procurement processes

62% of the respondents indicated that although their organisations measure the effectiveness of their procurement performance, it lacked consistency, 11.3% indicated it could be better. 61% of the respondents stipulated that the organisations measure the effectiveness of key procurement processes but it lacks regularity. 62.9% indicated that responsibility for improving procurement results was clearly defined.

6.8. Partnership and supplier relations

The survey also measured how organisations use their assets and how they create partnerships with their suppliers. When the respondents were asked if their departments develop and manage their relationship with suppliers to create mutually beneficial interactions, 39.2% disagreed, 5.2% were uncertain, 43.5% agreed with this statement but indicated that it was inconsistent. 52.6% of the respondents indicated that had systems and processes to monitor and control the department's procurement operating costs but it was inconsistent.

57.6% of the respondents indicated that their procurement department did not play an active role in managing capital and project spend while 67% specified that their organisation did not have a robust procurement data repository capable of conducting extensive procurement spend analysis.

6.9. Triple bottom line dimensions in Lagos State public procurement

The paper measured the environmental, social and economic aspects of sustainability that had been embedded in the respondent's organisations.

6.9.1. Environmental aspects of sustainability

In terms of the organisations environmental performance, 35.9% of the respondents agreed that their organisations had incorporated energy wastage into their sustainability strategies. 30.9% were uncertain while 29% disagreed. 34% agreed that their organisations had embedded water pollution schemes while 33% disagreed.

50.5% of the respondents disagreed that their organisations had embedded chemical releases strategies while 25.8% agreed.

62.9% agreed that their organisations had incorporated air pollution measures; 53.6% of the respondents disagreed that their organisations had deforestation measures in place, while 27.8 strongly disagreed.

Table 3: Mean rating of environmental aspects of sustainability

	Mean	Standard Deviation	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
Energy Wastage	3.05	0.9	(2) 2.10%	(29) 29.9%	(30) 30.9%	(34) 35.1%	(2) 2.1%
Water pollution	3.01	0.91	(2) 2%	(32) 33.0%	(28) 28.9%	(33) 34%	(2) 2.1%
Chemical pollution	2.75	0.89	(1) 1%	(49) 50.5%	(21) 21.6%	(25) 25.8%	(1) 1.0%
Waste and by-products	3.0	0.92	(1) 1.0%	(36) 37.1%	(24) 24.7%	(34) 35.1%	(2) 2.1%
Air pollution	3.51	0.84	(1) 1.0%	(16) 16.5%	(16) 16.5%	(61) 61.5%	(3) 3%
Deforestation	1.94	0.74	(27) 27.8%	(52) 53.6%	(15) 15.5%	(3) 3.1%	(0) 0.0%
Emissions to air	3.11	0.88	(3) 3.1%	(22) 22.7%	(33) 34.4%	(39) 40.2%	(0) 0%
Protection of endangered species	1.82	0.75	(35) 36.1%	(46) 47.4%	(14) 14.4%	(2) 2.1%	(0) 0.0%

6.9.2. Social aspects of sustainability

The respondents were asked if their organisations encourage a diverse of competitive suppliers, 35.1% disagreed, 34% agreed while 27.8% were uncertain.

When they were asked if their procurement practices supports fair employment practices, 41.7% disagreed, 25.8% were uncertain while 32% disagreed. The respondents were asked if they ensured that their suppliers promote employee welfare, 56% disagreed, 17.5% were uncertain while 20.64% agreed.

70.8% of the respondents disagreed when they were asked if their procurement practices enable training opportunities and skills development, 13.5% were uncertain while 10% agreed. 49% agreed that procurement practices leads to community benefits while an overwhelming 66% of the respondents disagreed that their procurement decisions facilitates local SME participation.

6.9.3. Economic aspects of sustainability

The paper asked respondents if their organisation’s procurement strategy leads to job creation, 40.2% were uncertain while 46.4% disagreed. Only 9.3% of the respondents agreed. 53.6% strongly disagreed when asked if they use life cycle costing in their procurement framework, while 33% disagreed.

When the survey enquired if their procurement frameworks reduce entry barriers, 57.7% agreed while 50% agreed that their procurement practices ensures supplier agreements are competitive and fair.

6.10. Other factors

The research was also interested in establishing the main aspects the procurement organisations in the Lagos State public sector consider when selecting a supplier.

As depicted in Table 4, cost of procurement projects was the most important element when organisations select suppliers; appositely, sustainability was the least considered element in selecting suppliers

Table 4: Main aspects in selecting suppliers

Main aspects considered in selecting suppliers. Ranked in order of importance.

Item	Total Score ₁	Overall rank
Cost	791	1
Financial capacity	651	2
Quality of goods and services	642	3
Reputation	553	4
Reliability	515	5
Service level	436	6
Customer focus	393	7
Innovation	250	8
sustainability	134	9

₁ Score is a weighted calculation. Items ranked first are valued higher than the following ranks, the score is a sum of all weighted rank counts.

7. Discussion

The dearth of significance accorded to sustainability in the Lagos public sector is clearly epitomised by the fact that none of the respondents had the designation of sustainable procurement or sustainability officer.

Additionally, the vast majority of the respondents (84%) stated that they had no sustainability procurement experience, while 73% of had not undergone any specific sustainability training.

The results also indicate that most public sector organisations in Lagos State do not have a sustainability policy. 97% of the respondents indicated that their organisations did not have any departments dedicated to sustainability. However, some of the organisations have incorporated sustainability into their procurement decisions. This implies that some organisations acknowledge the sustainability challenge, indeed, some of the organisations are already embedding sustainability initiatives even in the absence of a policy framework.

The results show that public sector organisations in Lagos State do not utilise whole lifecycle costing in evaluating the sustainability of their procurement decisions and do not ask their suppliers to commit to waste reduction goals. These sustainability shortcomings are as a result of a lack of comprehensive and organisation-wide sustainability policy.

The survey results also indicate that the public procurement organisations in Lagos State are still at the independent-supportive level of the Reck and Long purchasing development model (Reck and Long, 1988), the results indicate that there is a dis-alignment between strategic direction and the organisation's strategic goals. The main principles of these organisations are still based on the principles of cost reduction and supplier relationship management is not yet optimised.

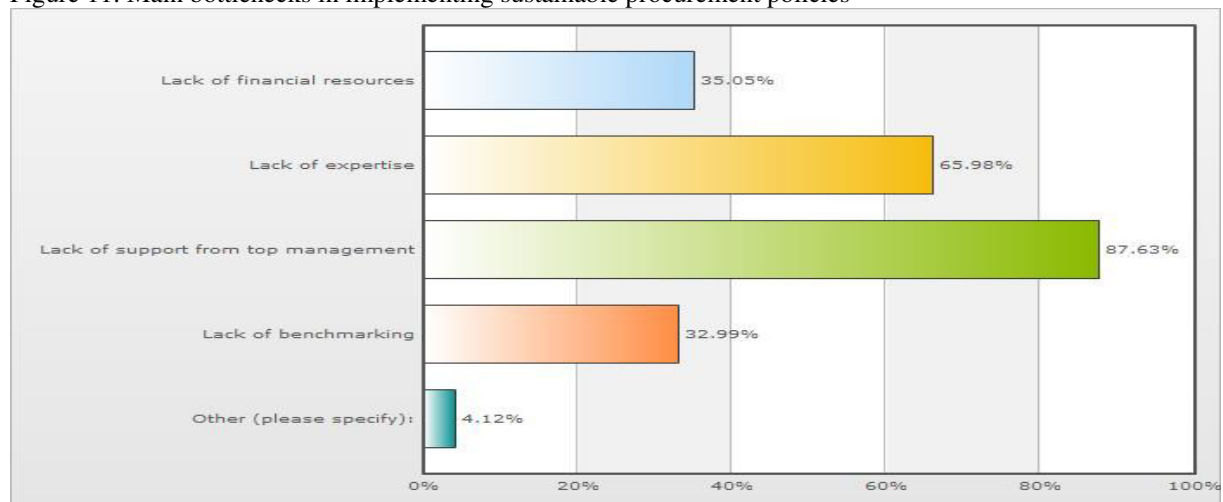
7.1. Triple bottom line

Willard (2010); Brammer and Walker (2007); Elkington (1998) and Smith et al. (2008) have articulated the importance of the incorporation of the triple bottom line i.e. Economic, Social and Governance (ESG) in public policy.

The results suggests that the public sector in Lagos has not optimised opportunities and the possibilities of embedding environmental, economic and social aspects of sustainability into their organisations. There is inconclusive evidence that the organisations encourage a diverse base of suppliers, this is an action that is required to improve economic conditions especially at the local level. The majority of the respondents indicated that their procurement practices do not support fair employment practices, the results also specify that procurement practices do not create training opportunities and skill development, an important tool for increasing social inclusivity and mobility. Results also indicate a low appreciation for SME participation in public procurement, which is an important tool in achieving local economic development.

The results of the survey is in consonance with other works from the body of literature, (McCarthy 2009; Clarke, 2008). The absence of management support and the lack of expertise were the main challenges in implementing sustainable procurement in public organisations in the state. However, the lack of financial resources and benchmarking were also highlighted as major bottlenecks. It is instructional to state that 4.12% of the (other) option to this section of the survey as seen in Figure 11 stated that (1) lack of organisational interest, (2) lack of vision. One of the respondents said that "*sustainability is just not important in my organisation*".

Figure 11: Main bottlenecks in implementing sustainable procurement policies



Source: Author's computation from survey results

8. Recommendations and policy implications

8.1. Recommendations

Based on the findings of the research, the paper makes the following recommendations:

1. The government should implement a public sector sustainability policy that will evoke a paradigm shift to greater sustainability awareness within the Lagos State public sector.
2. A sustainable procurement policy should be formulated to incorporate the “triple bottom line” into public procurement framework.
3. A material valuation should be carried out in order to identify the relative importance of key ESG issues.
4. The government should implement a comprehensive skills development programme to sensitize the workforce on the importance of sustainability.
5. Sustainability teams should be created to focus on key areas and align them with public procurement.
6. Whole life cycle evaluations should be adopted in procurement decision making processes and there should be improvements in procurement processes to optimise performance.
7. It is also important that the procurement departments are independent of oversight from the finance departments. The functional organisational relationship should be collegiate and not reliant.

8.2. Policy implications

This research is relevant for governments, especially in developing countries where sustainability policies are yet to be fully implemented. The research educates a discussion about the criticality of infusing sustainability into their public procurement decisions. Public organisations can also recognise the inhibitors to the embedding of sustainability into public procurement.

9. Limitations and future work

9.1. Limitations

One of the limitations of the research is that it is a one country study and the findings from this study cannot be assumed to be universally applicable.

Secondly, the population size of the study is low. A larger data set will be more representative of the target population and facilitate further comprehensive analysis.

9.2. Future work

Future research should be based on a larger population size and may also include qualitative research, for example, in the form of semi-structured interviews, this way, researchers can ask follow up questions to some of the survey enquiries. This will allow for a deeper analysis.

Additionally, this research has not wholly considered the impact of financing in its methodology; future research may examine the impact of public investment in embedding sustainability in public sector procurement.

Lastly, the paper has focussed on the public sector of Lagos State, further research may include other states in Nigeria in order to achieve a wider scope of respondents.

10. Conclusion

The paper reviewed literature and there is near consensus that the current global economic model is unsustainable; the situation is even more critical in developing countries. This report has examined the level at which Lagos State has embedded sustainability into their procurement decisions and activities. The results of the finding suggests that sustainability is not a top priority in the State’s public sector. Majority of the respondents did not have an awareness of the importance of sustainability and there was no sustainable procurement public policy in place.

There are a few studies on sustainable procurement in developing countries, this paper contributes to this emerging literature. The paper also contributes to the concepts of sustainability, procurement, the public sector and developing countries literature by amalgamating these four areas into one study.

This paper also elucidates on how policy makers and practitioners in the public sector of developing nations may incorporate sustainability into their procurement frameworks.

The paper recommends that the government implements sustainability initiatives and also invest in the education of the workforce in order to sensitize them on the importance of sustainable procurement. In addition, whole life cycle evaluations should be adopted in procurement decision making processes and there should be improvements in procurement processes to optimise performance.

References

- Audet, D. (2002), "The Size of Government Procurement Markets", *OECD Journal on Budgeting*, Vol. 2, No. 3, OECD Publishing, Paris.
- Audu, E.B. (2013), "Gas flaring: a catalyst to global warming in Nigeria: International Journal of Science and Technology": Volume 3 No.1, January 2013 ISSN 2224-3577.
- Amigun, B., Musango, J. K., & Stafford, W. (2011), "Biofuels and sustainability in Africa". *Renewable and sustainable energy reviews*, 15(2), 1360-1372.
- Baptista, J. A. (2014), "The ideology of sustainability and the globalization of a future". *Time & Society*, 23(3), 358-379.
- Beddoe, R., Costanza, R., Farley, J., Garza, E., Kent, J., Kubiszewski, I. & Woodward, J. (2009), "Overcoming systemic roadblocks to sustainability: The evolutionary redesign of worldviews, institutions, and technologies". *Proceedings of the National Academy of Sciences*, 106(8), 2483-2489.
- Berry, C. (2011). "The sustainable procurement guide: procuring sustainably using BS 8903". BSi.
- Brammer, S., & Walker, H. L. (2007), "Sustainable procurement practice in the public sector: An international comparative study". *International Journal of Operations & Production Management, Volume 31, Issue 4*.
- Brundtland, G., Khalid, M., Agnelli, S., Al-Athel, S., Chidzero, B., Fadika, L., & Okita, S. (1987), "Our Common Future". (Brundtland report).
- BudgIT (2015), "Lagos State Budget data". Available at <http://www.yourbudgit.com/data/>. Accessed on 2nd June 2015.
- BudgIT (2015), "Nigerian federal budget". Available at <http://www.yourbudgit.com/data/>. Accessed on 2nd June 2015.
- Change, C. (2007), "IPCC Fourth Assessment Report". *The Physical Science Basis*, 2, 580.
- Clark, M. (1999), "Fisheries for orange roughy (*Hoplostethus atlanticus*) on seamounts in New Zealand". *Oceanologica Acta*, 22(6), 593-602.
- Connelly, S., Markey, S., & Roseland, M. (2011), "Bridging sustainability and the social economy: Achieving community transformation through local food initiatives". *Critical Social Policy*, 31(2), 308-324.
- Defra, (2005), "Securing the Future: A new Strategy". Ch.1, 2005, p.12; Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69412/pb10589-securing-the-future-050307.pdf (accessed on 23rd May 2015).
- Economist, (2012), "Nigeria's oil: A desperate need for reform". The Economist Magazine. Available at: <http://www.economist.com/news/middle-east-and-africa/21564906-goodluck-jonathan-says-he-wants-reform-oil-industry-really>. Accessed on 30th May 2015.
- Ehui, S. K., & Spencer, D. S. (1993), "Measuring the sustainability and economic viability of tropical farming systems: a model from sub-Saharan Africa". *Agricultural Economics*, 9(4), 279-296.
- Elkington, J. (1998). Partnerships from cannibals with forks: The triple bottom line of 21st - century business. *Environmental Quality Management*, 8(1), 37-51.
- Elkington, J. (2004). Enter the triple bottom line. *The triple bottom line: Does it all add up*, 11(12), 1-16.
- Etuonobe A.K, (2009): The Devastating Effects of Environmental Degradation - A Case Study of the Niger Delta Region of Nigeria, Paper presented at the FIG Working Week 2009, Surveyors Key Role in Accelerated Development Eilat, Israel, 3-8 May.
- European Commission (2008), *Measurement of Indicators for the Economic Impact of Public Procurement Policy*, Working document, European Commission, Brussels.
- European Commission (2003), "Public procurement factsheet". Available at http://ec.europa.eu/internal_market/publicprocurement/docs/modernising_rules/reform/fact-sheets/fact-sheet-01-overview_en.pdf. Accessed on 2nd February 2015.
- Force, S. P. T. (2006). Procuring the Future. *Sustainable Procurement Task Force, London*.
- Fuller, R. B., (2008). *Operating manual for spaceship earth*. Zurich: Lars Muller Publishers.
- Geng, Y., & Doberstein, B. (2008), "Developing the circular economy in China: Challenges and opportunities for achieving 'leapfrog development'". *The International Journal of Sustainable Development & World Ecology*, 15(3), 231-239.
- Gibbon, E. (1994): The history of the decline and fall of the Roman Empire. London/New York: Penguin.
- Haque, M. S. (1999). The fate of sustainable development under neo-liberal regimes in developing countries. *International Political Science Review*, 20(2), 197-218.
- Isidiho, A. O., & Sabran, M. S. B. (2015). Project Sustainability: A Necessary and Sufficient Condition for Continued Actualization of the Goals of Niger Delta Development Commission (NDDC) Projects in Nigeria. *SCOTTISH JOURNAL OF ARTS, SOCIAL SCIENCES AND SCIENTIFIC STUDIES*, 3.
- Jacques, P. (2014), "Sustainability: The Basics". Routledge.
- John Zodzi (2014), "Togo increases 2014 spending, sees stronger growth". Reuters markets report. Available on <http://www.reuters.com/article/2013/12/05/togo-budget-idUSL5N0JK4AH20131205>. Accessed on 21st May 2015.
- Kaye Nijaki, L., & Worrel, G. (2012). Procurement for sustainable local economic development. *International Journal of Public Sector Management*, 25(2), 133-153.
- Kemp, R., Parto, S., & Gibson, R. B. (2005). Governance for sustainable development: moving from theory to practice. *International Journal of Sustainable Development*, 8(1-2), 12-30.
- Kisner, C. (2008): Climate Change in Thailand: Impacts and adaptation strategies: Published by the Climate Institute. Available at <http://www.climate.org/topics/international-action/thailand.htm>. Accessed on 3rd June 2015.
- Lagos State Government (2012), "Lagos State Civil Service Staff Strength". Available online at <http://www.lagosstate.gov.ng/pagemenus.php?p=19&k=17>. Accessed 21st May 2015.
- Lagos State Government (2014), "Civil Service departments' category listing". Available at <http://www.lagosstate.gov.ng/entitycategory.php?p=5>. Accessed on 21st May 2015.

- LSPPA (2015), "Overview of the Lagos State public procurement". Available at <http://www.lagosppa.gov.ng/>. Accessed on 21st May 2015.
- Lattanzio.R, (2008): Air Quality Issues in Natural Gas Systems, CRS Report for Congress. Prepared for Members and Committees of Congress.
- McCrudden, C. (2004, November). Using public procurement to achieve social outcomes. In *Natural resources forum* (Vol. 28, No. 4, pp. 257-267). Blackwell Publishing Ltd.
- Nwagwu and Oni (2015), "Lagos and Its Potentials for Economic Growth". Available at <https://ng.boell.org/>. Accessed 13th February 2015.
- OGC (2008), "An introduction to public procurement". Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/62060/introduction-public-procurement.pdf. Accessed on 3rd February 2015.
- OECD (2009), "OECD Principles for Integrity in Public Procurement". OECD Publishing, Paris.
- OECD (2013), "Public procurement spending", in OECD, *Government at a Glance 2013*, OECD Publishing, Paris
- OECD (2014), "Size of public procurement spending". Available at http://www.oecd-ilibrary.org/sites/gov_glance-2011-en/09/01/index.html?contentType=/ns/StatisticalPublication,/ns/Chapter&itemId=/content/chapter/gov_glance-2011-46-en&containerItemId=/content/serial/22214399&accessItemIds=&mimeType=text/html. Accessed on 3rd February 2015.
- Ogwu, Peters, Aliyu, Abubakar. (2015): An Investigative Approach on the Effect of Air Pollution on Climate Change and Human Health in the Niger Delta Region of Nigeria: *International Journal of Scientific Research and Innovative Technology* ISSN: 2313-3759 Vol. 2 No.5; May 2015 37
- Oladunjoye (2014), "Manufacturing sector now Nigeria's major economic growth driver". Daily Independent Newspaper, 18th July 2014. Available online at: <http://dailyindependentnig.com/2014/07/manufacturing-sector-now-nigerias-major-economic-growth-driver-rencap/>. Accessed 10th March 2015.
- Rees, W. E. (1995), "Achieving sustainability: reform or transformation"? *Journal of planning literature*, 9(4), 343-361.
- Robert .B & Sombroek, W.B, (1996), "The effects of global change on soil conditions in relation to plant growth and food production": *Land and Water Development Division. FAO, Rome, Italy*. FAO Corporate Document Repository.
- Senge, P., Smith, B., Kruschwitz, N., Laur, J., & Schley, S. (2009). The Necessary Revolution: How Individuals and Organizations Are Working Together to Create a Sustainable World. *Strategic Direction*, 25(8).
- Shaun McCarthy (2009): CSR Ambitions; Action Sustainability, available at <http://www.actionsustainability.com/news/221/CSR-ambitions/> (Accessed 10 March 2014)
- The New Copenhagen Climate Deal. (2009): A Pocket Guide. First edition; World Wide Fund for Nature. Switzerland.
- Trading Economics (2015), "USA Economic Indicators". Available at <http://www.tradingeconomics.com/united-states/indicators>. Accessed 10th March 2015.
- Uchegbu S.N. (1988) Environmental Management and Protection, Spotlight Publishers, Nigeria.
- Uchegbu S.N. (2002) Environmental Management and Protection, Precision Printers and Publishers, Nigeria
- Umoh, V. A., & Peters, E. (2014). The relationship between lung function and indoor air pollution among rural women in the Niger Delta region of Nigeria. *Lung India: official organ of Indian Chest Society*, 31(2), 110.
- United Nations Population Division, (2015): World Population Prospects. New York: United Nations.
- Walker, H., & Brammer, S. (2009), Sustainable procurement in the United Kingdom public sector. *Supply Chain Management: An International Journal*, 14(2), 128-137.
- Willard, B. (2012). *The new sustainability advantage: seven business case benefits of a triple bottom line*. New Society Publishers.
- World Bank (2015), "World Development Indicators". World Bank, Washington, USA.
- World Population Review (2015), "Nigerian population". Available at <http://worldpopulationreview.com/countries/nigeria-population/>. Accessed 5th May 2015.
- Yale Insights, (2009): Has globalization failed in Nigeria? Published by Yale School of Management. Available at <http://insights.som.yale.edu/insights/has-globalization-failed-nigeria>. Accessed on 6th May 2015.
- Zambon, K (2011): Geospatial Technology Allows Observers to Keep Eyes on Nigeria. Pushlished by Advancing Science, Serving Society. Available at: <http://www.aaas.org/news/geospatial-technology-allows-observers-keep-eyes-nigeria>. Accessed on 25th March 2015.
- Zoheir Ebrahim & Jörg Friedrichs (2013): Gas Flaring: The Burning Issue: Published by Resilience.org. Available at <http://www.resilience.org/stories/2013-09-03/gas-flaring-the-burning-issue>. Accessed on 17th May 2015

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:

<http://www.iiste.org>

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: <http://www.iiste.org/journals/> All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: <http://www.iiste.org/book/>

Academic conference: <http://www.iiste.org/conference/upcoming-conferences-call-for-paper/>

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

