Journal of Economics and Technology Research
ISSN 2690-3695 (Print) ISSN 2690-3709 (Online)
Vol. 3, No. 4, 2022
www.scholink.org/ojs/index.php/jetr

Original Paper

Sustainability Practices and Supply Chain Resilience in the Development of a Circular Economy: A Study of Nigeria

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Received: October 10, 2022 Accepted: October 28, 2022 Online Published: November 10, 2022

doi:10.22158/jetr.v3n4p30 URL: http://dx.doi.org/10.22158/jetr.v3n4p30

Abstract

Sustainable Supply Chain Management has become an essential portion of business strategy for almost all sectors. However, not so much is understood about the wider effects of sustainability practices on the ability of the SC to endure disruptions. The aim of this study was therefore to scrutinize the effect of sustainability practices on supply chain resilience in the development of a circular economy in Nigeria. This study was steered within the horizon of qualitative method with a philosophical research paradigm of constructivism. The study used twenty-one (21) Consumer Goods Firm in Nigeria as population and sample. Primary data was explored using key informant interview. Thematic analysis was used to analyze the data collected. The study reveals that sustainability practices contribute to supply chain resilience in the development of a circular economy. The research concluded that, cradle to cradle practice, environmental sustainability, economic sustainability, and social sustainability play a major role in ensuring resiliency of consumer goods firms' supply chains especially in developing a circular economy. The outcome of this research is expected to lead to the development of a circular economy in Nigeria. The study will be of significance to Nigerian government, consumer goods companies, practitioners, regulatory bodies, and researchers.

Keywords

sustainability, supply chains, resilience, circular economy, Nigeria

1. Introduction

The disruptions stroked by Supply Chains (SCs) are numerous, many initiate from within the SC like break down of manufacturing line, demand variations, information technology complications, sustainability problems and/or quality challenges, the remaining are outside and due, amid other causes, to regulatory fluctuations, industrial labour actions, climate circumstances, economic disorder, fabricating, and terrorism (Scholten et al., 2020). With absence of resilience, a single node disruption may culminate in breaks or decreased capacity for the whole SC (Tukamuhabwa et al., 2015). Sung (2020) said that as SC networks become world-wide and progressively complex in design, mutually academics and experts are paying close consideration to how to handle danger factors like disruption in supply chain and quality control catastrophes that arise in the supply chain.

Sustainability is becoming a key emphasis of SCs, and resilience is part of the requirements to accomplish the sustainability aims (Irshad et al., 2016). Sustainable Supply Chain Management (SSCM) has become an essential portion of business strategy for almost all sectors. However, not so much is understood about the wider effects of sustainability practices on the ability of the Supply Chain (SC) to endure disruptions (Fahimnia & Jabbarzadeh, 2016). The growing experience of world SCs to extreme disruptions like those linked to COVID-19 pandemic obviously established the necessity for innovative data-driven risk cope models that monetize information from within and outside parties to back SC resilience, sustainability, and safety (Bechtsis et al., 2021).

Procurement Management has emerged as a key approach for enterprises seeking to become competitive in the long run. Procurement encompasses the whole process of acquiring property and/or services. It begins when an agency has identified a need and decided on its procurement requirement. Procurement continues through the processes of risk assessment, seeking and evaluating alternative solutions, contract award, delivery of and payment for the property and/or services and, where relevant, the ongoing management of a contract and consideration of options related to the contract. Procurement also extends to the ultimate disposal of property at the end of its useful life (Waters, 2004). However, it is even extended to cover assets under or to be leased as provided by the adoption of IFRS 16 commencing from 1st of January 2019. Recently, attention of researchers, governments, organizations, and other relevant stakeholders has been on the promotion of a circular economy through the inclusion of sustainability in every aspect of the Supply Chain (SC). This in turn is expected to contribute to a more resilient supply chain which is able to tackle turbulences or disruptions.

Recently, the COVID-19 pandemic is well-thought-out as the greatest serious universal health calamity of our time and continues to paralyze the social and economic life of several nations (Sajjad, 2021). The covid-19 pandemic has affected the supply of Goods and Services within and outside countries. Businesses need raw materials to be able to produce Goods for consumption, but some of these materials are not available due to lockdowns and other covid-19 restrictions. Consumption was very high, and resource were very scarce, individuals, firms, government, and supply chains do not care to

employ the habit of recycling, reuse, refurbish, remanufacture in order to ensure adequate utilisation of scarce materials. If used products are put back to the supply chain as raw materials, a lot of wastages that causes environmental externalities will be reduced and this would help in making the supply chain more resilient. Resilience resolves the capability of the supply chain to handle the effects of a preventable risk events to reappear to its normal activities (Anbumozhi et al., 2020). Inversely, the enhancing corporates' sustainability and efficiency by decreasing inventories could decrease its ability to respond to supply disruptions; devoting to the relations with suppliers to enhance their sustainability performance could denote high strictness when disruptions in supply need companies to quickly procure from diverse sources. Cases exist where sustainability and resilience may not lead to trade-offs (Negri et al., 2021).

The natural environment has been facing a lot of challenges due to organizational and human activities ranging from pollution to neglection of sustainability practice. Recently, the world attention has been on how to protect the environment and promote sustainability in every aspect of supply chains and part of it was to promote sustainable procurement, a scenario that would ensure the promotion of sustainability in every aspect of procurement activities. Sustainability is part of the seventeen goals being advocated by the Sustainable Development Goals (SDGs). With increased pressure to reduce environmental externalities, its high time for firms to start measuring their carbon footprint and ensure the future generation's needs are not compromised. At the firm's stage, the integration of sustainability and resilience mechanisms into supply chain operations comes with substantial modelling and management difficulties. Part of these complications that this study intends to address in some form in this research comprise finding, recognising and weighting of the sustainable practices and resilience in supply chain performance measures and sightseeing the real-world implementation (Fahimnia & Jabbarzadeh, 2016). Circular economy is the type of economy built from societal production-consumption systems that enlarges the service created from the undeviating nature-society-nature material and energy throughput flow. This is achieved by utilising renewable energy sources, cyclical materials flows, and cascading-type energy flows. Efficacious circular economy contributes to environmental, economic, and social components of sustainable development (Korhonen et al., 2018). The fresh modern challenge for SC managers is to plan an effective and efficient SC network which will be sufficiently resilient to cope with any interruption and that also should have adequate watchfulness to offer equal sustainability beneath a disturbance state (Irshad et al., 2014).

The issue of sustainability and resiliency cut across different fields of endeavour and that could be one of the reasons behind its inclusion in the seventeen Sustainable Development Goals which are aim at achieving by 2030. The Nigerian oil and gas sector has witnessed a lot of disruptions in its supply chains because it was not resilient enough to cope with uncertainties. Nigeria witnesses scarcities in the petroleum industry's products and this persists for a very long period of time. Domestic refineries are

down and could not produce to capacity. A lot of useful wastes are disposed which could be used for other purposes. There is the tendency that in the future crude oil will cease to exist in Nigeria and this brings to question the issue of sustainability in the oil and gas products. Nigeria can only survive this if its supply chain is robustly resilient. Nigeria needs to develop a circular economy where environmental, economic, and social issues will be put in place to ensure the safety of the ecosystem and efficient social and economic system. A system a where consumer Goods products will continue to flow, a system that minimizes wastes and convert it into useful products, a system that ensures resiliency in disruptions, a system that takes care of future generation's needs.

Therefore, the main research question of this study is, how does sustainability practices affect supply chain resilience towards developing a circular economy of Nigeria?

The aim of this research is to assess the effect of sustainability practice on supply chain resilience in developing a circular economy of Nigeria. Thus, the specific objectives are:

i. to evaluate the effect of cradle-to-cradle practice on supply chain resilience in developing circular economy.
ii. To investigate how environmental sustainability affects supply chain resilience in developing a circular economy of Nigeria.
iii. to examine how economic sustainability impacts on supply chain resilience in the development of circular economy in Nigeria.
iv. to assess the effect of social sustainability on supply chain resilience in the development circular of economy in Nigeria.

In order to accomplish the aim of this research, the following questions have been raised:

i. How does cradle-to-cradle practice affect supply chain resilience in developing circular economy in Nigeria?
ii. How does environmental sustainability affect supply chain resilience in developing a circular economy of Nigeria?
iii. Does economic sustainability impact on supply chain resilience in the development of circular economy in Nigeria?
iv. What is the effect of social sustainability on supply chain resilience in the development circular of economy in Nigeria?

This research will contribute significantly to the existing literature. In spite of having various studies undertaken on sustainability and resilience in supply chain by various researchers in different nations, none of the studies have particularly and empirically investigated the effect of sustainability practice on supply chain resilience in development of circular economy of Nigeria. This has created a significant knowledge gap and therefore forms the basis for this study. This study, therefore, adopted some components of Triple Bottom Line (TBL) to take care of sustainability practices. The domain of this research was the listed consumer goods companies of Nigeria. The study will be beneficial to

practitioners, and the firms under study. It will be beneficial to practitioners in coming up with policies on sustainable procurement and practicing same which could aid supply chain resilience. They may also use the outcome of the study to reduce the level of environmental externalities caused by their operations.

The study searches relevant research from googles scholar and Discovery using diverse databases such as Web of Science, Open Access, and ProQuest etc. The study logs, catalogues, and synthesises the relevant literature obtained. Key word search on “sustainability AND resilience”, “sustainable practice AND resilience”, “sustainable procurement AND supply chain resilience”, “sustainable practice AND supply chain resilience”, “resilience in supply chain” etc. was done.

A strong supply chain can be well-defined as one that its processes remain unaffected or slightly affected when a facility or numerous facilities are disrupted by a natural or artificial tragedy (Fahimnia et al., 2018). Scholten et al. (2020) see supply chain resilience as the ability of the SC to re-emerge in supremely an improved state than before the disturbance, thus, getting advantage on the rivalry by reappearing or taking advantage of fresh opportunities better than other companies which were previously affected together. Procurement is the procedure involved in gaining a commodity or services (Adeniyi et al., 2020). Smith et al. (2004) seen procurement as the procedure entailed in the purchase of commodities or services at the finest likely total cost of ownership in the correct number and quality and at the appropriate benefit or use of client through a contract. Circular economy denotes the transformation of corporate processes from the outmoded undeviating system of economy where natural resources like raw materials are transformed into products through manufacturing generating waste leading to degraded environment, to a circular system that impairment done in resources procurement is restored (Agyemang et al., 2019).

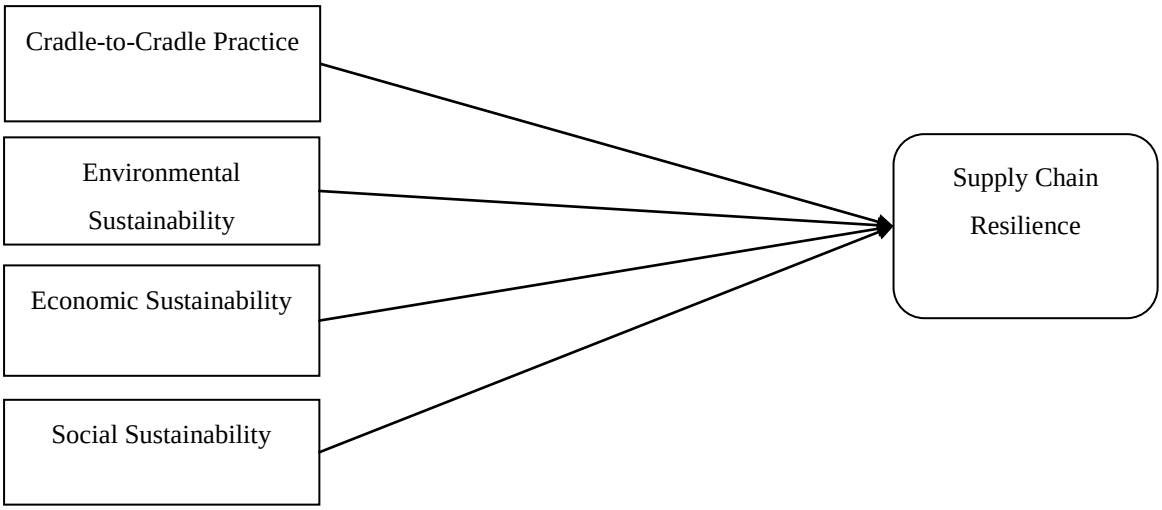

Figure 1. Conceptual Framework

The Figure 1 above shows the direct relationship between cradle-to-cradle practice, sustainable procurement, environmental sustainability, economic sustainability, social sustainability, and supply chain resilience. The link between the phenomena under study is that it is expected that the sustainability practices will greatly help in enhancing supply chain resilience.

Sajjad (2021) evaluated the effects of the COVID-19 pandemic on SC sustainability and synthesized evolving literature on possible strategies by which transparency, social sustainability and resilience can be improved across the stretched business SC processes. The research found that, corona virus pandemic has been linked with a key disturbance of world SC operations and has led to diverse sustainability consequences. While the COVID-19 triggered falls in air pollution and GHG (Greenhouse Gas) emissions, it has had grave social consequences for the well-being and livelihoods of employees and their relatives. The research recommended that firms should adopt or come up with strategies like advanced digital technologies, employee protection schemes, localization and regionalization, diversification, and stakeholder collaboration in order to enhance supply chain resiliency.

Fahimnia et al. (2018) explores the degree to which SC greening and buttressing strategies are supportive or conflicting. A supply chain design model is introduced which uses an environmental performance scoring approach and a robustness measure to explore the relationship between greening and buttressing. Potential trade-offs to develop robustly green and greenly robust supply chains are appraised. Data from a multinational apparel company was used. Results show both greening and buttressing can be costly, green supply chains are most sensitive to disruption, robust supply chains have strong long-term benefits, and buttressing a green supply chain is a good investment. From another dimension, Fahimnia and Jabbarzadeh (2016) evaluated connection that sustainable supply chain has with resilience from the level of design of supply chain. It was discovered that, sustainable supply chain planned via a permanent trade-off analysis was powerless to satisfy demands for Good during supply disruptions. Nevertheless, resiliently sustainable supply chain established via a dynamic sustainability trade-off examination was able to fulfil the whole demand in market at a minor rise in entire supply chain charge via the modification of sourcing, manufacture, and delivery tactics once disruptions happen. Moreover, the study detected that the social and environmental performance of the sustainable resilient supply chain persisted nearly unpretentious in disruptions.

Agyemang et al. (2019) explored the drivers and barriers to employing a circular economy in automobile manufacturing sector of Pakistan. The found that, market share/benefit/profitability, cost reduction and appreciation/concern for environment/business principle are the uppermost three drivers to implementation of a circular economy. Correspondingly, lack of expertise, cost and financial constraint, and unawareness are the upper three barriers in the circular economy principles' implementation in the automobiles sector of Pakistan. On the other hand, Negri et al. (2021) conducted a systematic literature review on how to integrate sustainability and resilience in Supply Chain (SC).

The research discovered the idea of sustainable SCs were well recognised and overall arrangement on its theoretical basics exists. SC resilience was fairly to a smaller degree established. The link and associations between sustainability and resilience is frequently disjointed: confusion exist on sustainable and resilient SCs establishment; clarity does not exist on what operations might jointly improve the fields. There is existence of a foremost conflict because sustainability usually concentrates on efficiency whereas resilience pursues effectiveness. The study recommended that further research should examine the implementation associations and effects.

Kalmykovaa et al. (2018) developed tools for circular economy implementation. Two tools were offered. The initial is a “circular economy strategies database”, which comprises forty-five circular economy approaches which were applicable to diverse components of the value chain. The next is a “circular economy implementation database”, that comprises over one hundred case studies classified by scope, portions of the value chain which were involved, as well as by the utilised strategy and implementation degree. The study found that, while such components of the value chain as recycling/recovery and use/consumption are conspicuously presented, others, comprising distribution and manufacturing were not often considered in circular economy. From another angle, Korhonen et al. (2018) contributed to scientific study on circular economy and conducted critical analysis of CE from the viewpoint of environmental sustainability. The research discovered six challenges such as those of system boundaries and thermodynamics, which must be fixed for circular economy to contribute to world net sustainability. The 6 challenges comprise of Thermodynamic Bounds, Spatial and Temporal System Boundary Limitations, Limits Posed by Physical Economic Growth: Rebound Impact, Jevon's Paradox and the Boomerang, Path Dependencies and Lock-in, Intra-organizational VS. Inter-organizational Strategies and Management, and Definition of Physical Flows. From a different angle, Nizami et al. (2017) evaluated the likely of waste biorefineries in emerging nations as a solution to present left-over dumping challenges and as facilities to produce power, fuels, value-added goods, and heat. The research concluded that, waste biorefineries if industrialised in emerging nations could offer energy generation, environment savings, savings of landfills expenses, fresh businesses and resulting occupation creation, greenhouse gas emissions lessening, and savings of natural resources of groundwater, soil, and land.

Thilmany et al. (2021) identified drivers that elucidate why domestic solutions to corona pandemic differ when compared with the nation-wide discussion on food SC interruptions. The study recommend local regional food systems businesses are agile and linked to SC associates, letting them to invent rapidly with a targeted method. Bearing in mind the shorter SCs and minor processes typical of local and regional food systems, the research proclaim the present regulatory setting’s impartiality and significance may be examined. From another perspective, Bechtsis et al. (2021) examined how data-centric supply chains can be designed or restructure and managed to reenforce resilient, sustainable, and secure environments. The study highpoints the necessity for data-driven digital

technologies which empower collection of data and handling, safe storing and efficient processing of data towards monetization of data for SC safety, sustainability across end-to-end processes and cost-competitive resilience. Scholten et al. (2020) in their study "Dealing with the unpredictable: SC resilience" discovered that resilience as a subject has become vital not only in sectors like food, automotive, electronics and insurance but also as a field for inter-governmental and governmental consideration, as echoed in calls for H2020 projects on, for example, urban resilience.

Owida et al. (2022) offered a decision-making model for integrating sustainability and resilience in managing manufacturing systems in the era of corona virus pandemic. The research revealed that, efforts of digitalisation and technology are the foundations for curbing dangers and guaranteeing a sustainable and resilient manufacturing system in the era of the COVID-19. It was discovered that, in the COVID-19 era, the manufacturing system decision-making procedure has been primarily steered by the regulations and legislation on countrywide and regional stages and world-wide corporate policies. From another angle, Jabbarzadeh et al. (2018) presented a mix methodology for the design of a sustainable supply system that executes resiliently in the aspect of random disturbances. The study developed stochastic bi-objective optimisation model which uses a fuzzy c-means clustering approach to evaluate and measure the suppliers' sustainable performance. The research concluded that the overall SC cost rises as sustainability level becomes bigger. However, the degree of rise in SC cost in disturbance circumstances declines at advanced sustainability levels. This result backs the impression that practices of sustainability are helpful to improved SC resilience against interruptions.

Scala and Lindsay (2021) evaluate how resilience is obvious in public sector healthcare SCs when they are challenged with pandemic disruption and identified lessons to inform future-readiness phases and recovery. The data were obtained using semi-structured interview and the study found in what way precise resilience strategies like flexibility, redundancy, collaboration, and agility contributed to SC resilience in the period of the corona virus pandemic response. Collaboration has been recognised as a prime mechanism for resilience with public sector links regarded as enabling this. Ponomarov and Holcomb (2009) presented a combined viewpoint on resilience via a wide-ranging literature review in various fields comprising ecosystems and developmental psychology. The research found that the prime fundamentals of SC resilience and the associations amongst them, the relations between risks and consequences for SC management, and the procedures for managing these vital issues are unwell understood. The study further suggest that the real-world consequence of the result is SC disruptions have negative influence on equally costs and revenue. Resilient SCs integrate incident readiness, frequently are capable of recovering to their former state or even improved post the disruptive incident and are proficient of offering an effectual response.

Jain et al. (2017) developed a hierarchy-based model for SC resilience, clarifying the dynamics between numerous enablers and confirming the model analytically. The prime discovery was that by utilising the proposed model, firms can improve their resilience possibility by altering their strategic

assets. The model has been verified via rigorous statistical examinations comprising reliability, discriminant validity and convergent validity.

It was evidently obvious from the preceding reviewed literature that, none of the literature appraised how sustainable practices influence supply chain resilience in development of a circular economy in Nigeria especially in the era of COVID-19 and beyond. Therefore, this research is first of its kind in Nigeria.

2. Method

This study was steered within the horizon of qualitative approach with Constructivist philosophical research paradigm. The study adopted causal research design to classify data and respond to the research questions that were raised. The study espoused the causal design for the reason that it looked at the subject matter above plain description and exploration. The study used twenty-one Consumer Goods Firms publicly quoted in Nigeria as population. One employee from each of the firms was selected as sample using purposive sampling technique, therefore, twenty-one personnel from the consumer goods sector of Nigeria served as sample of the study. Primary data was gotten from Key Informant Interview (KII). The interview has been exploited to obtained data from the respondent because the study adopted qualitative approach. Furthermore, KII allows a scholar to get data from professionals and individuals that are involved in discharging an operation or activity. Thematic analysis was employed to analyse the data obtained. The thematic analysis has been utilised due to its richness in recognising diverse patterns of data set and it is among the utmost suitable approaches for examining interview. All ethical matters have been appropriately addressed, and confidential information will be kept as secret.

3. Result

This section presents the results of data collected and run. The output of the data run was in form of word cloud and project map.

Figure 2. Word Cloud

Source: Output from Nvivo 12 Plus

The word cloud shows the frequency at which words appear in the data obtained. It signals how important a word is in answering a research question and thereby achieving the research objective.

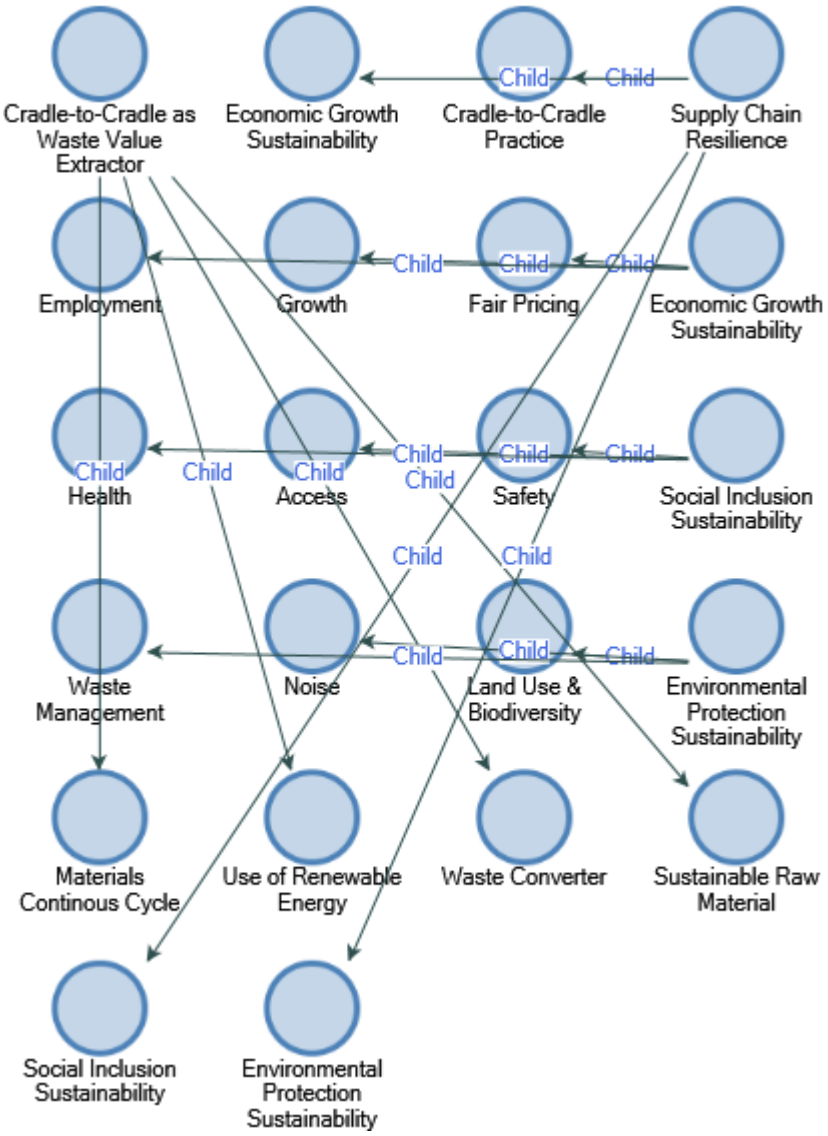

Figure 3. Project Map

Source: Output from Nvivo 12 Plus

The project map serves as an approach use in conducting thematic analysis. It presents data in form of themes and subthemes which appear as parents and children. Each parent serves as theme and has children under it.

4. Discussion and Conclusion

This section deals with the analysis of data obtained from key informant interview conducted across the firms in the Nigerian consumer goods sector. Themes have been formulated and the responses were coded using Nvivo 12 plus. The output of the data run was in form of word cloud and project map and thematic analysis was employed to analyse the data and come up with findings.

Size determines how often a word was uttered in the interview, the bigger the size of the word in the word cloud the more frequent it appears and helps in achieving the research objective. From the figure 2 above, it can be seen that words such as supply, chain, economy, sustainability, circular, safety, resilient, disruption, materials, products, pandemic, environmental, cradle, pollution are more visible in the cloud because the subject matter under consideration put more emphasis on them. Discussion below was based on figure 3 above.

Cradle to Cradle as Waste Value Extractor

How does cradle-to-cradle practice affect supply chain resilience in developing circular economy in Nigeria?

"Well, the cradle-to-cradle considers waste as food. Therefore, it is a great strategy when it comes to development of a circular economy" [RP1]

"With cradle-to-cradle practice products are design with the aim of bringing them back to the supply chain as raw materials. It is about keeping raw materials in continuous cycle, considering diversity, and making use of local resource, and exploring the consumption of renewable energy only in order to mitigate disruptions in supply chains and thereby promoting supply chain resilience" [RP15]

The covid-19 pandemic has really disrupted businesses and supply chains across the globe which posed a question of resiliency in world supply chains. This has made a lot of firms internationally to start thinking of how they can come up of with supply chains strategies that would lead to resiliency in disruptions. The biggest among them is the development of a circular economy where goods are reuse, recycle, remanufacture, refurbish, and/or retaking back to the supply chain through other means. It all has to do with issue of sustainability practices which guarantees the continuous flow of raw materials as used products are tapped to extract value. So, during the pandemic there was high demand and supply was very low due to disruption in freight logistics, unavailability of raw materials and labour because of lockdowns. Profit for companies was down, many employees lose their jobs, prices of commodities became very expensive, but the environment was saved from greenhouse gases emission. Therefore, the pandemic has really triggered firms and supply chains to formulate supply chain resilience strategies to ensure sustainable supply. One of those strategies was cradle to cradle practice. This agrees with the study's prior expectation and reality.

Therefore, cradle to cradle practice affects supply chain resilience in the development of a circular economy by ensuring materials continuous cycle, considering diversity, utilising domestic resource, and utilising renewable energy only. The finding is contrary to the finding of Negri et al. (2021).

Environmental Protection Sustainability

How does environmental sustainability affect supply chain resilience in developing a circular economy of Nigeria?

"For a resilient supply chain to be achieved, we need to convert the waste that we produce into valuable Goods or generate energy. With this we promote environmental sustainability by reducing

greenhouse gases emission, eliminate landfill, extract some quantity of raw materials, and provide job opportunities for some categories of individuals and firms" [RP8]

"We take the issue of noise pollution very serious as it disturbs the public. Therefore, our machines and vehicles are modern and regularly serviced to avoid unnecessary noises and vibrations. State government like Kaduna has restricted the movement of Trucks within the State in daytime and this was to reduce noise, congestions, vibrations and GHG emissions in the state." [RP20]

Sustainability can lead to a resilient supply chain in developing a circular economy because it considers how scarce resource can be minimize for maximum output, it leads to recycling of products and look into the needs of the future. With sustainability, a supply chain is to a certain extent prepared for disruptions and other forms of uncertainties. The sustainability could be from the perspective of procurement, environmental protection, economic growth, or social inclusion. A sustainable supply chain would actually guarantee resilience in production and distribution across the globe. Sustainability for the perspective of environmental protection can really contribute to a resilient supply chain through management of wastes, reduction of noise and vibration by logistics vehicles and efficient land use and biodiversity consideration. This helps in achieving a circular economy.

The restriction of movement of delivery vehicles in some place at daytime due to noise, congestion and vibration has really affected the resiliency of the sector's supply chain as it increases lead time. To tackle the disruption, some of the firms came up with a good routeing system by taking other routes. Some of the firms actually, consider the issue of effective land use very vital as they minimize space and ensure they build their factories closed to their customers for fast delivery and avoidance of supply disruptions especially as it occurred during covid-19 pandemic lockdowns. The firms also take the issue of biodiversity very significant. When their operations endanger the lives of species in water that could lead to sanctions by appropriate authorities which in turn could disrupt their operations. Therefore, they take issue of recycling waste very vital because used products and their packages are mostly dumped in waters and that endangers the inhabitants. This is in accordance with the study's initial anticipation and agrees with the finding of Nizami et al. (2017).

Economic Growth Sustainability

Does economic sustainability impact on supply chain resilience in the development of circular economy in Nigeria?

"In the development of a circular economy, economic growth sustainability influences supply chain resilience through rising growth, improve employment opportunities and fair pricing of products." [RP13]

With sustainable operations within the supply chains economic activities would keep growing and with that a resilient supply chain could be achieved because profit of the firms in the supply chain will be maximised. In a circular economy, when used products are taking back to the supply chain that creates a cheaper source of materials for production and could eliminate out of stock, create job opportunities

for individuals and firms and could lead to a sustainable resilient supply chain. With recycle products, fair pricing of products can be achieved. This finding goes with the priori anticipation of the study and agrees with reality.

Social Inclusion Sustainability

What is the effect of social sustainability on supply chain resilience in the development circular of economy in Nigeria?

"The health and safety of workforces is very essential to continuous production and supply of Goods to the customer in the supply chain. As a principal participant in the consumer goods sector, the Firm gives the highest importance to the implementation, maintenance, and continuous enhancement of high standards of quality, environment, health, and safety" [RP16]

"Our company also ensures wide access to materials, goods, and services in order to promote availability of consumer goods products across the globe and thereby promote resilience of the supply chain. We have also put a system of reverse logistics in place to ensure the return of deform goods and waste" [RP12]

In the development of circular economy in Nigeria, social inclusion from the perspective of safety, health and access contribute to supply chain resilience in many ways. In some consumer goods firms, all food manufacturing zones are visibly marked, and personnel are obliged to follow clear procedures concerning cleanliness and safety before they are allowed access to food manufacturing parts of the site. Workers and guests to the place are required to use proper protective equipment when involved in manufacturing or possibly hazardous jobs. By taking the issue of sustainable health, safety, and products accessibility very essential, a supply chain would be resilient enough to disruptions because it would be difficult to experience health, safety and stockout hazards which could drive their customers away. This agrees with the researchers' initial expectation.

In accordance with analysis done above, the study found that:

i. Cradle to cradle practice contributes to supply chain resilience in the development of a circular economy in Nigeria through materials continuous cycle, consideration of diversity, utilisation of local resource, and use of renewable energy only.
ii. Environmental sustainability contributes to supply chain resilience in developing a circular economy of Nigeria by conversion of waste that we create into valuable Goods or energy generation, this promotes environmental sustainability by reducing greenhouse gases emission, eliminate landfill, extract some quantity of raw materials.
iii. Economic sustainability influences supply chain resilience in the development of a circular economy in Nigeria through rising growth, improved employment opportunities and fair pricing of products.
iv. Social sustainability contributes to supply chain resilience in developing a circular economy of Nigeria through extensive access to materials, goods and services, health and safety of

employees, customer, and the public.

This study assessed the effect of sustainability practices on supply chain resilience in developing a circular economy of Nigeria. The research concluded that, cradle to cradle practice, environmental sustainability, economic sustainability, and social sustainability play a major role in ensuring resiliency of consumer goods firms' supply chains especially in developing a circular economy of Nigeria. They contribute through converting waste into useful products, reuse, recycle, remanufacture, provision of employment opportunities and skills, exploration of renewable energy, improve vehicle, driver and road user safety, fair pricing, product and materials wider accessibility, and ensuring health and wellbeing of employees to guarantee continuous supply.

Based on the findings and conclusion of this study, it was recommended that:

i. Consumer goods companies and the Nigerian government through regulatory authorities should formulate policies that will make it mandatory for firms to adopt cradle to cradle practice strategy.
ii. The managements of companies in Nigeria and government authorities should come up with strict policies and strategies that would ensure a pollution free environment by promoting reverse logistics, waste management and ensuring appropriate use of land.
iii. The government should enlighten firms and the public about the economic benefits of waste recycling and reuse which comprise of creation of job opportunities, fair product pricing and improved profitability.
iv. The management of companies in Nigeria should adhere strictly to health and safety regulations for hygienic operational environment and products. The management should also ensure that their firms' products reach customers across the globe within a short period of time. Moreover, the management should ensure establishment of business close to raw materials required for production.

Acknowledgement

We use this opportunity to thank and acknowledge the efforts of Kuehne Foundation towards ensuring the success of this research and for its academic support.

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