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## EFFECT OF GREEN TECHNOLOGY COMPETENCIES ON PERFORMANCE OF SELECTED MANUFACTURING FIRMS IN AKWA IBOM STATE

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### Abstract

*The study investigated the effect of green technology competencies on performance of Selected Manufacturing firms in Akwa Ibom State. The specific objectives are to assess the effect of green product production and consumption on organizational market share of Selected Manufacturing firms in Akwa Ibom State and analyze the effect of green technology competencies on organizational profitability of Selected Manufacturing firms in Akwa Ibom State. The study adopted a survey design. The study mainly utilized primary and secondary data to gather information from the respondents. The target population was 457 respondents from the selected manufacturing firms in Akwa Ibom State. The sample size of the study was 213 respondents. To test hypothesis regression model was used to test the dependent and independent variables. A total of 213 questionnaires were distributed to the manufacturing firms in Akwa Ibom State, 11 questionnaires were wrongly filled with percentage ratio of 5.2% while 202 questionnaires were filled and returned. Thus, 202 questionnaires were valid for the study which shows 94.8% of the total questionnaire for this study. The findings of study showed that green product production and consumption has a significant effect on organizational market of Selected Manufacturing firms in Akwa Ibom State. The study concluded that green technology competencies has a significant effect on organizational profitability of Selected Manufacturing firms in Akwa Ibom State. The study recommended that manufacturing firms should improve significantly in implementing energy-efficient technologies and practices in products production, implement water-saving technologies and processes to minimize water consumption in production. Reuse and recycle water wherever possible.*

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**Keywords:** *Green Technology Competencies, Green Product Production and Consumption, Performance and Market Share*

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### INTRODUCTION

Nigerian educational system comprises the basic education, junior secondary school, secondary school and high education. The higher education comprised Universities, College of education, Polytechnic and Mono-technic. The Universities are classified into public universities and private universities. The Public universities are universities owned by the government either by the federal or states government. The Public Universities in Nigeria presently are about 175 (NUC, 2020). They provided universities' education for the secondary school leavers in Nigeria.

Adopting green practices is an important consideration for today's firms. Resource limitation, increasingly sophisticated consumers, societal pressures and regulatory policies are driving the need towards a more balanced approach to economic growth and

environmental sustainability. Green techno is comprised of product and process innovation. It captures improvements in product design and manufacturing processes which save energy, reduce pollution, minimize waste and decrease a firm's negative impact on the environment (Wang, Zhang, Su, & Deng, 2018).

Zainul-Abidin (2010) refers to green technology as a novel way of doing things to accomplish or provide direct and positive benefits to the environment. Generally speaking, green technology aimed at developing and implementing corrective measures to palliate environmental damages is needed. Its role in addressing environmental challenges such as energy security, industrial pollution, climate change and the recycling of waste materials in today's hyper competitive environment has become progressively important for firms and societies. Admittedly, firms that infuse green technology into their strategic agendas improve organizational growth and environmental efficiency. Green technology and the implementation of green supply chain management are models of practices that must be implemented in order to leverage the effect of these challenges. Green technology is in fact an important strategic catalyst to obtain sustainable development, including technological innovation involved in energy-saving, pollution-prevention, and waste recycling. Moreover, green technology may be divided into green product and green processes that are designed for reducing energy and pollution emission, recycling of wastes, and utilizing sustainable resources (Chen, 2008).

With the increase in the implementation of green innovations and technologies, the importance of addressing key drivers that support such activities is emphasized. Recent studies identify, among others, corporate environmental ethics, stakeholders' view of green product, and market demand for green products as contributors to the success of the implementation (Weng, 2015; Zhu, 2013). However, technological challenges become greater as firms adopt green technology and sustainable practices internally and in association with other firms in the supply chain. Such challenges are tackled with large scale data, top management commitment, and human resource (HR) practices that focus on achieving competitive advantage and improving environmental and firm growth. HR practices have been linked with green management, technology/operations management and found to have contributing roles in organizational sustainability and to boost the performance of the firm (Shahzadi, Javed, Pirzada, Nasreen, & Khanam, 2014).

Green technologies consist of green innovation practices (e.g., green product, process, managerial, and marketing innovation) and the execution of green human resource management practices (e.g., green training and development, administrative support and culture, recruitment and selection, compensation, and benefits). Green technology is a significant strategic enabler to acquire justifiable development, as it practices energy saving, environment-protecting, waste-recycling, and pollution preventing methods. Furthermore, green technology can be divided into green product, green marketing, green processes, and green management that are intended for ecofriendly environment, decreasing consumption of energy and increasing efficient use of the resource, control over pollution emission, and waste recycling, improving the performance of the organization and providing the pollution-free environment to society at large scale (Calza, Parmentola, & Tutore, 2017).

### **Statement of the Problem**

Manufacturing firms around the world are not realizing that environmental cost needs to be accommodated in their business models. Quinn and Dalton (2009) have argued that poor emission practices from manufacturing firms are destroying life on earth and there is no polite way to say that manufacturing firms is destroying the world. Some

manufacturing firms in Nigeria fail to understand that they are primary players in economic development and they have the financial backing, technological know-how, and the institutional capacity, but they have refused to implement sustainable solutions to improve environmental performance. If they do not proactively incorporate environmental aspects into their business models, they are bound to experience a negative reaction through the media, public perception, brand reputation, government regulation, customer satisfaction, employees, shareholders revolts, communities or organization trying to protect the environment. Today's, unfavourable environmental effect on organizational performance has become worrisome and they are found wanting in adopting technological innovation for problems in the future.

However, Nigeria government is not responsible for the reduction of greenhouse gas emission. The government makes regulations to comply with the international treaties (like the renewables, carbon captures and storages). Hence, some Manufacturing companies in Nigeria lacks the capacity to carry out environmental protection activities to comply with international regulations of environmental protection and environmental consciousness of consumers. Manufacturing companies that fails to adopt the proactive strategies of environmental management could disintegrate the goals of environmental protections with different departments in the companies to meet the environmental regulations and improvements by utilizing the innovative product or process and green practices (Greeno & Robinson, 2002). On that note, in order to enhance environmental performance, enterprises must redesign products and adapt new technology for processes (Nidumolu, Prahalad, & Rangaswami, 2009).

Ugochukwu and Ertel (2012) posited that inadequate technology arising from manufacturing firms on oil prospecting and exploration in the Niger Delta area of Nigeria has impacted negatively on the biodiversity of the affected areas. The main stresses arise from leakages of crude oil, gas flaring and the escape of other chemicals used in green production and consumption. Effects on the flora and fauna of freshwater ecosystems in this part of Nigeria have been noticed. This is not far from the havoc air pollution from other manufacturing firms are causing at their various locations. In some occasions, the host communities have protested both peacefully and violently leading to loss of revenue. Therefore, the study examined the effect of green technology on organizational growth (A Study of Selected Manufacturing firms in Akwa Ibom State).

### **Objectives of the Study**

The main objective of the study is to examine the effect of green technology competencies on performance of Selected Manufacturing firms in Akwa Ibom State. The specific objectives are to:

- i. Assess the effect of green product production and consumption on organizational market share of Selected Manufacturing firms in Akwa Ibom State.
- ii. Analyze the effect of green technology competencies on organizational profitability of Selected Manufacturing firms in Akwa Ibom State.

### **Research Questions**

- i. What is the effect of green product production and consumption on organizational market share of Selected Manufacturing firms in Akwa Ibom State?
- ii. What is the effect of green technology competencies on organizational profitability of Selected Manufacturing firms in Akwa Ibom State?

## RESEARCH HYPOTHESES

**Ho<sub>1</sub>:** Green product production and consumption has no significant effect on organizational market of Selected Manufacturing firms in Akwa Ibom State.

**Ho<sub>2</sub>:** Green technology competencies have no significant effect on organizational profitability of Selected Manufacturing firms in Akwa Ibom State.

## REVIEWED OF RELATED LITERATURE

### Green Technology

Clean or green technology is the improvement and application of equipment, systems and products utilized to save the natural environment and resources which minimize and decrease the adverse effect of human activities (Monu, 2015). Green technology satisfies the following criteria:

- a) It minimizes the deterioration of the environment;
- b) It lowers greenhouse gases (GHG) emission to zero as well as its utilization is safe and finally it enhances healthy and improved environment for all forms of life.
- c) It saves the use of natural resources and energy.
- d) It enhances the utilization of renewables.

Different authors have expressed their views on green technology in different ways. Chen (2008) describes green technology as a transformation process that comprises novel ways of doing things (e.g., production–manufacturing, construction, procedures, systems, etc.) that provide direct and positive benefits to the environment. According to Chen, Lai and Wen (2007), green technology is a novelty used in technologies that incorporate energy saving, pollution prevention, waste recycling, green product designs and corporate environmental management. The import of the definitions centers on how stakeholders can adopt green technology to promote and attain organizational goals without hurting the environment. Admittedly, green innovation plays a major role in organizational development toward sustainability. Shen, Zhang, and Long (2017) have acknowledged green technology as a vital spark in a firm's performance management. In today's hyper competitive environment, firms aiming for survival should adopt effective green technology policies and engage, build and develop to become relevant to stakeholders. With proper policies laid out, firms stand a chance to advance and become global players.

In essence, green technology is an important intangible asset that affects the firm value, helping enterprises transform the environmental sustainability goal into a profitable investment opportunity. The financial market will assign a value to the bundle of an enterprise's assets, which is equal to the present discounted value of all future cash flows created by its assets. If intangible assets are expected to affect future cash flow, their value should be reflected in the observed market value of the firm (Abdul-Nasser El-Kassara & Sanjay Kumar, 2017). Consistent with this idea, when green innovation is expected to influence the future cash flows of an enterprise by production, management, marketing, reputation and other aspects, it will affect the financial market in evaluating its value. Green innovation consists of process and product innovation through improvements in manufacturing processes and product design. Green innovation's objectives are to reduce pollution, save energy, minimize waste, and decrease a firm's negative impact on the environment. The discourse on the relationship between green innovation and firm performance has grown but there is unclarity on the relationships between them which requires further empirical examinations. Green innovation enhances environmental

performance, offsets environmental costs by developing new markets and increasing market share and increases resource productivity. Green innovation brings a “first-mover advantage” to firms in terms of new market opportunities, improved corporate image, and competitive advantage, along with increased customer loyalty and firm reputation (Arora, 2014). On the other hand, as compared to nongreen firms, green innovation firms witness decreased financial performance as green innovation increases costs (Li, Huang, Ren, Chen & Ning, 2008). The literature mentioned above suggests unclarity and gap in the existing literature on the consequence of green innovation in the organization. Furthermore, the literature is deficient on whether the motivation for firms to adopt and implement green innovation processes and offer green products to the markets is internally driven or the relevant stakeholders pressurize them.

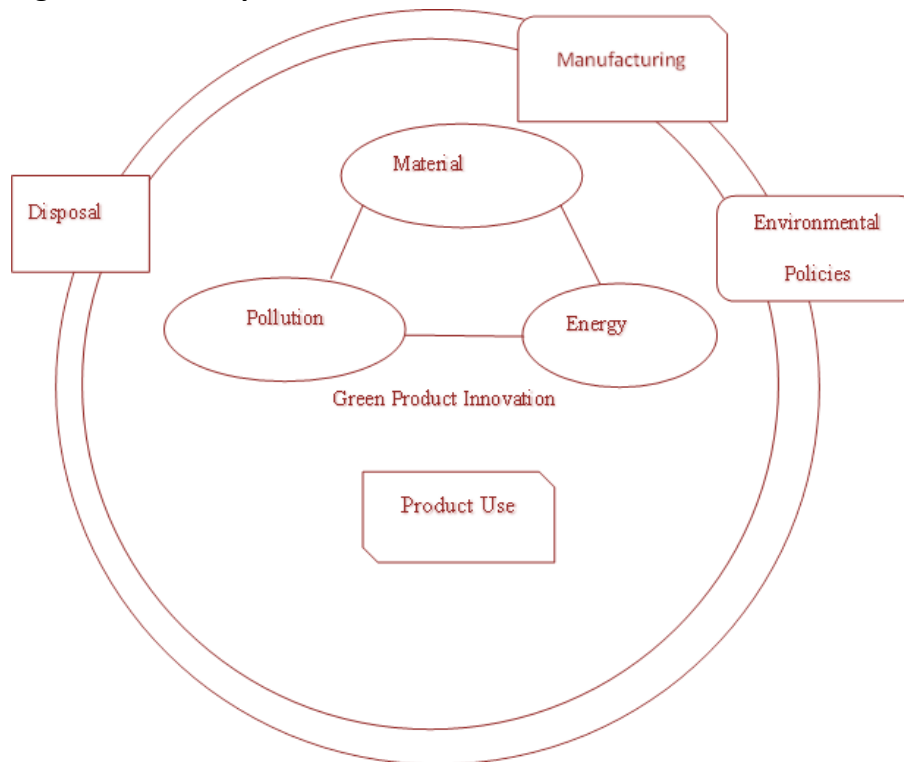
Green innovation reduces the firms' costs and enhances their competitiveness in dynamic markets. Firms that believe in green innovation prefer to use recycled materials for product development as these are inexpensive and environment friendly. At the same time, we posit that due to the increased environmental awareness of stakeholders, firms are under constant pressure to enhance their corporate image and improve market competitiveness through green product innovation (GPDl) (Weng, 2015). The level of empathy and attachment to the agenda of sustainability on the part of the firm's leadership and employees influence positively the acceptance of responsibility to act more sustainably. While the best practices and exemplary green innovation cases generally portray large-sized companies' reality, smaller firms should better understand their unique green innovation characteristics. The extant literature suggests scant attention to how small and medium-sized enterprises (SMEs) manage sustainable innovation. Needless to mention that SMEs should possess relevant entrepreneurial skills, engagement with external networks, and governmental supports in their growth (Green, Salkind, & Akey, 2008). However, the literature is scarce to guide on how to go ahead. Thus, based on the gap and unclarity in the extant literature, we proposed a theoretical model that depicts how SMEs under stakeholder pressure leverage their dynamic capabilities to engage in green innovations for enhanced firm performance. To explicate the nexus among stakeholder pressure, green dynamic capabilities, green innovation, and firm performance, we have used the stakeholder resource-based view to shed light on the direct and indirect effects of stakeholder pressure, green dynamic capabilities, and green innovation on SMEs' performance.

### **Green Product Innovation**

According to Zailani et al. (2015), a green product is one that functions with processes of material retrieval, production, sales, utilization, and waste treatment like recycling, in addition to pollution reduction and energy saving. For Aysen (2018), a green product is designed to minimize its environmental impact throughout its life-cycle. In particular, such products minimize nonrenewable resource use, avoid toxic material, and use renewable resources in accordance with their rate of replenishment. Moreover, the definition of green product according to the industrial perception states that such products must respect the “Three Rs” – reduce, reuse, and recycle. Therefore, green products are defined as those that are made and packaged from recyclable or re-usable material, are energy-efficient or use renewable sources of energy, are non-toxic in nature, minimize their greenhouse gas emissions, have received green certification, require less water for manufacturing or using, are manufactured and marketed by a socially responsible firm, and are manufactured locally (Aysen., 2018).

Conducting green product innovation practices is a relatively new approach for companies. Improvement of environmental awareness among stakeholders leads companies to conduct green product innovation to have competitive advantages and reach high performances by gaining the support of their stakeholders.

**Figure 1. A Conceptual Framework for Green Product Innovation**



*Source: Dangelico and Pujari (2010)*

As observed in Figure 1, green product innovation has multiple processes where energy, material, and pollution-are highlighted based on the effect of the environment at different product life cycle stages-manufacturing process, product use, and disposal. Radical green innovation introduction in the stages of product's life cycle addresses dimensions such as pollution prevention, energy use, and material selection which may create product competitiveness and differentiation for products. Introducing innovation will need an improved level of corporate environmental responsibility and sustained level of the organizational environmental policy implementation to convert green product ideas into practices and get rid of risks and challenges (Dangelico and Pujari, 2010). Green product innovation is the application of innovative ideas which lead to the design, production and marketing of new products whose greenness and newness outperform competitive products (Wang, et al, 2018).

Green product innovation protects the natural environment and makes contributions to environmental benefits more than competitive products (Lin, 2013). Since, environmental concerns have become more important in the business world, green product innovation has been crucial among manufacturing companies. Many companies make investments in sustainability initiatives for risk mitigation, cost savings, and revenue generation (Dangelico et al., 2017).

Green product innovation refers to the application of innovative ideas, leading to the design, manufacturing, and marketing on new products whose newness and greenness significantly outperform conventional or competing products. Green innovative products

are characterized by taking into account the recyclability and disposal issues throughout their life cycle; usage of materials that are recycled and less polluting, non-polluting, or non-toxic; due consideration to energy use, human toxicity, ecological impact, and sustainability issues at every stage of their life cycle; and incorporate a continual impact assessment and improvement mechanism in the product development cycle (Chiou et al., 2011). The “greenness” of a product is a relative concept that may change over time and be subject to the influences of context and expectations, similar to any other perceptual or evaluative phenomena. Over the years, many authorities at both national and international agencies have attempted to establish standards or specification for product “greenness” through treaties, regulations, practices, and guidelines. Although the standards may vary, they are generally concerned with ecological and human health, as well as the social, cultural, and economic impacts of a product. A product is considered to outperform a conventional or competing product in “greenness” if it imposes fewer burdens on the environment in terms of energy and raw materials requirements, air emissions, waterborne effluents, solid waste and other environmental releases incurred throughout its product life cycle.

### **Theoretical Framework**

#### ***Theory of Development by Rogers, (1995)***

Under the pressures of government policy and market competition, green innovation is both a challenge and an opportunity for an enterprise that pursues both ecological and business goals. To minimize risks and maximize benefits, organizations have the need to self-assess how well they are prepared for green innovation. In general, green innovation readiness describes how prepared an organization is to implement green innovation. It signifies an enterprise’s self-assessment of necessary and sufficient conditions for the endeavor to succeed in attaining sustainability goals. As per the TOE framework, there can be three aspects of green innovation readiness: technology readiness, organization readiness, and environment readiness. They concern how ready an organization is for green innovation in terms of technical, internal and external conditions, respectively. Only when an enterprise is prepared from all three dimensions can it successfully implement green innovation and take full advantage. Based on the self-assessment of green innovation readiness before and during the implementation process, a firm may make timely adjustments, allocate important resources, and acquire essential capabilities. Like each aspect of green innovation readiness, green innovation itself is a multidimensional construct. Researchers found that green innovation comprises three endeavors, green process innovation, green product innovation, and green managerial innovation.

The study anchored more on Legitimacy theory. In this theory any situation where the organization's activities do not respect the moral values, the organization is severely sanctioned by the society; these sanctions may even lead to the failure of the organization. The organization has to justify its existence through legitimate economic and social actions that do not jeopardize the existence of the society in which it carries on, nor the environment.

### **Empirical Review**

#### ***Green technology competencies, green product production and consumption on organizational market share***

Amuda, Raheem, Idris, and Stephen, (2002) study investigated on the Barrier Factors Affecting Adoption of Green Building Technologies in Nigeria. This study aims at determining factors that affect adoption of Green Building Technologies that normally

reduce greenhouse gas emissions. To elicit relevant information, online structured questionnaire forms were administered on practitioners who have been involved in green building development in Nigeria. Mean score ranking was adopted in ranking the barriers to green building technologies, while discriminant analysis was performed to examine how organizations groups (client, consulting, contracting, academia) were distinguished on the barrier factors identified. Findings revealed that, out of the 23 barrier factors considered in this research, lack of institutions to formulate policies and set guidelines (mean score - 4.5) ranked 1st as barrier to adoption of green building technologies in Nigeria. This is closely followed by lack of information about green products (4.0), low level of awareness about sustainability issues (4.0), human resource and client knowledge, lack of knowledge about green building technologies, high cost of green products, while unavailability of sustainable materials and products ranked the lowest (2.7). Only nine factors at 0.05 level of significance entered the discriminant analysis model and emerged as variables with the most significant power in differentiating the organization groupings on the basis of perceived barriers to adoption of green building technologies. The study recommends that there should be strong political will from government, to establish institutions that formulate policies on green building technologies.

Anas, Alhadid1 & As'ad, Abu-Rumman (2014), study the impact of green innovation on organizational performance, environmental management behavior as a moderate variable: an analytical study on Nuqul Group in Jordan. The purpose of the study is to examine the impact of green innovation (green product innovation, green process innovation) on organizational performance. The study was applied on Jordanian industrial companies, specifically on Nuqul Group in Jordan. Design/Methodology/Approach: The questionnaire was developed and distributed by 143 questionnaires to the higher managerial employees and the middle managerial employees (General Manager, Assistant General Manager, head of department, assistant head of department and supervisors). The researchers used the Simple regression and stepwise analysis to measure the effect of Green Innovation on Organizational Performance, and Environmental Management Behavior as a Moderate Variable. Finding: The most important finding of the study is having impact of moral green innovation in organizational performance, and also there is impact of the environmental management behavior as a moderator variable between green innovation and performance organizational. Implications: This study confirms the presence impact of green innovation in organizational performance, and this confirms that the practices of green economic and green management have significant benefits at the level of the national economy and achieve significant savings at the level of the Industrial sector.

Abdul-Nasser El-Kassara and Sanjay Kumar Singh (2017) studied green innovation and organizational performance: The influence of big data and the moderating role of management commitment and HR practices. Faced with internal and external pressure to adapt and implement environmental friendly business activities, it is becoming crucial for firms to identify practices that enhance their competitive advantage, economic, and environmental performance. Green innovation, green technologies, and the implementation of green supply chain management are examples of such practices. Green innovation and the adoption of the combination of green product innovation and green process innovation involve reduction in consumption of energy and pollution emission, recycling of wastes, sustainable utilization of resources, and green product designs. Although the extent research in this area is substantial, research on the importance of considering corporate environmental ethics, stakeholders view of green product, and



demand for green products as drivers of green innovation must be conducted. Moreover, the role of large scale data, management commitment, and human resource practices play to overcome the technological challenges, achieve competitive advantage, and enhance the economic and environmental performance have yet to be addressed. This paper develops and tests a holistic model that depicts and examines the relationships among green innovation, its drivers, as well as factors that help overcome the technological challenges and influence the performance and competitive advantage of the firm. This paper is among the first works to deal with such a complex framework which considers the interrelationships among numerous constructs and their effects on competitive advantage as well as overall organizational performance. A questionnaire was designed to measure the influence of green innovation adoption/ implementation and its drivers on performance and competitive advantage while taking into consideration the impact of management commitment and HR practices, as well as the use of large data on these relationships. Data collected from a sample of 215 respondents working in Middle East and North Africa (MENA) region and Golf-Cooperation Countries (GCC) were used to test the proposed relationships. The proposed model proved to be fit. The hypotheses were supported, and implications were discussed.

### **Gap in Literature**

This study attempts to fill in the research gap by investigating green technology readiness in terms of organizational growth. It addresses the research question “what is the effect of green product production and consumption on organizational market share of Selected Manufacturing firms in Akwa Ibom State? What is the effect of sustainable energy and climate technologies on organizational effectiveness of Selected Manufacturing firms in Akwa Ibom State? What is the effect of carbon capture and storages and renewables on organizational sustainability of Selected Manufacturing firms in Akwa Ibom State? What is the effect of green technology competencies on organizational sustainability of Selected Manufacturing firms in Akwa Ibom State? Based on the technology organization-environment (TOE) framework, it develops a research model that depicts how technological readiness, organizational readiness and environmental readiness affect green innovation endeavors that lead to subsequent performances and competitiveness.

### **METHODOLOGY**

The study adopted a survey design. Survey research design was adopted to obtain accurate data based on the opinion of the respondents on the research questions and research objectives in the study area with the use of a well-structured questionnaire. The study mainly utilized primary and secondary data to gather information from the respondents.

The target population was 457 respondents from the selected manufacturing firms in Akwa Ibom State. The selected manufacturing firms are Jubilee Syringe Manufacturing Co. Ltd, Champion Breweries, Semek Group of Companies, Victradeam Manufacturing Ventures and Life Resources Nigeria Limited. Thus, the sample size of the study was 213 respondents. A simple random sampling method was adopted and it gave the staff chance of being selected in the study. The methods used in this study to gather data was a set of questionnaire and a rating scale of 5 point likert such as 5 (SA; Strongly Agreed); 4 (A; Agreed); 3 (UN; Undecided); 2 (SD; Strongly Disagreed); 1 (D; Disagree). Content validity is the extent to which the instrument measures the overall appearance and subject matter in line with the objectives of the study. In other word to test

hypotheses of the study regression model was used to test the dependent and independent variables.

### DATA PRESENTATION AND ANALYSIS

A total of 213 questionnaires were distributed to the manufacturing firms in Akwa Ibom State, 11 questionnaires were wrongly filled with percentage ratio of 5.2% while 202 questionnaire were filled and returned. Thus, 202 questionnaires were valid for the study which shows 94.8% of the total questionnaire for this study.

**Table 1: Assess the effect of green product production and consumption on organizational market share of Selected Manufacturing firms in Akwa Ibom State.**

Statement	SA 5	A 4	UN 3	D 2	SD 1	TOTAL	MEAN	SD
Green Design improves organizational market share	121	80	-	-	1	926	4.6	.745
Green Materials Management enhance organizational market share	117	55	9	10	11	863	4.3	.945
Green Construction Processes improves organizational market share	94	62	15	20	11	814	4.1	1.04
Green Marketing Management improves organizational market share	139	63	-	-	-	947	4.7	.721
Reverse Logistics improves organizational market share	91	68	6	17	20	799	3.9	1.12
<b>DEPENDENT VARIABLES</b>								
Product Differentiation improves green product production and consumption	111	61	-	10	20	839	4.2	.945
Services Differentiation enhance green product production and consumption	107	65	9	10	11	853	4.2	.925
Personnel Differentiation improves green product production and consumption	104	52	10	20	16	814	4.0	1.04
Channel Differentiation improves green product production and consumption	110	48	10	9	25	815	4.0	1.01

*Source: Field Survey, 2024*

Table above showed effect of green product production and consumption on organizational market share of Selected Manufacturing firms in Akwa Ibom State. The decision rule mean score of  $\bar{x}$  3.00 was used to take decision on all the five (5) points likert scale. Majority of the respondents with the highest mean scores of 4.7, 4.6, 4.3 and 4.1 respectively strongly agreed that green marketing management improves organizational market share, green design improves organizational market share, green materials management enhance organizational market share and green construction processes improves organizational market share, while the respondents of the dependent variables with the highest mean scores of 4.2, 4.2, 4.0, 4.0 strongly agreed that Product Differentiation improves green product production and consumption, Services Differentiation enhance green product production and consumption, Personnel Differentiation improves green product production and consumption and Channel Differentiation improves green product production and consumption.

**Table 2: Analyze the effect of green technology competencies on organizational profitability of Selected Manufacturing firms in Akwa Ibom State.**

Statement	SA 5	A 4	UN 3	D 2	SD 1	TOTAL	MEAN	SD
Solar Power improves organizational profitability	128	42	-	14	18	854	4.2	.923
Wind Power enhance organizational profitability	181	21	2	-	-	995	4.9	.742
Hydropower improves organizational profitability	110	48	10	9	25	815	4.0	1.01
Geothermal Energy improves organizational profitability	97	67	11	19	8	832	4.1	.923
Biomass increases organizational profitability	155	47	-	-	-	963	4.8	.742
Biofuels increases organizational profitability	110	48	10	9	25	815	4.0	1.01
<b>DEPENDENT VARIABLES</b>								
Gross profit enhances green technology competencies	155	47	-	-	-	963	4.8	.742
Operating profit improve green technology competencies	150	42	10	-	-	948	4.7	.875
Net profit boost green technology competencies	154	21	6	-	-	872	4.3	.843

*Source: Field Survey, 2024*

The table showed the effect of green technology competencies on organizational profitability of Selected Manufacturing firms in Akwa Ibom State. Majority of the respondents with the highest mean scores of 4.9, 4.8, 4.2, 4.1, 4.0 and 4.0 strongly agreed that Wind Power enhance organizational profitability, Biomass increases organizational profitability, Solar Power improves organizational profitability, Geothermal Energy improves organizational profitability, and Hydropower improves organizational profitability and Biofuels increases organizational profitability while the respondents of the dependent variables with the highest mean scores of 4.8, 4.7, 4.3 and 4.0 strongly agreed that Gross profit enhances green technology competencies, Operating profit improve green technology competencies and Net profit boost green technology competencies.

### Test of Hypotheses

**Ho<sub>1</sub>:** Green product production and consumption has no significant effect on organizational market of Selected Manufacturing firms in Akwa Ibom State.

**Table 3: Regression model on Green product production and consumption on organizational market**

Variable	Parameters	Coefficient	Std error	t – value	P-value
Constant	$\beta_0$	0.061	0.047	1.298	.000
GPPC (X <sub>1</sub> )	$\beta_1$	0.242	0.097	2.495**	.001
<b>R-Square</b>		0.578			
<b>Adjusted R – Square</b>		0.540			
<b>F – statistics</b>		7.568***			

*Source: Field Data, 2024*

Table above shows the coefficients of showed that Green product production and consumption on organizational market. The coefficient of multiple determination (R<sup>2</sup>) was 0.578 which implies that 57.8% of the variations in dependents were explained by changes in the independent variable while 42.2% were unexplained by the stochastic variable indicating a goodness of fit of the regression model adopted in this study which is statistically significant at 1% probability level.

The coefficient of Green product production and consumption was statistically significant and positively related to organizational market at 5 percent level (2.495\*\*). This

implies that green product production and consumption has a significant effect on organizational market of Selected Manufacturing firms in Akwa Ibom State.

**Ho<sub>2</sub>: Green technology competencies has no significant effect on organizational profitability of Selected Manufacturing firms in Akwa Ibom State.**

**Table 4: Regression model on Green technology competencies on organizational profitability**

Variable	Parameters	Coefficient	Std error	t – value	P-value
Constant	$\beta_0$	0.074	0.069	1.072	.000
GTC ( $X_1$ )	$\beta_1$	0.089	0.067	1.328**	.001
<b>R-Square</b>		0.689			
<b>Adjusted R – Square</b>		0.580			
<b>F – statistics</b>		10.224***			

*Source: Field Data, 2024*

Table above shows the coefficients of Green technology competencies on organizational profitability. The coefficient of multiple determination (R<sup>2</sup>) was 0.689 which implies that 68.9% of the variations in dependents were explained by changes in the independent variable while 31.1% were unexplained by the stochastic variable indicating a goodness of fit of the regression model adopted in this study which is statistically significant at 1% probability level.

The coefficient of Green technology competencies was statistically significant and positively related to organizational profitability at 5 percent level (1.328\*\*). P-value = .001 < .05% significance level. This implies that green technology competencies has a significant effect on organizational profitability of Selected Manufacturing firms in Akwa Ibom State.

#### **SUMMARY OF FINDINGS**

- i. Green product production and consumption has a significant effect on organizational market of Selected Manufacturing firms in Akwa Ibom State.
- ii. Green technology competencies have a significant effect on organizational profitability of Selected Manufacturing firms in Akwa Ibom State.

#### **CONCLUSION**

The integration of green technology within organizations has proven to be a transformative force in driving sustainable growth and long-term success. Moreover, organizations that prioritize green technology are increasingly attractive to customers, investors, and employees. Consumers are becoming more environmentally conscious, demanding products and services that align with their values. Investors are recognizing the financial potential of sustainable companies and are more likely to support organizations committed to minimizing their environmental footprint. Additionally, talented employees are often drawn to companies that embrace green technology, contributing to a competitive advantage in the labor market. Green technology is not just a moral imperative; it is a strategic and economic necessity for organizational growth in the 21st century. Companies that embrace sustainability are better positioned to thrive in a changing world, where environmental responsibility is integral to long-term success. By reducing costs, enhancing market appeal, and aligning with evolving regulations, organizations can foster a greener, more prosperous future while simultaneously expanding their own horizons. The study concluded that green technology competencies has a significant effect on organizational profitability of Selected Manufacturing firms in Akwa Ibom State

## RECOMMENDATIONS

- i. The manufacturing firms should improve significantly in implementing energy-efficient technologies and practices in products production, implement water-saving technologies and processes to minimize water consumption in production. Reuse and recycle water wherever possible.
- ii. Organizations should constantly prioritize training and development programs that equip employees with the knowledge and skills needed to understand, implement, and optimize green technologies within the organization. Encourage ongoing learning and certifications in relevant fields.

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