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Green Techno-Entrepreneurship and Sustainability of Manufacturing Firms in Abia State, Nigeria

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Abstract

This paper explores the dichotomy of economic sustainability versus environmental sustainability in manufacturing organizations operating in developing economies, paying special attention to South-East Nigeria. It analyzes five variables using the theory of ecological modernization along with stakeholder theory and resource dependency theory, namely (1) green entrepreneurial orientation (GEO) and competitive advantage; (2) eco-innovation and value creation; (3) renewable energy use and resource consumption; (4) green supply chain management (GSCM) and efficiency; and (5) green manufacturing practices (GMP) and operational performance. This research employed the cross-sectional survey method with the involvement of employees and management at five companies in Abia State (N=1,207). The study utilized a proportionally stratified sampling technique to select 401 participants but received responses from only 351 (87.5%) usable questionnaires. The research instrument had a satisfactory level of reliability (Cronbach's alpha between 0.782 to 0.893). Simple linear regression, ANOVA, and Pearson correlation were used for data analysis. There was a statistically significant positive relationship between green entrepreneurial orientation (GEO) and competitive advantage, as well as between eco-innovation and value creation. The models of renewable energy (F= 403.50, p= .001) and green supply chain management (GSCM) (F= 246.37, p=.001) were significant, and there was a highly significant correlation between green manufacturing practices and organizational performance (r= .816, p< .001). The mean agreement level exceeded 3.9 on a five-point scale for all variables. These results suggest that green techno-entrepreneurial practices are linked to several aspects of sustainability in manufacturing industries in Abia State. Considering that the study is cross-sectional and based on perceptions, one should be careful with making inferences about causality and generalizability of the results to other companies.

Keywords: green techno-entrepreneurship, green entrepreneurial orientation, eco-innovation, renewable energy, green supply chain management

1. Introduction

The manufacturing industry acts as both an engine of economic development and a significant contributor to environmental stress. Industrialization, technological revolution, and growing consumption have increased resource exploitation, pollution, and climate risks (Michalis et al., 2022). The consequence is that businesses need to ensure environmental sustainability while remaining competitive (Enyi et al., 2023; Pangarso et al., 2022). The answer to this dilemma is green techno-entrepreneurship, which refers to the development and application of eco-friendly technologies, products, processes, and models in order to achieve economic benefit without causing environmental harm (Bulsara, Porey & Gandhi, 2012; Ebrahimi & Mirbargkar, 2017; Lindgren, 2020). This is very common among developing nations, where companies have technical inefficiency, increasing costs, poor infrastructure and policies, and poor management of resources (Haroon & Shariff, 2016). In Nigeria, electricity power supply is one of the major problems that many firms face (Umar, 2023). Abia State provides an example of such a problem. At the moment, in April 2026, there were 190 manufacturing firms in Abia, and 108 of these firms are found in Aba.

The processes involved in these industries are characterized by energy utilization, waste production, pollution, and inefficiencies in raw material usage. How much does the adoption of green technology and practices improve the viability of these companies, and what kinds of green practices affect what results, is yet to be sufficiently studied.

Most studies are conducted in Asia, East Africa, and other parts of Nigeria (Enyi et al., 2023; Ifekanandu, 2025; Nwagbala & Nwankwo, 2023), focusing on a particular practice or one result. Not much research has been done in Abia State about the link between the specific green practices and the results they are supposed to have. Therefore, this study tries to fill this gap by exploring five practice-result relationships among manufacturing companies in Abia State. The specific objectives were to: (i) examine the effect of green entrepreneurial orientation on competitive advantage; (ii) ascertain the effect of eco-innovation on value creation; (iii) determine the extent to which renewable energy strengthens resource utilisation; (iv) explore the extent to which green supply chain management (GSCM) improves efficiency; and (v) evaluate the relationship between green manufacturing practices (GMP) and operational performance.

There are three ways through which this paper contributes to the existing body of knowledge. Firstly, it provides firm-level information on a relatively unexplored manufacturing sector in South-East Nigeria. Secondly, the five green techno-entrepreneurial activities and the five sustainable impacts are organized in one framework. Thirdly, there is provision for practical insights for managers and policymakers in achieving a balance between industrial development and environmental conservation.

2. Literature review and hypotheses

2.1 Conceptual background

Green techno-entrepreneurship combines the technological and entrepreneurial aspects into business activities to resolve environmental problems. Green techno-entrepreneurship is closely linked to eco-entrepreneurship, environmental entrepreneurship, and sustainable entrepreneurship (Ebrahimi & Mirbargkar, 2017; Lindgren, 2020). In the present study, green techno-entrepreneurship is measured with five items corresponding to each sustainability dimension that this item is assumed to have more influence on.

1. Green entrepreneurial orientation (GEO) implies the ability of the company to be proactive in finding and seizing opportunities that bring both economic and ecological benefits and can be measured by green innovativeness, proactiveness, and risk-taking (Jiang et al., 2018; Makhloufi et al., 2022; Shafique et al., 2021).

2. Eco-innovation is an activity aimed at creation, implementation, or use of an innovative product, process, service or management practice which minimizes risks and environmental impacts during its life cycle (Hojnik & Ruzzier, 2016). According to Cheng and Shiu (2012), there are eco-product innovation, eco-process innovation, and eco-organizational innovation.

3. Renewable energy is any source of energy obtained from an inexhaustible source such as solar, wind, hydroelectric, and biomass (Yu-Xia et al., 2022). Other than the environmental benefits, it can create economic robustness by providing diversification of energy resources (Umar, 2023), which is an important aspect where energy distribution systems may have issues with reliability.

4. The green supply chain management (GSCM) approach includes environmental aspects in the sourcing, production, logistics, packaging, and recovery of products (Sarkis et al., 2011; Younis et al., 2016).

5. The green manufacturing processes (GMP) ensure reduction of waste generation, energy use, and emission through re-designing of products and following the six Rs: reduce, reuse, recycle, recover, redesign, and remanufacture (Rehman et al., 2016).

These constructs of competitive advantage, value creation, resource use, efficiency, and performance form part of the economic side of sustainability of manufacturing firms.

2.2 Theoretical foundation

The research is based on the theory of ecological modernization (EMT), which suggests that environmental problems can lead to innovation and industrial development, and economic development and environmental protection can be pursued simultaneously, rather than being mutually exclusive goals. As suggested by the theory of ecological modernization (EMT), firms utilizing green innovations, cleaner production processes, and more resource-efficient management systems are capable of improving performance and gaining competitive advantage, while at the same time meeting regulatory and market demands (Bai & Sarkis, 2010; Sarkis et al., 2011; Zhu et al., 2018).

Two supporting theories are used. According to stakeholder theory (Freeman, 2010), managers are responsible to a wide variety of internal and external stakeholders who influence the environmental strategy of the firm with their environmental expectations (Lee et al., 2018). The theory of resource dependence (Pfeffer & Salancik, 1978) explains how firms deal with resource dependencies; adopting renewable energy sources and supplier collaboration are two green practices that help decrease resource dependence and affect relations with suppliers (Sarkis et al., 2011).

2.3 Hypotheses development

Green entrepreneurial orientation and competitive advantage

Previous studies on manufacturing firms show that green entrepreneurial orientation (GEO) positively impacts the performance of such firms. In a study involving 246 Bangladeshi

textile firms, green entrepreneurial orientation had a positive effect on market orientation and green supply chain management and efficiency, which helped enhance economic, environmental, and social performance (Hossain et al., 2020). In another study involving 202 manufacturing SMEs, green entrepreneurial orientation was found to have a positive impact on economic, environmental, and social performance (Ye et al., 2022), and green entrepreneurial orientation (GEO) helped improve the financial and environmental performance of 384 Pakistani SMEs (Muzaffar et al., 2023). In a meta-analysis of 23 studies that involved 6,666 firms, there was a positive and significant relationship between green entrepreneurial orientation and sustainable firm performance (Öztürk et al., 2024), while a survey of 516 Chinese manufacturing managers confirmed the same finding (Wenli & Teetut, 2024). Therefore, firms that actively seek green opportunities, engage in green ventures under conditions of uncertainty, and embed ecological values in their strategic considerations are bound to gain superior differentiation. In other words:

H1: Green entrepreneurial orientation positively affects the competitive advantage of manufacturing firms in Abia State.

Eco-innovation and value creation

Research findings about eco-innovation largely indicate positive implications, although not always consistent. Green product innovation has led to better firm performance and competitive ability for 140 Turkish manufacturers (Murat, 2012). Similarly, environmental innovations have been linked to better environmental performance and competitive advantage of 135 manufacturers in Taiwan and China (Yichun & Chen, 2016). For manufacturers in Nigeria, eco-innovation positively affected the market share of the manufacturing companies (Jebolise & Udo-Nwokocha, 2018), while circular eco-innovators in Spain were more likely to have and maintain high productivity than other innovators (Corcoles & Triguero, 2025).

However, results about certain elements are less consistent: process and organizational eco-innovations positively impacted both financial and environmental performance of 214 firms from South America, but product eco-innovation had no such effect (Barriga et al., 2022). In Tunisia, eco-innovation positively affected environmental performance and reputation, but it did not improve economic performance (Faten et al., 2023).

All things considered, eco-innovation is expected to result in value creation by reducing negative environmental impacts while improving products, processes, and reputation. Thus, **H2**: Eco-innovation has a significant positive effect on value creation of manufacturing firms in Abia State.

Renewable energy and resource utilisation

Renewable energy has been linked with positive results on both micro and macro levels. To begin with, renewable energy has been found to increase the productivity of manufacturing companies in Cameroon (Etienne, 2022); renewable energy sources positively correlate with sustainable development opportunities for SMEs in Nigeria (Umar, 2023); renewable energy has led to sustainable economic growth in Vietnam by increasing energy supply security (Le et al., 2020). In addition, a systematic review of 27 previous studies found a link between renewable energy usage and better firm performance (Sitompul et al., 2024). For firms faced with expensive and unstable grid energy, renewable energy sources can increase energy efficiency and other uses of inputs. Hence,

H3: Renewable energy increases the resource utilization of manufacturing firms in Abia State.

Green supply chain management and efficiency

There has been evidence in Kenya (Ouru, 2015), Pakistan (Qalati et al., 2022), Indonesia (Jamayat et al., 2025), and sub-Saharan Africa (Otchere et al., 2025) on how green supply chain management (GSCM) and efficiency are related to performance. Specifically, in Nigeria, there was a significant relationship between green purchasing and green packaging and the profitability and revenues of firms operating in Enugu State (Nwagbala & Nwankwo, 2023), and between green supply chain management practices and the sustainability performance of consumer goods firms (Ifekanandu, 2025). Given the above, it is expected that through minimizing waste, lowering transportation and energy costs, and value recovery of the returned products, green supply chain management and efficiency will lead to improved efficiency in the production process:

H4: Green supply chain management significantly enhances the efficiency of manufacturing firms in Abia State.

Green manufacturing practices and operational performance

Green manufacturing has been associated with improved performance in Kenyan cement manufacturing (Eshikumo & Odock, 2017) as well as 61 manufacturers in Mombasa County, in which cost reduction was the underlying strategy (Musau & Rucha, 2021). In addition, green manufacturing was positively correlated with the sustainable performance of 70 firms in Sri Lanka (Walisundara et al., 2022) and the efficiency of learning and growth in listed Nigerian consumer goods companies (Onyeka-Iheme et al., 2024). Therefore,

H5: There is a significant positive correlation between green manufacturing and the performance of manufacturing firms in Abia State.

Figure 1. Conceptual framework and hypotheses.

3. Methodology

3.1 Research design

The study adopted a quantitative, cross-sectional survey design for collecting data from a representative sample of a large population at one particular time period. The primary data were collected using a structured questionnaire from the employees and management of the selected organizations.

3.2 Study setting and population

Abia State is in the South-East zone of Nigeria's geopolitical regions, with Umuahia being the capital city of the state, while Aba is known to be its major industrial city. Purposive sampling was done in selecting five viable and visible manufacturing companies that include Glassforce Nigeria Plc, Seven-Up Bottling Company Ltd (Aba), Starline Group of Companies, Valumberg Flour Mill (Aba) and Ziggy Table Water. The total number of workers, according to the human resource department of each company, summed up to 1,207 (see Table 1).

3.3 Sample size and sampling technique

The sample size was determined with Godden's (2004) formula at a 95% confidence level (Z = 1.96), a ±4% margin of error (C = 0.04) and maximum variability (P = 0.5). The infinite-

population estimate, SS = $Z^2 \cdot P \cdot (1-P)/C^2$ = 600, was adjusted for the finite population: New SS = SS/(1 + (SS−1)/1,207) = 401. Respondents were allocated to firms by proportional stratified allocation (nh = (Nh/N) × n), giving the allocation shown in Table 1.

Table 1. Population, sample allocation and questionnaire return by firm

Firm	Population	Sample	Retrieved	Return rate (%)
Glassforce Nigeria Plc	237	79	68	86.1
Seven-Up Bottling Company Ltd, Aba	182	60	52	86.7
Starline Group of Companies	220	73	65	89.0
Valumberg Flour Mill, Aba	503	167	149	89.2
Ziggy Table Water	65	22	17	77.3
Total	**1,207**	**401**	**351**	**87.5**

Source: Firms' human resource departments and field survey (2026). Return rate = questionnaires retrieved ÷ sample.

3.4 Instrument, validity and reliability

The questionnaire had two sections: Section A captured respondents' demographic characteristics, and Section B contained statements on the green practices and sustainability outcomes, rated on five-point scales (agreement: 5 = strongly agree to 1 = strongly disagree; extent: 5 = very large extent to 1 = very low extent). The items are listed in Appendix A. Face and content validity were established through review by the researcher's supervisor and experts in measurement and evaluation. Reliability was assessed with a pilot of 25 questionnaires distributed across the firms, and internal consistency was measured with Cronbach's alpha. All coefficients exceeded the conventional 0.70 threshold (Table 2; Appendix B).

Table 2. Internal consistency of the research instrument

Construct	Items	Cronbach's α
Green entrepreneurial orientation (GEO)	6	0.860
Eco-innovation (EI)	5	0.857
Renewable energy (RE)	4	0.842
Green supply chain management (GSCM)	11	0.782
Green manufacturing practices (GMP)	7	0.893
Manufacturing firm sustainability	3	0.842

Source: Pilot study (n = 25), 2026.

3.5 Data analysis

Data were analysed with SPSS version 25 (output in Appendices B and C). Descriptive statistics (frequencies, means and standard deviations) summarised responses, and a mean of 3.5 or above was taken to indicate agreement. Hypotheses H1 and H2 were tested with simple linear regression ($Y = \beta_0 + \beta_1 X + \varepsilon$), H3 and H4 with analysis of variance (ANOVA) of the regression model, and H5 with Pearson's product-moment correlation, all at the 5% significance level.

4. Results

Out of the 401 questionnaires handed out, 351 were correctly filled in, giving a response rate of 87.5%. The other 50 (12.5%) were missing, not correctly filled in, or discarded because they had inconsistencies (Table 1). From Table 3, 56.7% were males, 71.5% were between

the ages of 31 and 50, 53.8% were B.Sc., PGD, or HND holders, and 76.4% were non-managerial employees.

4.1 Response rate and respondent profile

Table 3. Respondent profile (N = 351)

Characteristic	Frequency	Percentage
Gender		
Male	199	56.7
Female	152	43.3
Age (years)		
Below 30	44	12.5
31–40	139	39.6
41–50	112	31.9
Above 51	56	15.9
Highest qualification		
M.Sc./MBA/MPhil	33	9.4
B.Sc./PGD/HND	189	53.8
FSLC/SSCE/GCE	85	24.2
Others	44	12.5
Employee status		
Management staff	83	23.6
Non-management staff	268	76.4

Source: Field survey, 2026.

4.2 Descriptive statistics

All the participants agreed with the statements on all the constructs (Table 4). The means of the items were between 3.95 and 4.17, being above the 3.5 cutoff point. Regarding the distribution of the responses among the items, between 76% and 85% of them were either "agree" or "strongly agree"/"large" or "very large". Highest agreement was found in relation to green manufacturing (grand mean = 4.10) and lowest in eco-innovation (grand mean = 4.00).

Table 4. Descriptive statistics by construct (5-point scale; N = 351)

Construct	Items	Item mean range	Item SD range	% agree (4–5)
GEO	4	3.99–4.16	0.93–1.21	81.2
Eco-innovation	4	3.97–4.05	0.70–0.99	78.9
Renewable energy	4	3.99–4.07	0.82–1.20	79.1
GSCM	4	3.95–4.07	0.45–0.93	78.8
GMP	4	4.06–4.17	0.58–0.94	82.5

Note: Item means and standard deviations are from the SPSS output. % agree is the pooled share of responses in the top two categories across the four items, computed from the response frequencies.

4.3 Hypothesis testing

H1 and H2. Table 5 reports the simple regressions. Green Entrepreneurial Orientation (GEO) had a positive and statistically significant relationship with competitive advantage ($\beta = 0.732$, $t = 3.674$, $p < .05$), and eco-innovation had a positive and statistically significant relationship with value creation ($\beta = 0.312$, $t = 3.372$, $p < .05$). H1 and H2 are supported.

Table 5. Simple linear regression results (N = 351)

Model	β	Std. error	T	R^2 / adj. R^2 / F†
H1: GEO → Competitive advantage	0.732	0.017	3.674	0.866 / 0.701 / 1459.964
Constant	2.554	0.274	8.297	
H2: Eco-innovation → Value creation	0.312	0.030	3.372	0.804 / 0.749 / 740.694
Constant	2.194	0.143	5.356	

Source: Field data, 2026.

H3 and H4. The ANOVA results in Table 6 show significant regression models for renewable energy and resource utilisation, $F(3, 348) = 403.50$, $p = .001$, and for green supply chain management (GSCM) and efficiency, $F(4, 347) = 246.37$, $p = .001$. H3 and H4 are supported.

Table 6. ANOVA results for H3 and H4

Model / source	Sum of squares	Df	Mean square	F	Sig.
H3: RE → Resource utilization					
Regression	180.365	3	60.122	403.503	0.001
Residual	51.838	348	0.149		
Total	232.203	351			
H4: GSCM → Efficiency					
Regression	113.328	4	28.332	246.365	0.001
Residual	39.921	347	0.115		
Total	153.249	351			

Source: Field data, 2026.

H5. Green manufacturing practices and operational performance were strongly and positively correlated, $r = .816$, $p < .001$, $N = 351$, so that about 67% of the variance in each is shared ($r^2 = .666$). H5 is supported. Table 7 summarises the decisions.

Table 7. Summary of hypothesis tests

	Hypothesis	Test	Decision
H1	GEO → Competitive advantage (+)	Regression	Supported
H2	Eco-innovation → Value creation (+)	Regression	Supported
H3	Renewable energy → Resource utilisation (+)	ANOVA	Supported
H4	GSCM → Efficiency (+)	ANOVA	Supported
H5	GMP ↔ Operational performance (+)	Pearson r	Supported

Note: Hypotheses were tested in null form and each null hypothesis was rejected at the 5% level.

5. Discussion

All of the relationships observed between the environmental management through technological entrepreneurship (EMT) practices and sustainability outcomes are positive in nature. Such results are consistent with the theoretical predictions of the environmental management through technological entrepreneurship model since the integration of environmental innovations in business practice is likely to increase economic and operational performance, not diminish it.

Green Entrepreneurial Orientation (GEO) and competitive advantage:

The link between green orientation and competitive advantage is similar to previous research that suggests that green orientation is positively related to economic, environmental, and social outcomes of manufacturers (Hossain et al., 2020; Ye et al., 2022) and the meta-analysis that revealed the positive GEO-performance link (Öztürk et al., 2024). The respondents had the highest scores regarding readiness to invest in risky green projects for future benefits (item average = 4.16) and integration of ecological values into the company's strategy (also 4.16), which means that employees see green orientation as a strategic tool instead of an obligatory task. Some research indicates the partial mediation of some factors, such as green supply chain management (GSCM) and boundary-spanning search, between green orientation and manufacturing outcomes (Hossain et al., 2020; Ye et al., 2022). Therefore, the direct effect may have several indirect components.,

Eco-innovation and value creation:

These results in relation to eco-innovation are consistent with those from Nigeria showing that eco-innovation improves the competitive advantage of firms (Jebolise & Udo-Nwokocha, 2018). However, these results need to be read alongside other research works that have shown that the gains of eco-innovation differ based on its form and outcome under examination (Barriga et al., 2022; Faten et al., 2023). In this case, considering the current measure that considers eco-innovation as one concept, it is difficult to determine which types of eco-innovation generate value for companies in Abia State.

Renewable energy and resource utilization:

This prominent model of renewable energy usage is consistent with previous studies related to productivity or performance benefits of renewable energy in industry settings (Etienne, 2022; Sitompul et al., 2024) and among Nigerian SMEs (Umar, 2023). According to resource dependence theory, organizations that produce part of their energy have lower dependence on an unpredictable source from outside and can better allocate their inputs. However, the indicators used to measure the influence mainly reflect perceptions of renewable energy (such as its ability to reduce emission levels and prevent depletion), and not the actual usage of the energy.

Green supply chain management (GSCM) and efficiency:

This result is consistent with the findings from Kenya (Ouru, 2015), Pakistan (Qalati et al., 2022), and Indonesia (Jamayat et al., 2025), as well as the studies from Nigeria that have linked green procurement and packaging to financial performance (Nwagbala & Nwankwo, 2023). Efficient routes, environmentally evaluated suppliers, energy-saving processes, and product recovery were all highly ranked by the respondents, in line with the view that green supply chain management cuts down waste and expenses. The stakeholder approach offers another explanation in terms of the expectations of the suppliers and customers.

Correlation between green manufacturing practices (GMP) and performance:

The correlation is very high (r = .816), in agreement with the findings from Kenya (Eshikumo & Odock, 2017; Musau & Rucha, 2021) and Sri Lanka (Walisundara et al., 2022). Out of the various parts of the study, recycling design for products had the highest score (item mean = 4.17). Correlation shows a relationship between two variables but does not establish a cause-and-effect relationship.

5.1 Theoretical implications

This study supports the core tenet of environmental management through technological entrepreneurship (EMT) within the Nigerian manufacturing industry and shows how the stakeholder approach and resource dependency theory can be combined with environmental management through technological entrepreneurship to explain the differences in green behaviors among firms. The study also offers an easy-to-understand practice-outcome model (Figure 1) that future studies may develop further by adding mediators (such as green innovation or supply chain learning) and moderators (such as institutional pressure or environmental dynamics).

5.2 Practical and policy implications

(1) Managers need to incorporate the environmental orientation in their corporate strategy by defining environmental opportunities and investment standards clearly, as well as by exploring environmentally friendly technologies that make the firm more responsive and competitive.

(2) There should be investments in renewable energy sources such as solar energy, facilitated by stakeholders who will help in accessing equipment and funding.

(3) It is important to realign the supply chain towards green procurement strategies, which entail the selection of environmentally friendly suppliers and green packaging, with communication of these intentions to consumers.

(4) The manufacturing process must focus on the use of green product design, clean production techniques, and the proper disposal of the product at the end of its useful life.

(5) Policymakers could support adoption through incentives such as tax waivers, subsidies or grants for firms going green and through regulation and infrastructure that lower the cost of renewable energy.

5.3 Limitations and future research

There are several limitations to consider when discussing the conclusions. First, this is a cross-sectional study conducted from the perception point of view of employees, which means that the obtained results represent correlations rather than cause-and-effect relationships. The study is also prone to common method bias and social desirability bias because the respondents had to evaluate their employers. Second, only five firms were used for the analysis, and about three-quarters of them were non-management personnel, who had no visibility of strategy development; therefore, the results cannot be extrapolated to the whole industry in Abia State and Nigeria. Third, the practices were tested separately against one outcome measure. Conducting a multivariate analysis considering all practices and firm

characteristics and also mediators will help get a more complete picture. Fourth, due to security issues, some of the employees did not want to take part in the study.

For future research, it is recommended to use larger and randomly sampled samples of participants in several South-East states, combine the survey data with objective variables (for example, energy efficiency, waste generation, productivity) and use the structural equation modeling in order to identify mediator and moderator variables.

6. Conclusion

This study examines the relationship between green techno-entrepreneurship and sustainability in manufacturing organizations in Abia State. The green entrepreneurial orientation is positively related to competitive advantage; eco-innovation to value creation; renewable energy to resource utilization; green supply chain management to efficiency; and green manufacturing practices to operational performance. All these results imply that manufacturing organizations within the State which practice green techno-entrepreneurship generally have better competitive advantage, efficiency, and operational performances. Due to the nature and scope of this research design, the results obtained can be viewed as indicative evidence.

Ethics approval and consent:

Ethical approval was sought from the relevant institutional authority before conducting the research. Approval was also granted by the management of the selected manufacturing companies in Abia State. All the participants were clearly made aware of the objective of the study and also the fact that their participation in the study is voluntary and they can withdraw at any time without fear of any repercussions. Informed consent of all the participants was obtained before administering the questionnaire to them. The participants were made to understand that the data obtained will only be used for academic purposes and will be kept strictly confidential.

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Conflict of interest

The authors state that there are no conflicts of interest associated with this study. There were no personal, financial, professional, or institutional conflicts of interest that affected the study’s design, conduct, analysis, or reporting.

Data availability

The information used in this research is available from the corresponding author upon reasonable request. It is possible to provide access to the data under reasonable conditions, including proper confidentiality and ethical aspects.

Author contributions

The authors were involved in the conception/design of the study, construction of the research tool, data collection, data analysis, interpretation of the results, and writing/revising of the

manuscript. The authors read and approved the final version of the manuscript and accept responsibility for the integrity and correctness of the manuscript.

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