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Towards Sustainable Purchasing: A Survey of Practices amongst Food & Beverage Manufacturers

[1]Nsikan, John E.[2]Okon, Saviour S.[3]Udom, Mina ElsieL.&[4]Boma-Orawari, Lolo Edna

[1]*Department of Business Management, Covenant University, Ota- Ogun State – Nigeria*
[2]*Department of Marketing, University of Uyo- Uyo, Nigeria*
[3]*Department of Urban and Regional Planning, Rivers State University, Nigeria*
[4]*Garden City Premier Business School, Port Harcourt- Nigeria*

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ABSTRACT
The pressure to embrace sustainable consumption and production has seen many firms adopt measures towards ensuring that their operations are not just profitable, but people and planet-friendly. However, research into what food and beverages (F&B) manufacturers are actually practicing with regards to sustainable purchasing is relatively unexplored. In addition, the beneficial impact of sustainable purchasing on performance of F&B supply chain is not clearly established. This study offered the opportunity to survey the sustainable purchasing practices employed by140 food and beverages purchasing and supply managers inNigeria. The semi-structured questionnaire was used for data collection. The study highlights that despite the calls for increased integration of social, environmental, and economic considerations in purchasing decision, F&B organisations understudied appeared to favour economically sustainablepurchasingpractices (competitive quotation/bidding,automated purchasing, flexible delivery, sustainability notices on contract document, supplier financial position).Respondents also reported better supply chain performance gains (delivery efficiency and cost minimisation) in employing economically sustainable purchasing practices. The implications of these findings are discussed, and the agenda for future research are outlined.

I. INTRODUCTION

Sustainable purchasing has become a contemporary thought and a significant aspect of sustainable consumption and production research (Suhaiza, 2015; Felecia, 2018; Fayezi et al., 2018; Matthias, Felix, Lutz & Craig, 2011). For clarity sake, sustainable purchasingthrives on the notion which requires suppliers to integrate, in addition to economic objectives, environmental and social concerns intheir purchasing decision and supply management practices (Hedley, 2011). It is further described as the practice whereby firms acquire goods, works and utilities in a manner that provide economic benefits to the organisation, and at the same time, minimising destruction to lives and livelihood (Bjorn &Hauschild, 2013).

In various industries around the globe, there is a growing concern towards the design and implementation of practices aimed at enhancing sustainability of purchasing. Consequently, food and beverage manufacturers and their supply chain partners are now aligning their purchasingprocesses to incorporate the social, environmental and economic variablesin order to reduce waste, prevent pollution, minimise the utilisation of natural resources, and carbon emission (Gilbert, 2011; Jones, Ngugi & Odhiambo, 2019).The reason according to Giunipero, Hooker & Denslow, (2012) is that procuring sustainably,amongst other benefits, positively impacts on community wellbeing, customers experience and employee welfare.

To help supply chain practitioners align their purchasing processes with sustainability philosophy, various sustainable Purchasingpathways have been identified in sustainability management literature. Brammer & Walker, (2011) for instance classified sustainable purchasing into five main practices including reuse, recycle and reduce technologies; e-purchasing systems; eco-friendly product labelling; ethical

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purchasing; and the sharing of socially-responsible purchasing information between supply chain firms (Kumar et al., 2005).Meehan &Bryde, (2011), identified five dimensions in which sustainable purchasingcan be deployed including the concern for the environment, philanthropy, diversity, human rights, and product or service safety.

Although many food and beverage producers are currently considering integrating the sustainability thinking into their purchasing and supply chain processes(Ojo, Adeniyi, Ogundimu, &Alaba, 2022; Umar, Danjuma, Hammawa, & Habibu,2016), One pertinent issue remains what sustainability criteria do these production firms take into consideration when procuring their products, services and works. To complicate issues, empirical investigation aimed at unravelling the actual sustainable purchasing practices employed byproducers of food and beverageproducts is relatively unexplored. In this scenario, it is not readily ascertained whether the implementation of sustainability inpurchasingis significantly related to supply chain performancein the context offood and beverages manufacturing.

By supply chain performance, this study implies the outcomes realisable as a result of an efficient supply chain management processes such as increased delivery timeliness, enhanced collaboration for knowledge sharing, and minimised operating costs.But as food and beverage (F&B) companies begin to show interest in implementing sustainable purchasing as a supply chain management practice, little is known whether these practices add value to the performance of their supply chains in terms of cost reduction and timely product delivery(Jones, Ngugi & Odhiambo, 2019;Nyaga&Achoura, 2020). Knowledge of what constitute sustainability in purchasing from the perspectives of food and beverage supply chain practitioners would help relevant stakeholders update their sustainability policy guidelines in consonant with the current reality.

This study wastherefore aimed at investigating the food and beverages manufacturing industry to understand the sustainable purchasing practices employed and their relationship with supply chain performance.

II. LITERATURE REVIEW

2.1 Sustainable purchasing practices

The management of sustainable supply chains has been studied from many perspectives including sustainable supply selection, sustainable warehousing, and sustainable purchasing and e-purchasing (Bolstorff& Rosenbaum 2012; Antonio et al., 2020; Bjorn &Hauschild, 2013). In a recent study, Elhedhli&Merrik, (2019) argues that measuring the costs of supply chain activities on environment and survival is gradually receiving empirical and industry attention; leading to the widely used term "Sustainable Supply Chain Management". David, Alexander & Chee, (2017) describes SSCM as the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development into account which are derived from customer and stakeholder requirements. Oelze at al., (2018) opined that the idea of sustainability in measuring supply chain performance has overcome the previous single bottom line perspective that only focused on financial or economic objectives.

In the sustainable supply chain literature, evidence abound of many studies focusing mainly on environmental or green Purchasing, and economic aspects of sustainable purchasing(Jia & Wang, 2019; Jones, Ngugi & Odhiambo, 2019; Singhry, 2015). In addition, a large number of extant research also tended more towards investigating sustainability in public sector purchasing(Francesco, Fabio, Marco &Tiberio, 2012; Cees, Janjaap, & Rob, 2017); and investigating the drivers and barriers to sustainable Purchasing implementation in developed nations (Fayezi, Zomorrodi& Bals, 2018; McMurray, Mazharul, Chamhuri, &Fien, 2014).Despite the abundance of sustainable Purchasing literature, only a handful of studies (Kannan et al., 2015; Nyaga&Achoura, 2020), to the best of our knowledge and search, have considered the food and beverages SMEs in Africa's developing nations. Kannan et al., (2015) for instance, explored the social sustainability issues in Purchasing and supplier selection in Southern African food manufacturing industry. Their study suggests that some social sustainability issues confronting buyers and service providers when selecting suppliersincludes: extent and perception of staff training by the company, respect to employees right, priority accorded to worker's safety, health and welfare, respect to stakeholders right, respect to local community, laws and policies, investment in community welfare, and the willingness to share and disclose information.

Likewise, Nyaga&Achoura, (2020) investigated the influence of sustainable purchasing practices on Purchasing performance in Kenyan food and beverages manufacturing industry. The authors found that reverse logistics, green specification, green inventory management and green tendering are practiced across most food and

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beverages manufacturing firms across Nairobi County. Their study also reported that the four sustainable Purchasing practices (reverse logistics, green specification, green inventory management and green tendering) positively influence Purchasing performance through reduction of cost, clean environment and increased quality of supplies.This study is interested in determining the extent to which these practices are embraced by F&B firms in Nigeria, and the effects if any, on the performance of their supply chains.

2.2 Supply Chain Performance

Managing performance with the aim of improving supply chain outcomes has been an interesting research area over the years. Given its importance, reputable logistics and supply chain related organizations such as UPS, Toyota, Amazon, Dell, WallMartz, etc has invested massively in initiatives that seeks to boost the performance of their supply chain (Bigliardi&Bottani, 2010; Supply Chain Council, 2005). Scholars have also made concerted effort in designing metrics for measuring supply chain performance. For instance, Gunasekaran &Mcgaughey. (2004) proposed a comprehensive framework for SCP measurement broadly divided into strategic, tactical and operational processes. Six categories included: (1) metrics for order planning; (2) evaluation of supply link; (3) measures and metrics at production level; (4) evaluation of delivery link; (5) measuring customer service and satisfaction; and (6) supply chain and logistics.

In addition, researchers (such asKazi& Nazmul, 2014; Singhry, 2015; Chan 2018; Sillanpaa (2013) advocated for the inclusion of newer sets of indicators in supply chain performance measurement. For instance, Kazi& Nazmul, (2014) found delivery reliability, supplier responsiveness, costs minimisation, delivery lead times, conformance to specifications and process improvements as indicators of supply chain performance.Similarly, Chan (2018) argued for both qualitative and quantitative measures. Quantitative measures are cost and resource utilization, while qualitative measures are quality, flexibility, visibility, trust and innovativeness. In like manner, Sillanpaa (2013) reported commonly employed supply chain performance indicators in Iranian manufacturing industry such as timeliness (lead time, quick delivery time, delivery cycle, and production time). Therefore, this study argues that supply chain performance can be enhanced by having clear insights into the sustainable Purchasing practices employed by small scale food and beverages producing firms.

2.3 Sustainable Purchasing and Supply Chain Performance

A number of studies have examined and reported the nexus between sustainable purchasing and supply chain performance. For instance, McMurray et al., (2014) reported a strong and positive relationship between sustainable purchasing practices and benefits such as company image, innovation, and competitiveness. Though the strong linkages between sustainable Purchasing and reported benefits are notable for Malaysian firms. A study by Jia &Wang, (2019) showed that manufacturing companies in India were able to achieve their strategic goals, improved brand reputation and competitiveness by implementing sustainable purchasingthat considered environmental purchasing, diversity management, ethical purchasing, respect to human rights, and work process safety as major elements.

Similrly, Meehan &Bryde, (2011) reported that engagement in sustainable purchasing by considering safety, philanthropic and environmental dimensions enabled improvements in buyer-supplier relationship, supplier quality, better delivery time, supply chain responsiveness, and documentation efficiency. Diab, AL-Bourini& Abu-Rumman (2015) established a strong positive association between green Purchasing and and operational performance amongst Jordanian food companies.Wanke and Saliby, (2009) conducted a study on the influence of minimal packaging on the performance of detergent product distribution supply chains. The study used descriptive research design to survey eighty-six distribution firms, the study established that minimal packaging positively affects SC performance through reduction of packaging costs, protecting environment and reduction of volumes of consignments and solid wastes.

Furthermore, Mathien and Suresh (2015) researched on the value of green inventory management practices on supply chain performance. Their study used structural equation modelling and surveyed ninety firms. The study concluded that green inventory management practices positively influence supply chain performance by increasing environmental regulation compliance level of the function and the whole firm, increases loyalty of the customers, uses minimal material hence minimal cost and encourages returns for recycling and re-use hence cheap sources of raw material.Similarly, Lucas, (2013) considered the nexus between green

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tendering and supply chain performance through descriptive research design. The study used multiple regression analysis to test the study hypothetical model and established that green tendering positively significantly affects supply chain performance. The study recommended that firms should use e-tendering practices in order to reduce paper work, reduce lead time, reduces inventory and transportation costs and generally bring efficiency in the tendering process in order to improve purchasing performance.Humphreys, (2013) surveyed fifty-five firms in their bid to establish the value of incorporating environmental criteria into the process of selecting suppliers. They found out that factoring environmental considerations into vendor selection result in getting an all-around vendor capable of delivering quality supplies at a reasonable price.In a related empirical research, Ogunyemi, Angela & Virginia (2017) adopted a semi-structured interview to identify the socially responsible Purchasing practices, the main drivers and barriers facing the implementation They reported that implementation of sustainable purchasingamongst surveyed firms was impeded by factors such as non-compliance by suppliers, lack of employee awareness, and the huge cost associated with its implementation.

Although there is vast literature on the theme of this study, a critical review seems to suggest the need for more research. Whereas, there is seems to be theoretical support for sustainable Purchasing as a means of shoring- up supply chain performance in organisations, Food and Beverages SMEs in Nigeria have been slow to integrate sustainability intotheir Purchasing and supply chain management functions (Hong, &Jeong, 2006. Awaysheh& Klassen, 2010). Moreover, very few empirical studies considered cost reduction and delivery efficiency as indicators of supply chain performance. This study therefore, argues that positive and strong relationship would exist between sustainable Purchasing and the performance of small scalefood and beverages manufacturing supply chains.

On the basis of the above review, the following hypotheses were formulated and tested:

H1 Sustainable purchasinghas a positive relationship with supply chain performance

H2. Sustainable purchasing is positively related with cost minimisation.

H3. Sustainable purchasing is positively related with delivery efficiency

III. METHODOLOGY

3.1 Design, Population and Sample Selection

The cross-sectional survey design was chosen for this study. The design was thought suitable for this study because of its economy; which enables the selection of representative unit of the larger population through sampling process, and collecting data from the population sample at a single point in time, and over a short period of time (Hunger &Wheelen, 2012). In addition, because surveys are easily amenable to descriptive quantitative analysis, it was easy to summarise and draw inferences from data gathered concerning relationships that might have existed among study variables. (Joe. Thomas, & Monica, 2012;Brammer& Walker, 2011; Fayezi et al, 2018). Though cross- sectional study has some inherent limitations in terms of its inability to analyse the behaviour of the variables over a long period of time, and to establish a true cause and effect relationship (Solem 2015), the careful selection of appropriate sample for this study offsets these weaknesses.

The study targeted all registeredF&B firms operating in the Nigerian manufacturing industry. Data base of the Manufacturers Association of Nigeria, as at the time of this study, provided the list of 84 registered F&B firms that constituted the study population. In order to select representative sample from the target population within the study time frame, the purposive and snowballing (both non-probability) sampling procedures were employed. The purposive sampling, for instance, was adopted because it offers the potential of gaining access to specific sets of individuals who are knowledgeable in the subject area and to ease the collection of relevant data (Creswell & Clark, 2010; Gimenez, 2005; Hair, Anderson, Tatham, & Black, 2009; Christou, 2012). Similarly, snowballing -a technique in which one respondent recommends another, who in turn recommends someone else, and so on was necessary because it would enable the researcher to gain access to other knowledgeable Purchasing or supply chain professionals based on referral (Naderifar, Hamideh, &Fereshteh, 2017). Besides, the snowballing sampling approach is simple and cost-efficient and needs little planning and fewer research assistance compared to other sampling methods (Naderifar, Hamideh, &Fereshteh, 2017; Owuor, Muma, Sophia & Susan, 2015).

For purpose of inclusion, selected samples would have started implementing sustainable purchasing for the past 5 years, and must have at least one certified purchasing or supply chain management professional as the unit head. Professional certification as a criteriawas included

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for two reasons: First, it was to ensure that someone knowledgeable in sustainable supply chain management issues including sustainable Purchasing oversees the department, and implements sustainable Purchasing standards. Second, such individual would assist to provide access to the study participants for purpose of questionnaire administration.

Based on the inclusion criteria, only 36F&B companies were qualified and actually participated in the study. A sample of 140 Purchasing and supply chain-related managers were selected for the study and administered with copies of the questionnaire. Out of a total of 140 copies of the questionnaire that was administered, respondents returned 76 copies. However, 71 copies were appropriately filled and used for this study; which translate to an effective response rate of 50.7%. Following Pagell, Yang, Krumwiede&Sheu's (2004) recommendation of minimum 35% response rate for supply chain management study in developing nation's context, this study concludes that our sample size was adequate for this study.

The sample characteristics and profile of respondents are as presented in Table 4. As indicated, 67.1% of the respondents were female while 32.9% were male. In the survey, the confectionary industry -catering and beverage making accounted for the largest percentage (29.9%) of respondents, while the least represented sector was Dairy/milk production (2.7%). A little more than half (54.8%) of the sample surveyed were between 30-40 years, and 54.2% of sampled F&B firms had workforce size of close to 50 workers. In addition, majority of respondents 65.7% were in Purchasing or logistics related units, 37.1% were those occupying the positions and performing Purchasing and production management roles, and 53.4% were associate members of the Chartered Institute of Purchasing and Supply Management Nigeria (CIPSMN).

3.2 Data Collection and Measurement

This study collected primary data via the structured questionnaire. The choice of the questionnaire above other forms of enquiries was founded on its economy, standardisation, fastness and convenience (Christou, 2012; Creswell & Clark, 2010; Fink, 2006). Nevertheless, employing the survey questionnaire for the collection of primary data is a widely acceptable practice in sustainability and supply chain management research (Ogunyemi et al., 2017; Owuor et al., 2015, Udofot&Nsikan, 2020; Islam et al., 2017; Sibel & Bulent, 2019). The questionnaire was designed by taking inputs from some relevant sustainable Purchasing and supply chain management literature (eg. Islam et al., 2017; Meehan &Bryde, 2011; Ogunyemi et al., 2017). A pre-study informal discussion with three Purchasing and supply chain management professionals in food and beverages industry was also done to further enhance the quality of constructs in the questionnaire design (Hair et al., 2006; Sibel & Bulent, 2019).

The questionnaire assumed a close-ended form, with items arranged using the 5-point Likert scale structure, ranging from strongly disagree (1) to strongly agree (5). Using the ordinal (Likert type) scale for this study was predicated on its advantage of producing quantifiable data that is can be easily analysed and interpret regardless of sample size involved. Besides, it gives the respondents much latitude or scope of answers rather than being confined to a nominal scale having "Yes or No" type of responses. The questionnaire (available at appendix section) has a total of 24 items. For ease of data collection, priority was given to those who were members of the Chartered Institute of Purchasing and Supply Management of Nigeria (CIPSMN); a professional association in which the researcher also belongs. Two major reasons explained this decision. First, it was assumed that a known member of CIPSMN would facilitate access to relevant units in the organisations under study, in order to enable the researcher to conduct the survey, since the researcher is also a CIPSMN member. Second, CIPSMN members areSCM professionals who usually perform Purchasing and contract management activities, they would therefore have the relevant competencies to provide the right set of responses to the questionnaire items, thereby reducing the likelihood of common method variance problem (Hunger &Wheelen, 2012). Reasons such as these would probably have accounted for a number of previous studies that drew their samples from among the members of a professional association (For example: Carter & Jennings 2002; Eadie, Perera, & Heaney, 2010; Holt &Ghobadian, 2009; Murphy &Poist 2000).

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Table 1 Sample Profile

Sample characteristics	Components	Per cent %
F&B Sub-Sector	Dairy & Milk Production	2.71
	Processed Foods	3.70
	Meat Processing	9.86
	Processed Fruits & Vegetables	10.30
	Nodules & Pasta	14.30
	Table water bottling	13.54
	Confectionery	29.9
	Fast foods Restaurants	6.50
	Bottled Soft Drinks	8.19
Gender	Male	67.1
	Female	32.9
Age	Less than 30yrs	12.3
	30-40 yrs	54.8
	41-50yrs	24.7
	51-60yrs	8.2
Size of workforce	Less than 15	11.2
	15-20	23.8
	21-50	54.2
	51-100	10.0
	More than 100	0.8
Highest Qualification	Bachelor Degree	69.9
	Master's Degree	26.0
	Doctorate Degree	4.1
Department	Warehouse & Stores	22.1
	Purchasing& logistics	65.7
	IT	8.88
	Production	3.32
Job position	Manager	16.4
	Director	7.4
	Purchasing officer	37.1
	Production Engineer	23.9
	Stores Supervisor	12.4
	Others	2.8
Professional Affiliation	CIPSMN	53.4
	CIPS-UK	8.2
	CISCM-GLOBAL	26.0
	CILSCM	12.3

For the purpose of this study, the independent or predictor variable is sustainable Purchasing, while the dependent or response variable is supply chain performance. Three predictor variables, namely: a). environmentally sustainable Purchasing, b). socially responsible Purchasing, and c) economically sustainable Purchasing, were used as dimensions of sustainable Purchasing. The dependent or response variable - supply chain performance- was measured by two indicators, namely; delivery timelines, and cost minimization.For the purpose of this study, these

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variables were measured in subjective terms due mainly to the difficulties of accessing quantitative indicators that should originate from company's internal records (Fink, 2006). It is common place among developing nations to find most small-scale enterprises not willing to disclose, for research purpose or public consumption, their financial or operating performance data (Danie & Pieter, 2011; Anas, Mohammed & Abdul, 2020). Where the difficulty in accessing quantitative (economic or financial) data arises, the use of subjective or qualitative performance measurement scale for small business research is recommended (Hunger &Wheelen, 2012; Siti &Atikah, 2014; Sandeep & Harpreet, 2016; Sapienza, Smith & Gannon, 1988). In fact, subjective or qualitative performance measurement is also widely adopted by supply chain management researchers (Chang, Tsai & Hsu, 2011; Hong &Jeong, 2006; Erkan, Mehmet, Lenny, Ekrem, &Halil, 2009). The three predictor variables of sustainable Purchasing were so conceptualised based on the Triple-Bottom-Line model (Sarkis et al., 2015; Okwu and Tartibu 2020). The Triple –bottom –line advocates for the measurement of a firm's activity (including Purchasing) by integrating the impact on both the people, planet and profit.

3.3 Reliability and Validity

In order to ensure reliability, the questionnaire was pretested and some items were adjusted to ensure clarity. The constructs from the piloted questionnaire were then subjected to a reliability test using the Cronbach's alpha coefficient and composite reliability (CR) tests. The results (see Table 2) showed that all items had above 70% reliability coefficient. The Cronbach alpha reliability and composite reliability are known to be amongst the most reliable tools for confirming the internal consistency of survey, and used in many social science and management – based study (Udofot&Nsikan, 2020; Akdogan&Demirtas, 2014). According to Nunnally and Bernstein (1994), Cronbach alpha reliability value which is greater than thethreshold of 0.70 has a good internal consistency; hence, this study questionnaire was suitable.

3.4 Data Analysis Techniques

Descriptive, correlation and hierarchical regression were used to analysed data after checking for data consistency by performing composite reliability and discriminant analysis.Meanscores and standard deviation were the descriptive statistics used to answer the research questions by identifying commonly implemented sustainable purchasing practices in the studied organisations. On the other hand, correlation and hierarchical regression analysis were carried out by converting the descriptive results into summaries and used for estimating relationship and to validate the hypotheses. (Christou, 2012)

IV. EMPIRICAL FINDINGS AND DISCUSSION

4.1 Results of Reliability

The Cronbach's alpha coefficient technique was employed in this study to check the extent of internal consistency of each scale and construct. Cronbach's alpha is a widely used tool to assess the reliability of questionnaire elements (Akdogan&Demirtas, 2014; Meehan &Bryde, 2011). According to Nunnally and Bernstein, (1994) a value equal to or greater than 0.70 signifies high construct reliability. The results in Table 2 shows that each construct had a high reliability greater than the benchmark 0.7 as the Cronbach alpha values for each construct ranges from 0.780 to 0.951. This indicates that the instrument was reliable and actually measured what it was supposed to measure i.e sustainable Purchasing and supply chain performance amongst small scale F&B firms. In addition, the composite reliability (CR) test was performed to evaluate criterion-related reliability. As shown in Table 2, the CR score for the constructs were above the 0.75 threshold as suggested by Hair, Anderson, Tatham, & Black, (2009). For instance, the CR check yielded a score of 0.833 for the environmentally sustainable Purchasing construct, 0.851 for socially sustainable Purchasing construct, 0.948 for economically-sustainable Purchasing construct, and 0.841 for the overall supply chain performance. This also indicate a high level of construct reliability which according to Bagozzi&Youjae, (2012) is suitable for hypotheses testing.

4.2 Result of Descriptive Analysis

The mean performance rating and standard deviation (SD) are employed to describe respondents in relation to their implementation of sustainable Purchasing. Based on Saunders et al., (2012), a target mean score of 3.0 derived by dividing the sum of the 5-point Likert scale by 5 was used as a criterion for decision making. Thus, a mean scores$\geq$ 3.00 for any construct signifies the implementation of sustainable Purchasing and vice versa. Statistical results in Table 2 shows that, the mean score for most sustainable Purchasingconstructs were above the target benchmark (except otherwise stated). For instance,

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all but one environmentally sustainable Purchasing constructs had mean score greater than 3.0; an indication that most of the environmentally sustainable practices are being implemented by respondents. In specific terms, the use of green Purchasing performance feedback (Mean= 3.74; SD=0.94) and the assessment of supplier's environmental audit records (Mean= 3.69; SD=0.91) were the topmost environmentally-related Purchasing practices implemented by respondents. The least practiced environmentally sustainable Purchasing was the selection of suppliers on the basis of ISO 14001 (Mean= 2.94; SD=0.47). This suggest that using ISO 14001 certification as a requirement for sustainable Purchasing and supplier selection may not have been fully embraced amongst all F&B SMEs under study.

In terms of socially sustainable Purchasing practices, results in Table 4.2 also indicates that three constructs were rated highly by the surveyed respondents, namely: ethical sourcing (Mean =3.37; SD=0.77), sustainability education/training (Mean =3.27; SD=1.09) and prompt response to safety issues (Mean =3.16; SD = 1.04). The least rated socially sustainable dimensions of purchasing(social responsibility rating and equal opportunity compliance) simply suggests that sample are yet to come to terms with these requirements as they implement sustainable Purchasing functions.

Table 2 also reveals the descriptive results for the economically sustainable Purchasing dimensions. All except one (capacity for flexible delivery, Mean=2.90; SD=0.56) of the economic dimensions of sustainable purchasing had above the 3.0 mean score. The positive mean rating for the other four constructs ranges between 3.39 to 3.58. This implies that respondents accord priority to implementing more of economic sustainability requirements in Purchasing than the social sustainability factors. In addition, respondents rated highly the SCP measures; achieving a more transparent Purchasing process (Mean=3.68; SD=0.70) and enhancing quality of product delivery (Mean=3.68; SD=0.85) occupying the top two positions. This suggests the likelihood of increased SC performance as implementation of sustainable Purchasing increases in the surveyed industry.

Table 2 Descriptive and reliability analysis for constructs and measures (N= 71)

Sustainable Purchasing Constructs	Mean	SD	Cronbach's α	CR
Environmentally sustainable Purchasing			**0.87**	**0.83**
Joint Eco-friendly design policy	3.68	0.81		
Integrates environmental awareness in Purchasing	3.41	1.10		
Assessment of supplier's environmental audit records	3.69	0.91		
Green Purchasing performance feedback	3.74	0.94		
Suppliers selection with ISO 14001 Certification	3.64	1.07		
Socially sustainable Purchasing			**0.84**	**0.85**
Satisfactory social responsibility performance rating	2.56	1.12		
Social sustainability education/training	3.27	1.09		
Ethical standards of sourcing	3.37	0.77		
Compliance with equal opportunity standards	2.70	0.94		
Prompt response to safety issues	3.16	1.04		
Economically sustainable Purchasing			**0.79**	**0.95**
Economically-competitive quotation	3.52	0.91		
Automated Purchasing system	3.59	0.93		
Sustainability criteria on all contract notices	3.59	0.67		
Flexible delivery capability	2.90	0.56		
Strong financial position	3.40	0.89		

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Delivery Efficiency			**0.88**	**0.76**
Faster order fulfilment lead time	3.13	0.99		
Purchasing cycle time becomes more efficient	2.21	1.34		
On-time delivery quality	4.32	1.33		
	3.30	0.89		
Costs Savings				
			0.84	**0.81**
More transparent Purchasing process	2.96	1.08		
Reduced total Purchasing cost	3.34	0.91		
Enhanced quality of product delivered	4.58	1.46		
Overall Supply Chain Performance (Average)	4.35	0.88	0.78	0.84

Note: Higher mean scores indicate high level of sustainable purchasing of implementation.

4.3 Result of Correlation Analysis

The Pearson correlation analysis was performed in order to understand the strength and direction of the linear relationship between the three dimensions of sustainable purchasing(environmnent, social, and economical) and measures of supply chain performance. Table 3 depict results of these correlations.

Table 3 Correlation Between Constructs

Parameters		EnvSP	SocialSP	EconSP	DE	CS	SCP
Environmentally Sustainable Purchasing	(EnvSP)	1.00					
Socially Sustainable Purchasing	(SocialSP)	.244*	1.00				
Economically Sustainable Purchasing	(EconSP)	.562**	.440**	1.00			
Delivery Efficiency	(DE)	.394**	.452**	.660**	1.00		
Cost Savings	(CS)	.283*	.252*	.555**	.396**	1.00	
Supply chain Performance (Overall)	(SCP)	.407**	.430**	.420**	.498**	.447**	1.00

Note: ***Correlation is significant at p< 0.05. ** p < 0.01 (two-tailed tests).

Results in Table 3 indicates a strong and positive relationship between overall SCP and the dimensions of sustainable Purchasing namely: EnvSP ($r = 0.407$, $p < 0.01$), SocialSP ($r = 0.430$, $p < 0.01$) and EconSP ($r = 0.420$, $p < 0.01$). This implies that the greater the implementation of sustainable purchasing, the better improved the supply chain performance of sampled F&B firms. In addition, positive and significant relationship is noticed between costs saving measure of SCP and EconSP ($r = 0.555$, $p < 0.01$), and at 0.05 level, with EnvSP ($r = 0.283$, $p < 0.05$), SocialSP ($r = 0.252$, $p < 0.05$). This may imply that, at varying level of implementation, the more sustainable purchasing practices are adopted by the firms under survey, the greater the opportunity to save supply chain management costs. In terms of delivery efficiency, the correlation matrix reveals the existence of strong, positive and significant relationship amongst the three dimensions of purchasing sustainability, namely: EnvSP ($r = 0.394$, $p < 0.01$), SocialSP ($r = 0. .452$, $p < 0.01$) and EconSP ($r = 0. 660$, $p < 0.01$). Again, this result can be interpreted that a positive change in

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employing sustainability measures in Purchasing, would yield positive changes in the efficiency within which F&B products are delivered to last mile customers.

Regardless of its importance and popularity, correlation analysis is however not useful in predicting cause and effect relationship amongst variables (Field, 2009). In addition, where several correlation analyses are carried out on the variables, the result could be overstated and therefore misleading (Hair et al., 2006). In order to minimise these limitations on this outcome of this study, further analysis, known as the multiple regression was performed and the results is presented in the next section.

4.4 Result of Regression Analysis

Table 4 provides a summary of regression analysis. The regression coefficientshows that significant relationship exists between economically sustainable purchasing and all dimensions of supply chain performance: costs savings (β= 0.574, p< 0.000), delivery efficiency (β= 0.551, p< 0.000), and overall supply chain performance (β= 0.656, p< 0.000). This therefore supports Hypotheses H1c, H2c, and H3c. Results also shows that socially responsible Purchasing was significantly associated with delivery efficiency (β= 0.201, p< 0.000) which, supports hypothesis H3b. The result of the regression analysis also indicated that implementation of environment and socially sustainable Purchasing was not significantly associated with both cost savings and delivery efficiency. Based on the adjusted R^2 , Model I explains about 51.4 % of the variance in achieving improved overall supply chain performance. Model II also explains about 27.9% of the chances of predicting cost savings, while model III explains about 44.5% predictability for delivery efficiency. This implies that only the implementation of economically sustainable standards in Purchasing yielded substantial improvement in supply chain performance since economic sustainable Purchasing alone significantly influenced all the measures of supply chain performance in this study.

Table 4. Regression Models Summary

Independent variables	Dependent Variables		
	SCP –Overall (Model I) Beta	CS (Model II) βeta	DE (Model III) Beta
EnvSP	0.003 (0.034)	-0.041 (-0.342)	0.035 (0.334)
SocialSP	0.140 (1.530)	0.009 (0.084)	0.201** (2.054)
EconSP	0.656** (4.912)	0.574** (4.391)	0.551** (4.811)
Constant (α)	6.729	5.793	0.936
F-value	26.371	10.280	20.264
Adjusted R^2	0.514	0.279	0.445
Durbin Watson	1.712	1.859	1.717
No of observations	71	71	71

Note: **Beta coefficient is significant as p < 0.01. Scores in parenthesis are t-scores

The summary of findings (Table 5) shows that amongst the sustainable purchasing practices, only economically sustainable purchasing was capable of affecting and possibly leading to improvement in all measures of supply chain performance. However, it seems that social and environmentally sustainable purchasing was not as effective as expected in their influence or effect that could lead to better supply chain performance in terms of delivery efficiency and costs minimisation. The findings and their implications are further discussed in the next section.

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Table 5: Summary of Hypotheses Results

Sustainable Purchasing variables	SCP –overall Hypothesis	Costs Savings Hypothesis	Delivery Efficiency Hypothesis
EnvSP	H1a: Not Supported	H2a: Not Supported	H3a: Not Supported
SocialSP	H1b: Not Supported	H2b: Not Supported	H3b: Supported
EconSP	H1c: Supported	H2c: Supported	H3c: Supported

4.5 Discussion and Managerial Implications of Findings

The study sought to understand the measures that food and beverages firms employ in order to ensure that their purchasing processes are sustainable- i.e not detrimental to life and livelihood. Based on the descriptive statistics, respondents seem to adopt more of joint ecologically-friendly initiatives in designing purchasing policies with their strategic or preferred suppliers. They also mentioned gaining access to prospective supplier's environmental audit record as a necessary requirement for sourcing and contract tender, and they also adopt, as a standard process, the practice of giving their suppliers feedback information on green Purchasing. These set of findings corroborate that of AsokoInsight, (2019) and Hamid, (2020) which reported that SMEs in many developing countries are gradually embracing sustainability as key supply chain management practice.

On the contrary, the use of ISO 14001 certification received low attention from small scale F&B supply chain professionals in this study. One simple explanation to this finding could be that most small scale enterprises lack the financial means to engage in ISO 14001 and other quality assurance certification regardless of the benefits, due to the expensive resources required to acquire international certification. This finding, to a large extent is consistent with prior research such as Sayel, (2005) which found that about 24% of small engineering and production firms in Indonesia are reluctant to acquire ISO quality-based certifications as a results of the huge costs associated with their acquisition.

Other techniques adopted by respondents to ensure purchasing sustainability include; choosing suppliers on the basis of economically competitive quotation, adopting automated Purchasing throughout the entire purchasing process to reduce cumbersome paperwork and ensure cleaner environment. Respondents also mentioned other sustainable purchasing initiatives they implement such as; inscribing sustainability conditions on all notices, communication documents, and various collaboration platforms for suppliers, and selecting partners with demonstrable financial capability. The need for delivery flexibility, despite its importance as a sustainable purchasing requirement, was rated lowly by most respondents.

The results also shown three socially responsible purchasing initiatives that was common amongst the respondents. They include ethical standards of sourcing, suppliers' prompt response to safety issues and sustainable education and training for supplier's employees. Ethical sourcing implies being transparent and open in the sourcing and other purchasing processes. The need for transparency and integrity in purchasing has become a crucial subject amongst purchasing stakeholders in most developing nations including Nigeria. Therefore, it is not out of expectation to find most F&B respondents subscribing to or endorsing ethical responsibility in purchasing as a sustainability initiative. Again, the finding substantiates those of Matthias et al., (2011); Mani &Vinay, (2015); and Bali et al., (2017). For instance, in their study of selected emerging economy sustainability supplier selection practices, Matthias et al., (2011) reported that most buying firms surveyed place high consideration on ethical sensitivity in product sourcing, good social responsibility records, and employee safety when selecting their suppliers.

In addition, another finding worth discussion is the dominance of economically sustainable purchasing dimension above the other two sustainability components i.e the social and environmentally sustainable purchasing. It implies that in spite of the awareness of the triple bottom line requirements, the perceived benefits of integrating the three sustainability elements in business processes, and some forms of stakeholder pressure, the F&B firms still prefer to implement the economic aspects of sustainability in their purchasing functions than the other environment and social components. This observation actually buttresses the doubts expressed by Alhaddi, (2015)

on the implementation of the triple bottom line sustainability. Moreover, the direction of responses is in agreement with studies such as Bruno, (2015); Swee et al., (2010), Galal &Moneim, (2016) which reported the many challenges and barriers that fraught the effective implementation of sustainable supply chain in most developing nations. This calls for further studies on ways of strengthening the implementation of sustainable supply chain management including sustainable purchasing in low- and middle-income countries.

The result showed clearly that significant and direct relationship exist between some of the dimensions of sustainable purchasing and some measures of supply chain performance. For instance, economic sustainability dimension of purchasing was found to be directly and significantly related to overall SCP and its measures- delivery efficiency and cost minimization. The result seems to explain that as respondents heightened their economic sustainable purchasing standards, the possibility of improving their overall supply chain performance also increases which tend to support the views of AI Khattab, et al., (2015) and Antonio et al., (2020). For instance, Antonio et al., (2020) literature reckons economic sustainability as an important factor for all enterprises because such practices support long-term economic growth of the firm and that of the nation without negatively impacting social, environmental, and cultural aspects of the community. The finding is also in line with Alireza, David, &Farhad, (2014) which suggest that a company's ability to produce goods and services that are needed/wanted by the customers, at a reasonable cost, generate income, and provide employment is a critical part of economic sustainability.

Furthermore, the positive relationship between all economic sustainability indicators and supply chain performance points to the F&B respondent view of sustainability which should include more of the elements of profitability, cost, employment provision, and the production of durable and acceptable goods than the social or environmental components of sustainable supply chain management; an opinion propagated by Alireza, et al (2014).

In addition, positive and significant relationship was found between the costs saving measure of supply chain performance and environmentally sustainable purchasing which suggests that respondents envisaged reduced supply chain costs in areas such as logistics and transportation, inventory costs, warehousing management costs, product tracing and tracking costs, cost of return logistics, intangible costs such as dwindling reputation, non-availability or unwillingness to share relevant product or market information with suppliers.

In particular, the existence in this research of a direct relationship between environmentally sustainable purchasing practices and supply chain cost saving and its implications for supply chain and purchasing professional and scholars echoes the recommendations made by several environmentally sustainable supply chain authors including Mathien and Suresh (2015); Lucas, (2013); and Wanke and Saliby, (2009). These authors also reported direct relationship between green or environmental supply chain and costs minimisation. Moreover, the direct relationship between socially responsible purchasing and delivery efficiency implies that the more sustainable purchasing practices are adopted by the firms under survey, the greater the opportunity to save supply chain management costs and deliver product to users in an efficient manner. Even though this finding finds support in the works of several scholars who also found positive relationship between social sustainability initiatives in purchasing and performance, this finding is also inconsistent with some other studies in some less developed countries and in different industries where a negative relationship with socially responsible purchasing implementation was found (Sayel, 2005), (Joe et al.,2012), (Eadie et al., 2010). In terms of delivery efficiency, the correlation matrix reveals the existence of strong, positive and significant relationship amongst the three dimensions of purchasing sustainability. Again, this result can be interpreted that a positive change in employing sustainability measures in purchasing, would yield positive changes in the efficiency within which F&B products are delivered to last mile customers.

V. CONCLUSION

This investigation assessed what F&B managers considered as sustainable practicesin their purchasing functions, and how those sustainability practices enhance their supply chain performance in terms of costs reduction and efficient product/service delivery. The findings in this study revealed that the economic sustainability factors ranked highest, followed by the social factors. These sustainable environmental factors include public disclosure of environmentalrecords, waste and material management and pollution control ranked the bottom lowest of the sustainable environmental factors of which supply chain

managers considered as sustainable when selecting suppliers. Findings also showed that environmental sustainability factors are ranking lowest amongst the sustainable purchasing factors. Going by these finding, it is therefore important that managers begin to actively consider suppliers that are environment sustainability compliant. This is particularly important now because the former perception of sustainability as viewed a matter of goodwill with no direct impact on an organization's core business strategies has changed over the years. Now organisations need to actively incorporate sustainability principles into their core business strategies. It is therefore important to comply with not just a social and economic factor but all of the entirety of the triple bottom line of sustainability which is fully inclusive of environmental sustainability factors. This is important not just to maintain compliance and avoid regulatory sanctions but to enhance reputation and brand management as the scrutiny will continue to increase, not just from regulators but from investors, customers, pressure groups and the media in the near future.

VI. LIMITATIONS AND AREAS OF FURTHER RESEARCH

Suitability considerations is at the top burner of research in recent years. This research has identified the specific factors considered important byfood and beverages supply chain managers in their purchasing decisions. In this research, firm size and firm age was not considered to moderate or mediate the effect of the sustainable purchasing factors on supply chain performance. Further studies could explore the moderating role of firm size, and age of the buying firm on the relationship between sustainable purchasing and supply chain performance. Moreover, further research could test the findings in this study on other industry to see whether the same result about the relationship between sustainable purchasing and supply chain performance would still be obtained. Such future studies may consider the banking sector or the government/public sector.Further research may also explore the moderating effect of information and technology on sustainable purchasing and supply chain performance.

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