

IMPLEMENTATION OF SUSTAINABLE PROCUREMENT PRACTICES IN PUBLIC SECTOR CONSTRUCTION ORGANISATION IN GHANA

Kwaku Agbesi¹, Ernest Kissi and Theophilus Adjei-Kumi³

^{1&3} *Department of Construction Technology and Management, Kwame Nkrumah University of Science and Technology, Ghana*

² *The Social Investment Fund, PO Box CT3919, Accra, Ghana*

Sustainable procurement adoption in the public sector construction organisation is still evolving in both developed and developing countries, researchers believe that its existence will aid in achieving sustainable development. This paper presents the level of implementation of sustainable procurement in public sector construction organisation in Ghana. Based on stratified and purposive sampling techniques data was collected from 193 government institutions. One-sample t-test was used to validate the data collected. The findings indicated that the simultaneous application of the economic, social and environmental aspects of sustainable procurement in construction were limited. It was revealed that nine out of the twenty-one of the three aspects of sustainable procurement practices was moderately implemented. The significant sustainable practices implemented were preventing nuisance from construction operations; providing employment to the community; clearly establishing needs and evaluate other options; value for money; decreasing water usage; reusing existing built assets; reducing water, land and air pollution and environmental management system. This suggests that government must encourage the incorporation of the considerations of economic, environmental and socially responsible policy goals within sustainable procurement practices of public sector instructions.

Keywords: sustainability, procurement, Ghana, public-sector

INTRODUCTION

The construction industry has acknowledged the vital contribution it makes to the attainment of sustainable development (Glass *et al.*, 2012). Sustainable development is about achieving economic and social objectives while minimizing adverse environmental impacts (Barkemeyer *et al.*, 2014). In the last two decades, the interest of sustainable procurement both in practice and academic research is burgeoning and substantial amount of literature has been generated (Roman, 2017; Grob and Benn, 2014). A review by Xia *et al.* (2015) showed that sustainability related research in construction has increased from 30 papers in 2000 to 127 papers in 2012 and currently researchers are posited in exploring every aspect of the sustainable parameters. Despite the interest generated and the increasing trend in research most construction

¹ gbesic@yahoo.co.uk

organizations are yet to fully adopt sustainable procurement (Islam *et al.*, 2016). Most public institutions particularly in Ghana are yet to fully apply sustainability as part of their integrated strategy and organisational culture that promote values and ethics.

Conventionally, procurement in the construction industry has to the greater extent concentrated on the lowest evaluated tenderer while the obligation to sustainability concerns has been ignored (Gunatilake, 2013). Conventional performance measures (time, quality and cost) are being extended to incorporate extra factors like environmental and social measures. The sustainability performance of suppliers has become a major element of tender selection criteria (Meehan and Bryde, 2015; Sourani and Sohail, 2013). An increasing number of countries both in developed and developing countries, are taking steps towards integrating environmental, and to a lesser extent, social criteria into their national procurement (Islam *et al.*, 2017). Varnäs *et al.* (2009) studied the level of adoption and implementation of green procurement in the Swedish construction industry. The results indicated that both public and private clients consider environmental issues in their procurements. Varnäs *et al.* (2009) noted that construction organisations in Sweden, mainly apply EMS, re-use of waste materials, use of limited materials in the procurement of construction contracts. Environmental sustainability criteria are mainly used in construction procurement in Canada (Ruparathna and Hewage, 2015).

In Ghana, the Public Procurement Act, Act 663 of 2003 has been amended to include social and environmental dimensions in public procurement, thus, Act 914 of 2016. This is concerted efforts by Government of Ghana to improve the adoption and implementation of the Tiple Bottom Line in public procurement thereby contributing to the attainment of sustainable procurement. However limited studies have been done on the level of implementation of sustainable procurement practices in Ghana's context. The level of implementation of sustainable procurement practices is significantly varied for each country depending on certain barriers that they confront in their respective country such as lack of regulation, limited knowledge and skills, lack of funding, perceived high cost of sustainability (Islam *et al.*, 2016), and different surrounding pressures including the regulatory environment and government support, organisational values, and competitive pressure (Agbesi *et al.*, 2018). This paper examines the level of implementation of sustainable procurement practices in construction in public sector client organisations in Ghana.

Sustainable Development and Construction Industry

The link between the activities of the construction industry and sustainable development is related to its social, economic, and environmental impacts (Shen *et al.*, 2017). The adoption of the principles of sustainable development in construction is to create a sustainable built environment that meets human's present needs, without endangering the ability of the future generation to meet their needs (Berry and McCarthy 2011). The principles of sustainable construction are related to the triple bottom line (TBL) of environmental, social and economic dimensions that are illustrated in the sustainable development concept (Tan *et al.*, 2011). Owing to its large size and importance, the construction industry has the potential to contribute directly to the attainment of sustainable development (Bamgbade *et al.*, 2017). Du Plessis (2002) opined that sustainable construction attempts to restore equity between the natural environment and built environment thereby addressing the intricate challenges of construction and the environment. The construction industry has immense contribution towards the economic and social development of many

countries and cause considerable damage to the environment (Bamgbade *et al.*, 2017). For example, the construction industry accounts for one tenth of the global economy (Bo *et al.*, 2015). In the UK, the industry accounts for 10% of the UK's GDP and employs over 3,000,000 people in over 250,000 firms (Bamgbade *et al.*, 2017). The Ghana's construction industry contributes average growth of 7-8 % per annum to GDP (Osei, 2013). The construction sector is one of the major offenders of global resource depletion (Xia *et al.*, 2015; Zuo *et al.*, 2012). Precisely, Rode *et al.* (2011) indicated that an estimated 10% of the global energy consumption is attributed to the manufacturing of building materials. Construction and demolition account for about 40% of the solid waste generated in the advanced nations, while the operation stage of construction products releases almost 40% of the total global greenhouse gas emissions (Rode *et al.*, 2011). Buildings are estimated to consume about 40% of the total available energy, responsible for roughly 30% of total CO₂ emissions and generate about 40% of all man-made waste in all European Union countries (Rode *et al.*, 2011). Pearce (2003) highlighted the construction sector contribution to sustainable development in the form of human (workforce), social (human welfare) and environmental capital. The construction industry remains one of the most critical sectors for the adoption of sustainable development principles because of its size and the enormous amount of the resources it consumes, and the major impact of its products on the built and natural environments in particular and the society at large (Xia *et al.*, 2015; Zuo *et al.*, 2012). As a result, sustainable construction practices can contribute towards the realisation of sustainable development; thereby, effectively improving the overall performance of the industry.

Sustainable Procurement

Sustainable procurement is built on the traditional procurement practice, through the adoption of sustainable development principles. Organisations are concerned on how they and their supply chain impact on the environment, society and the economy (Walker and Philips, 2009). According to Walker and Philips (2009), there is an existing opinion to limit economic and societal development and to lessen negative effects on the environment. In addition to environmental considerations, organisations need to address social equity issues both nationally and internationally along the supply countries (Walker and Philips, 2009). Sustainable procurement is considered as a way to contribute to the larger effort of achieving sustainable development due to the impact procurement has on the environment, economy and society (Islam *et al.*, 2016; Meehan and Bryde, 2015). Thus, sustainable procurement is included as the additional connection between environmental, economic, and social aspects added in procurement decisions, and thereby depicting the idea of sustainable development (Islam *et al.*, 2016). There are growing discussions on how the environmental, economic and social aspects of sustainable procurement could be integrated into a policy for use in both private and organisations (Renukappa, 2016). Sustainable procurement is therefore described by the United Kingdom Government commissioned Sustainable Procurement Taskforce as "...a process whereby organizations meet their needs for goods, 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 organization, but also to society and the economy, whilst minimizing damage to the environment", (Procuring the Future, Sustainable Procurement Task Force, 2006). In the context of construction, sustainable procurement is a process whereby the client and participating organizations meet design and development requirements in a way that achieves value for money on a whole life basis so as to generate benefits not only for project

stakeholders but also to society and the economy, while minimizing any environmental damage (Alkilani and Jupp, 2012). Sustainable procurement practice and research is increasing (Roman, 2017; Grob and Benn, 2014). Grob and Benn (2014) pointed to the sustained increase implementation of sustainability along the supply chain. However public sector organisations are yet to fully adopt sustainable procurement and fuse it into their organisational strategies and policies (Roman, 2017; Walker et al.; 2009). Walker *et al.* (2009) is of the view that if public sector organisations were to demand sustainability in procurement of goods, services and works, a considerable amount of progress could be made towards the attainment of sustainable development. There is wide-spread recognition that sustainability has three dimensions: environmental, economic and social (Adetunji *et al.*, 2008). Construction clients and other supply chain partners are extensively involved with the design and application of sustainable procurement policies that focus on the three pillars of sustainable development (Islam *et al.*, 2016). Public clients are under intense pressure from national and international organisations to adopt and implement sustainable procurement in their policies and strategies (Islam *et al.*, 2017; Wong *et al.*, 2016; Meehan and Bryde, 2015). Islam *et al.* (2016) affirmed there is growing domestic and international legal and regulatory pressure being faced by institutions to accept and implement sustainable procurement practices in order to reduce their effect on the environment. This is linked to the significant influence clients have on the adoption of sustainable procurement due to their critical involvement in the selection of stakeholders such as consultants and contractors, and the determination of construction products (Wilkinson *et al.*, 2015; Glass *et al.*, 2011). Despite these sustained pressures on organisations to adopt to sustainable procurement practices, it is yet to be translated into full scale adoption and implementation. To reduce the negative impact of the environment, sustainable procurement can provide the vehicle to reduce greenhouse gas emissions, improve water efficiency and support recycling by considering concepts such as whole life costing, capacity building, poverty reduction and improved equity, generate income, and optimise costs.

Implementation of Sustainable Procurement in Construction

Construction organisations are yet to fully fuse sustainability practices in their procurement decisions (Islam *et al.*, 2016). Indeed, the industry lags behind other industries with respect to sustainability adoption and implementation (Brennan and Cotgrave, 2014). Notwithstanding, considerable efforts have been made to infuse sustainable practices in construction procurement. Adetunji (2008) opined that most construction organisations have addressed environmental sustainability including waste management, recycling initiatives, material innovation, pollution avoidance, reduction of generic construction material usage (water, energy), transport policy (to minimising disruption to road users during road works). Gunatilake (2013) attributed this to the availability of well-established environmental management systems. Varnäs *et al.* (2009) studied the level of implementation of green procurement in the Swedish construction industry. The results indicated that both public and private clients consider environmental issues in their procurements. Environmental sustainability criteria are mainly used in construction procurement in Canada (Ruparathna and Hewage, 2015). Procurement has served as a tool to promote social outcomes (McCrudden, 2004). Preuss (2009) advanced how UK's Local Government had used procurement to achieve social outcomes including contracting with voluntary organisations. Even though there is evidence of gradual inclusion of social dimensions in procurement decisions. Eswarlal (2014) and, Seuring and Müller

(2008) noted that consideration of the social dimension in supply chain management is very weak. Zuo *et al.* (2012) opined that the construction industry's social sustainability has not received its fair share of both industry practice and academic research compared to environmental and economic sustainability. Adetunji *et al.* (2008) stated that few social practices applied in construction procurement appeared to favour health and safety, possibly due to poor health and safety records in the industry. Notwithstanding these, there is also increasing evidence of the adoption and implementation of triple bottom line (TBL) of sustainable practices in construction in recent times. Samudhram *et al.* (2016) revealed increasing levels of economic, social and environmental performances reporting at the firm level. They argued the Triple Bottom Line (TBL) reporting approach promotes firm level economic, environmental and social performances. In the United States of America, state, regional and local governments (e.g. Maryland, Minnesota, Vermont and Northeast Ohio) are increasingly adopting the TBL as decision-making and performance-monitoring tool (Hall, 2011). Meehan and Bryde (2015) revealed that the UK's housing sector takes holistic considerations of sustainable procurement (social, environmental and economic). Renukappa *et al.* (2016) also found that most organisations in the UK have simultaneously implemented the TBL of sustainable procurement initiatives. Organisations have implemented sustainable procurement initiatives including buying construction-related materials from small/local organisations, reducing waste, health and safety, discrimination, working hours, employee compensation, ethical behaviour and rights of minorities and helping suppliers to obtain ISO 14001 certification (Renukappa *et al.*, 2016). This is being influenced by the UK's government for organisations to achieve 100% sustainable organisation' in order to bring broader objectives of sustainability to satisfy international and national directives. Islam *et al.* (2016) also reported increasing implementation levels of the environmental and social dimensions of sustainable procurement among Saudi Arabia's public and private organisations. In Malaysia, both private and public organisations have adopted and implemented some aspects of the TBL (i.e. health and safety, purchasing from local suppliers, compliance with child labour laws) in construction procurement (McMurray *et al.*, 2014).

Sustainable Procurement Adoption in Ghana

Ghana's Public Procurement Act, 2003 (Act 663) addresses some aspects of economic and social sustainability issues under section 59. The Act did not address the environmental aspect of sustainability. Even though, the environmental aspect was not covered under the law there are standalone regulations on issues like Energy Efficiency Standards, Pesticides Control and Management, Reduction in Green House Emissions, Forest and Wildlife Management and among others. Ghana Labour Law, Act 651 of 2003 raises social issues of equal employment opportunities, occupational health and safety, and child labour. These social issues were not infused into Act 663. The Act 663 was amended with the object of addressing the inadequate sustainability issues in the Act. Sustainable public procurement has therefore been infused into the amended Act, Act 914. The object of the study is to measure the level of implementation of sustainable practices in construction procurement in Ghana.

RESEARCH METHODOLOGY

This study adopted quantitative research method through administration questionnaire to 193 respondents of 36 ministries and departments/agencies, 6 metropolitan, 49 municipal and 76 district assemblies. The respondents were represented by chief

directors; project managers; district coordinating directors; engineers; procurement officers; quantity surveyors; and planning officers. The sample was stratified by scope and purposively selected.

Survey Instrument Design and Operationalization of Measures

The questionnaire items used to measure sustainable procurement practices implementation were based on data collected from literature review. The eligible respondents were involved in sustainable procurement practices and best qualified to talk about their organisations. The questionnaire was reviewed by 2 experts and 10 district engineers and public sector procurement officers and pre-tested in a pilot survey. The respondents were asked to indicate to what degree their organisation had implemented the three dimensions of sustainable procurement practices (economic, environment and social) in construction. 21 sustainable procurement practices covering economic, environmental and social sustainable practices based a five-point likert measurement scale were operationalized. The respondents rated the practices from not; slightly; moderately; frequently and extremely implemented.

RESULTS

In this study, the Predictive Analytics Software (PASW) version 18 was used to compute the mean score value of the level of implementation of sustainable procurement practices in the organisations, and the level of significance of the results were tested by a one sample t-test. A total of 123 valid responses were offered, resulting in a response rate of 63.7%. The respondents were made up of 0.8% (1) chief directors; 4.88 % (6) project managers; 3.26% district coordinating directors (4); 60.98% engineers (75); 13.83 % (17) procurement officers; 13.01% (16) quantity surveyors; and 3.25% (4) Planning officers. 66.7 % of the respondents had PhD and master's degrees; and the remaining respondents have bachelor's degrees and Higher National diploma. A greater majority of the respondents of about 83.74% had over 5 years working experiences in procurement. Considering the varied profile and experiences of the respondents it can be confidently relied on. The respondents were asked to indicate to what degree their organisation had implemented the three dimensions of sustainable procurement practices (economic, environment and social) in construction. respondents rated the practices from not; slightly; moderately; frequently and extremely implemented. Table 1 provides the mean, standard deviation and t-statistic of the various levels of implementation of sustainable procurement practices in Ghana. Any mean value < 3.0 is considered to be insignificant for the study as it is below the natural rating of 3. Standard deviation values less than 1 indicate consistency in agreement among the respondents on the reported level of results (Field, 2005). The results indicated that construction clients had implemented nine out of the twenty-one aspects of the three dimensions of sustainable procurement practices, scoring mean values of 3.00 and above. These included maximum use of limited resources (3.74); environmental management system (3.57); provide employment to the community (3.40); value for money (3.20); use of local material (3.23); reducing energy consumption(3.17); the use of recycled and sustainable materials (3.17); promoting ethical practices (3.15); minimising disruption to traffic of local community(3.13) and reducing water consumption(3.04). The mean scores for the aspects of sustainable procurement practices that asked the organisations to determine the level of implementation of preventing nuisance from construction operations; provide employment to the

community; clearly establish needs and evaluate other options; value for money; decreasing water usage; reusing existing built assets; reducing water, land and air pollution and environmental management system were significant ($p \leq 0.05$), while the remaining sustainable procurement practices were statistically insignificant ($p \geq 0.10$). The result indicated that the average mean value of economic sustainable procurement practices aspect was 3.01, followed by social (2.98) and environmental (2.93). This indicated that even the use of economic sustainable procurement practices was relatively lacking.

DISCUSSIONS

There was a moderate level of application of some sustainable procurement practices in Ghana. Further, the findings indicated that the simultaneous application of the economic, social and environmental aspects of sustainable procurement in construction by the public-sector organisations were limited. This supports the finding of Islam *et al.* (2016), that observed a limited implementation of sustainable practices by organisations in developing countries.

Constructs	Items Code	Items Description	Mean	Avg. mean	Std. Dev.	t	Sig. (1-tailed)
Social	Imp1	Health and safety for workforce and local community/residents	2.44	2.98	1.12	1.07	0.28
	Imp2	Preventing nuisance from construction operations	2.85		1.00	2.35	0.02
	Imp3	Minimising disruption to traffic of local community	3.13		1.07	0.59	0.55
	Imp4	Community security/wellbeing	2.98		1.12	0.30	0.71
	Imp5	Provide employment to the community	3.40		1.17	2.35	0.02
	Imp6	Improving working environment and conditions	2.88		1.13	1.86	0.06
	Imp7	Promoting ethical practices	3.15		0.97	0.38	0.70
Environmental	Imp 1	Decreasing energy usage	3.17	2.93	0.98	1.02	0.31
	Imp 2	Decreasing water usage	3.04		1.12	3.37	0.00
	Imp 3	Use of recycled and sustainable materials	3.17		1.01	1.88	0.06
	Imp 4	Reusing existing built assets	2.75		1.03	2.72	0.01
	Imp 5	Reducing water, land and air pollution	2.66		1.09	5.48	0.00
	Imp 6	Conserving and improving biodiversity	2.43		0.98	1.12	0.27
	Imp 7	Environmental management system	3.57		1.00	6.45	0.00
Economic	Imp 1	Clearly establish needs and evaluate other options	2.54	3.01	1.00	2.34	0.02
	Imp 2	Value for money	3.20		1.08	2.34	0.02
	Imp 3	Local/area economic growth	2.51		1.04	1.77	0.07
	Imp 4	Consideration of whole life costing	2.93		0.99	1.30	0.26
	Imp 5	Use of local material	3.23		0.96	0.32	0.71
	Imp 6	Improving the efficiency of the supply side	2.93		0.99	1.93	0.06
	Imp 7	Maximum use of limited resources	3.74		0.97	1.20	0.23

Table 1: Level of implementation of the three aspects of sustainable procurement practices, Source: Field survey, 2017

This study further confirmed that construction clients lag behind other sectors in the adoption of sustainable procurement practices as postulated by Wong *et al.* (2016); and Varnäs (2009). Wong *et al.* (2016) posited that the awareness of sustainable practices in construction had been increasing over the last decade, however, construction client organisations were hindered to adopt sustainable procurement practices as a result of the lack and non-existence of legal enforcement by government. In the case of Ghana, the adoption and implementation of sustainability in construction procurement was not mandatory till September 2016, when the Act that regulated public procurement (Act 663 of 2003) was amended to include sustainable practices (Act 914). To accelerate the implementation of sustainable procurement practices, governments should provide incentives like subsidies and tax exemptions to encourage public sector organisations to adopt sustainable construction procurement (Wong *et al.*, 2016). In addition, the full implementation of sustainable procurement in construction requires the support,

commitment and leadership from top management of construction organisations (Ruparathna and Hewage, 2015)

CONCLUSION

The study examined the level of implementation of sustainable procurement practices in construction procurement by public organisations. The study firstly revealed construction clients had moderately implemented nine out of the twenty-one of the three aspects of sustainable procurement practices, which are maximum use of limited resources; environmental management system; provide employment to the community; value for money; use of local material; reducing energy consumption; the use of recycled and sustainable materials; promoting ethical practice; minimising disruption to traffic of local community; and reducing water consumption. Secondly, public sector organisations mainly implemented some aspect of economic, followed by social and environmental aspects of sustainable procurement in construction. The significant sustainable practices implemented by the organisations were preventing nuisance from construction operations; providing employment to the community; clearly establishing needs and evaluate other options; value for money; decreasing water usage; reusing existing built assets; reducing water, land and air pollution and environmental management system.

In conclusion, Ministries, Departments and Agencies, Metropolitan, Municipal and District Assemblies are recommended to integrate sustainable procurement into their policies, strategies and goals. The public sector organisations should further make sustainable procurement practices as a demand in the engagement of contractors, consultants and suppliers by introducing sustainable procurement practices in the call for tenders, evaluation of tenders and contracts. It is further recommended that, the Public Procurement Authority (PPA) through the standard tender documents and the procedures for the procurement of goods, works and services should include sustainable procurement practices and by introducing a sustainable procurement assessment tool to track the sustainable procurement performance of public sector procurement entities

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