

## **EFFECT OF GREEN SUPPLY CHAIN MANAGEMENT ON THE PERFORMANCE OF MANUFACTURING FIRMS IN ENUGU STATE**

**<sup>1</sup>Luka Sunday and <sup>2</sup>Okechuku Elizabeth Uzoamaka**

<sup>1</sup>Department of Human Resource Development, Faculty of Management Sciences, Enugu State University of Science and Technology (ESUT)

<sup>2</sup>Department of Business Administration, Faculty of Management Sciences, Enugu State University of Science and Technology (ESUT)

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**Abstract:** This study evaluated the effect of green supply chain management on the performance of manufacturing firms in Enugu state. Specifically, the study sort to determine the effect of green procurement on the output of manufacturing firms in Enugu state and to examine the effect of green distribution on the profitability of manufacturing firms in Enugu state. The study used the descriptive survey design approach. The primary source of data was the administration of questionnaire. A total population of one thousand five hundred and forty-two (1542), employees was used. The sample size of 308, using Freund and William's statistic formula at 5 percent margin of error. The findings of the study revealed that green procurement had significant effect on the output of manufacturing firms in Enugu state and that green distribution had significant effect on the profitability of manufacturing firms in Enugu state. The study concluded that implementing green procurement and green distribution practices leads to a positive impact on manufacturing firms. It was recommended among other things that manufacturing firms should provide education and training to their employees on sustainable business practices such as green procurement and green distribution. This can help employees understand the importance of sustainability in business and motivate them to implement these practices in their day-to-day operations.

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**Keywords:** Green, Supply chain, Management, Performance.

### **1.1 Introduction**

In recent years, there has been growing concern about the impact of manufacturing activities on the environment. The manufacturing industry is one of the largest sources of greenhouse gas emissions, air and water pollution, and waste generation (González-Benito & González-Benito, 2006). This has led to increasing pressure on manufacturing firms to adopt more environmentally sustainable practices. One approach to achieving sustainability in the manufacturing industry is through the adoption of Green Supply Chain Management (GSCM) practices. GSCM is an extension of traditional supply chain management that incorporates environmental considerations into supply chain activities (Sarkis, 2006). GSCM involves the integration of environmentally

friendly practices and policies throughout the entire supply chain, from sourcing raw materials to delivering finished products to customers (Govindan et al., 2015).

The adoption of GSCM practices has been shown to have a positive effect on the performance of manufacturing firms. For example, studies have found that firms that adopt GSCM practices can achieve cost savings through improved resource efficiency and waste reduction (Zhu et al., 2008; Luthra et al., 2016). Additionally, firms that adopt GSCM practices can enhance their reputation and brand value by demonstrating their commitment to environmental sustainability (Walker et al., 2012). Furthermore, GSCM can help firms comply with environmental regulations and avoid penalties and fines (González-Benito & González-Benito, 2006). GSCM's implementation is such a pioneering idea that is quickly gaining attention and interest of researchers and operating practitioners. The concept of GSCM in previous literature ranges from GP to GSCs, ranging from provider to producer to customers, including reverse logistics, Srivastava (2007) has incorporated environmental thinking into management of supply chains, including the design of products, material procurement and selection, production processes, consumer delivery of the finished product and after-service administration of the product. GSCM disposes of or reduces waste as energy, emissions, hazardous, chemical and solid waste (Olugu et al., 2017). It has been found that the focus of previous research is only on environmental issues in GSCM (Sasikumar & Kannan, 2009; Wu, Yang, & Olson, 2019; Khan & Qianli, 2017; Gomes & Daud, 2020). Performance sustainability model including economic performance, environmental performance and social performance were ignored.

As a result, green supply chain management (GSCM) makes a cognate effort to incorporate environmental issues in the context of supply chain management (Cousins et al., 2019). GSCM cut across the whole supply chain from suppliers, manufacturing companies, consumers, and also reverse logistics in a closed-loop supply chain (Abdallah, & Al-Ghwayeen, 2019). GSCM as environmental management model in companies has been widely adopted in manufacturing firms to reduce the adverse effect of its activities on the environment. The concept of GSCM is to incorporate supply chain management to promote a sustainable environment which includes processes for product design and development, selection and procurement of suppliers, production of clean technology, distribution for consumers of the end-of product, product and recycling (Endalaye, 2020). Companies have shown keen interest to the practice of GSCM in their supply chains to address organizational performance issues (Khan, Anwar, & Khattak, 2021). The prevalence of existing literature suggests a positive effect on both the organizational performance (Wibowo et al. 2018) and operational costs performance by the implementation of green supply chain management practices (Gandhi & Vasudevan, 2019). Other studies suggest that managers face major challenges in fully realizing the benefits of GSCM practices (Kirchoff et al. 2015). Goyal et al., (2017) also confirmed that there are many potential impediments to their implementation.

## **1.2 Statement of problem**

In a business setting where organizations adopt green supply chain management practices, manufacturing organizations prioritize their responsibility to the environment, society, and their long-term business viability. By adopting green supply chain management practices, they contribute to a more sustainable future while enhancing their competitive edge, reputation, and resilience in an increasingly environmentally conscious world.

Inversely, not adopting green supply chain management practices can have severe negative consequences for manufacturing organizations, affecting their reputation, financial performance, market access, and long-term

viability. As environmental awareness grows, organizations that do not embrace sustainability may find it increasingly challenging to compete and thrive in the modern business landscape.

Though there has been increasing global awareness of the need for sustainable practices, the implementation of green supply chain management (GSCM) among manufacturing firms in Enugu State, Nigeria remains relatively low. There is a need to investigate how GSCM adoption can impact the performance of manufacturing firms in Enugu State, given the unique characteristics and challenges of the state's business environment. Therefore, the problem is to determine the effect of green supply chain management on the performance of manufacturing firms in Enugu state.

### 1.3 Research Objectives

The main objective of the study is to examine the effect of green supply chain management on the performance of manufacturing firms in Enugu state. While the specific objectives are:

- i. To determine the effect of green procurement on the output of manufacturing firms in Enugu state.
- ii. To examine the effect of green distribution on the profitability of manufacturing firms in Enugu state.

### 1.4 Research Questions

- i. What is the effect of green procurement on the output of manufacturing firms in Enugu state?
- ii. What is the effect of green distribution on the profitability of manufacturing firms in Enugu state?

### 1.5 Research Hypotheses

- i. **Ho:** Green procurement does not have significant effect on the output of manufacturing firms in Enugu state
- ii. **Ho:** Green distribution does not have significant effect on the profitability of manufacturing firms in Enugu state

### 1.6 Scope of the Study

The topic of this study is the effect of green supply chain management on the performance of manufacturing firms in Enugu state. Geographically, this study focuses on selected manufacturing firms in Enugu State. The independent variable of the study is green supply chain management, which is proxied by procurement and distribution. The dependent variable of the study is performance which is proxied by output and profitability. The unit of analysis is the employees of the selected manufacturing firms.

## Literature Review

### 2.1 Conceptual Review

#### 2.1.1 Green supply chain Management

GSCM includes green design, green purchasing, green production, green distribution, logistics, marketing, and reverse logistics, and all these are partly or wholly engaged to reduce and eliminate the negative effect of entity activities on the environment (Srivastava, 2007). The green supply chain concept, according to Dubey, Gunasekaran and Papadopoulos (2017), includes all the phases of the product life cycle, range from raw material extraction, design, production and distribution, the use of and disposal of the product at the end of the product life cycle by consumers. GSCM is a wide range of practices. In line with the SCM concept, the GSCM limit depends on the researcher's objective (Srivastava, 2007).

#### 2.1.2 Green procurement

Green procurement practice is another important component of GSCM. The first step in the value chain is the buying function. The success of an organisation depends on the integration of its environmental efforts,

procurement activities and environmental objectives (Çankaya and Sezen, 2019). Green procurement may be defined as integrating environmental problems and concerns into the purchasing process (Zhou, Xu, & Muhammad, 2019). The choice of the right supplier is important in achieving the environmental objectives of a company. However, it is not sufficient to choose an appropriate supplier to improve its environmental performance.

Green procurement is defined as green buying resource that seeks to ensure recruitment products meet the environmental needs of firms such as waste reduction, recycling stimulus, restructuring, resource-saving and adequate substance replacement. Khan and Qianli (2017), claim that large organizations are practice more green based activities than small organizations and that these practices are the driving force behind organizational advances in combination with environmental awareness. Green procurement creates a competitive edge, protects resources and enhances firm performance (Faris and Maan, 2020: Mafini & Loury-Okoumba, 2018) found that green procurement has a positive influence on corporate performance, whether direct or indirect.

### **2.1.3 Green distribution**

The first dimension of GSCM that was included in this study is green distribution. Green distribution covers all activities aimed at reducing and eliminating environmental and shipping waste (Gardas et al., 2019); these include fuel consumption, frequency of transport operation, customer distance and packaging details such as weight, shape and material; all influence the performance of green distribution (Geng, Mansouri, & Aktas, 2017). Green distribution is an important activity that affects the performance of a green supply chain management practices. Green distribution is described as any transport suggestion between dealers and consumers having the least possible impact on the environment. And it includes the entire sharing of storage, order processing, packaging, picking, includes loading of vehicles, transportation to consumers and repackaging (Geng, Mansouri, & Aktas, 2017). The delivery process must be managed by strategic and collaborative agreement with the suppliers. It is also important to assess whether the provider complies with the environmental criteria of the company in addition to the choice and management of the supplier (Paulraj, 2011).

### **2.1.4 Performance**

The most important part of an organization is the performance, where performance is viewed as the success of an organization in achieving valuable outcomes, such as high returns (Memon & Tahir, 2012). Based on Smith and Reece (1999), business performance is defined as “the organization's ability to meet the desired result as determined by the company’s major shareholders”. On the other hand, it is to determine whether the actual output of an organization is as what has been targeted (Al Qudah, Osman & Safizal, 2014). Thus, to achieve high business performance, organizations need to attain and sustain competitive advantages. For this reason, many researchers had argued that strategic planning enables organizations to have competitive advantages and the ability to stay in business against competitors. They need to know that the correct performance level is important because it enables the organization to determine its current position and find ways to improve business if necessary. Consequently, the measurement of business performance has captured the attention of many scholars due to its complexity (Suklev & Debarliev 2012; Matsoso & Benedict, 2014). Different researchers have different ways to measure performance. Mandy (2014) summarized in his review that “the best way to evaluate performance is by effectiveness, growth and productivity, efficiency, individual employee sales, the value of exports, organization total assets and operation profit ratio as a measurement”. Researchers such as Arshada, Raslib, Arshadc and Zainc (2014) measured performance using financial indicator. Financial measure is done by measuring the sales, market

share, number of employees, return on capital employed, inventory turnover, return on investment, growth and profits. However, these indicators focus on the short term rather than long term strategy (Lonbani, Sofian & Barato, 2014). While other researchers such as Anyieni (2014) suggested the performance of benchmarking to compare performance with the relative competitors. Besides, Anyieni (2014) also suggests to benchmark with the pre-set target. Moreover, Dubihlela and Sandada (2014) suggested the use of perception of the owner or managers regarding the organization's success.

### **2.1.5 Output**

Output refers to the total production of goods and services of a whole country over a given period, its gross domestic product. The term may refer to all the work, energy, goods, or services produced by an individual, company, factory or machine. In the world of computing, it refers to any data that has been processed by and sent out from a computer or similar electronic device. The industrial output is the total output of all the facilities producing goods within a country. The manufacturing output, the output of all factories in a country, is a sub-set of industrial output. Manufacturing production refers to the total production output from industries that consist of producing goods in factories or plants for a specific time period. The manufacturing sector plays an important role in Nigeria economy and has many benefits that are crucial for her economic transformation, in a typical advanced economy the manufacturing sector is a leading, (Adegbuyi and Asapo, 2010). Output is the measure of production against efficiency. It crops up a lot in everyday conversation (Down, 2019).

### **2.1.6 Profitability**

In accounting, profitability is sometimes referred to as net profit or net income. When determining whether or not a firm is a continuing concern and can continue to function in its existing capacity, profitability is considered (Horton, 2021). Traditional marketplaces, which were considered as simple convergences of supply and demand, contribute less to the business sector than shopping malls. These malls attract buyers and sellers, and induce customers providing enough time to make choices as well as a recreational means of shopping. However, at present competition among malls, congestion of markets and traditional retail business has led mall investors and tenants to consider alternative investment portfolios to avoid the future risk. Xuan, (2020) opined that there are different profit maximization strategies for enterprises when they face different economic situations.

## **2.2 Theoretical Review**

This work is anchored on the Resources-Based View (RBV) Theory

### **2.2.1 Resources-Based View (RBV) Theory**

According to the RBV theory, a firm's resources and capabilities are the primary determinants of its competitive advantage and performance. In the context of green supply chain management, the adoption of sustainable practices can be considered as a valuable resource and capability that can enhance a firm's competitiveness and performance (Hult et al, 2001).

The RBV theory suggests that the adoption of green supply chain management practices can improve a firm's resource base by providing it with a sustainable competitive advantage. The sustainable practices can reduce costs, enhance operational efficiency, and improve brand image and reputation, leading to increased sales, profitability, and market share (Barrat and Oke, 2007).

Moreover, the RBV theory suggests that the adoption of green supply chain management practices can lead to the development of unique resources and capabilities that are difficult to imitate by competitors. For instance, the adoption of eco-design practices can lead to the development of innovative products and services that meet the

growing demand for environmentally sustainable solutions. Furthermore, the RBV theory suggests that the adoption of green supply chain management practices can lead to the creation of a corporate culture that values sustainability and social responsibility. Such a culture can attract and retain talented employees who are motivated by the firm's commitment to sustainable practices and enhance the firm's ability to collaborate with stakeholders (Kearns and Lederer, 2003).

In conclusion, the RBV theory supports the relationship between green supply chain management and firm performance by suggesting that the adoption of sustainable practices can enhance a firm's resource base, provide a sustainable competitive advantage, and develop unique resources and capabilities.

### 2.3 Empirical review

Onyinkwa, and Ochiri, (2016), conducted a study on the effects of green supply chain management practices on competitiveness of firms in the food and beverage sector in Kenya. The study adopted a descriptive research design which involved distribution of questionnaire to the food and beverage firms in Kenya. A descriptive research design was used in this study. The target population of this study comprised all the food and beverage firms that are registered by the Kenya Association of Manufacturers (KAM). The population and target population of this study comprised of all the 71 firms registered under the Kenya Association of Manufacturers. Once the questionnaires are received they were coded and edited for completeness and consistency. Quantitative data was analyzed by employing descriptive statistics and inferential analysis using statistical package for social science (SPSS). The findings of the study were on the effects of green supply chain management practices on competitiveness, firms in the food and beverage sectors adopt different green supply chain practices depending on the activities that they are engaged in and also which green supply chain practice will yield better competitiveness to the firm. It also established that most of the firms' green supply chain practices involved environmental collaboration, monitoring, purchasing and the greening of the production phase. It was also found out that the competitiveness to the food and beverage firms resulting from the green supply chain practices includes improved operational efficiency, increased customer base, offering superior services, reduction in waste level and all these leads to improved financial performance.

Mercyline and Kamande (2014) conducted a study in Kenya to investigate the relationship between environmental performance, profitability, and Environmental Management System (EMS) adoption in the manufacturing sector. The study aimed to examine the impact of eco-efficiency and eco-commitment on firms' profitability measured by Return on Assets (ROA) and the effect of a good EMS on the profitability and eco-efficiency of firms. The researchers employed a survey design and shared a questionnaire with six Kenyan manufacturing companies. The study findings revealed that firms can potentially increase their profitability by improving their eco-efficiency in resource use. Additionally, the study found that proactive firms perform better than reactive firms in terms of profitability and eco-efficiency. Firms that adopt both proactive and reactive EMS approaches perform even better, indicating the benefits of combining commitment-based and compliance-based approaches to environmental management.

### 3.0 Methodology

The study was based on the ten (10) selected pharmaceutical firms in Enugu metropolis with high number of staff and capital base of 20 million naira. The study used the descriptive survey design approach. The primary source of data was the administration of questionnaire. A total population of one thousand five hundred and forty-two (1542), staff was used. The sample size of 308, using Freund and William's statistic formula at 5 percent margin

of error. 272 staff returned the questionnaire and accurately filled. The validity of the instrument was tested using content analysis and the result was good. The reliability was tested using the Pearson correlation coefficient (r). It gave a reliability co-efficient of 0.81 which was also good. Data was presented and analyzed by mean score (3.0 and above agreed while below 3.0 disagreed) and Pearson correlation coefficient (r) was used to test the hypotheses.

**4.1 Data presentation and analysis**

**Objective One**

**Table 4.1.1** To determine the effect of green procurement on the output of manufacturing firms in Enugu state.

Options	SA Freq (%)	A Freq (%)	U Freq (%)	D Freq (%)	SD Freq (%)	Mean	Std
This firm is environmentally conscious in its sourcing and procurement of raw materials	150(55.1)	100(36.8)	8(2.9)	11(4.0)	3(1.1)	1.60	0.82
Firms that puts in consideration the environment when making purchases stands better chances of high output.	156(57.4)	97(35.7)	3(1.1)	6(2.2)	10(3.7)	1.60	0.91
The increased output of this firm is due to the procurement system practiced by the firm	134(49.3)	117(43.0)	7(2.6)	9(3.3)	5(1.8)	1.65	0.83

*Source: Field Survey, 2023.*

Table 4.1.1 shows the responses of the participants on the effect of green procurement on the output of manufacturing firms in Enugu state. It shows that 150(55.1%) of the respondents strongly agree that their firm is environmentally conscious in its sourcing and procurement of raw materials, 100(36.8%) of them agree to this assertion, 8(2.9%) of the respondents were undecided to this, while 11(4.0%) disagreed and 3(1.1%) strongly disagreed. This implies that the firms are environmentally conscious in its sourcing and procurement of raw materials with a mean and std of  $1.60 \pm 0.82$ . The table also show that 156(57.4%) of the respondents strongly agree that firms that puts in consideration the environment when making purchases stands better chances of high output, 97(35.7%) of them agree to this, 3(1.1%) were undecided to this assertion, while 6(2.2%) of them disagreed and 10(3.7%) strongly disagreed. With the mean and std of  $1.60 \pm 0.91$ , it implies that firms that puts in consideration the environment when making purchases stands better chances of high output. It further shows that 134(49.3%) of the respondents strongly agree that the increased output of their firm is due to the procurement system practiced by the firm, 117(43.0%) of them agreed with the assertion, 7(2.6%) were undecided to this while 9(3.3%) disagreed and 5(1.8%) strongly disagreed. The implies that increased output of firms can be due to the procurement system practiced by the firm with the mean and std of  $1.65 \pm 0.83$ .

**Objective Two**

**Table 4.1.2.** To examine the effect of green distribution on the profitability of manufacturing firms in Enugu state.

Options	SA Freq (%)	A Freq (%)	U Freq (%)	D Freq (%)	SD Freq (%)	Mean	Std
This firm has a good relationship with the society in its distribution practices	158(58.1)	97(35.7)	9(3.3)	4(1.5)	4(1.5)	1.52	0.80
Manufacturing firms gain better profit when they go about their distribution in a way that does not negatively affect the environment.	144(52.9)	110(40.4)	4(1.5)	8(2.9)	6(2.2)	1.61	0.84
The type of distribution system adopted by manufacturing firms directly impact its profitability	121(44.5)	133(48.9)	7(2.6)	4(1.5)	7(2.6)	1.69	0.81

*Source: Field Survey, 2023.*

Table 4.1.2 shows the responses of the participants on the effect of green distribution on the profitability of manufacturing firms in Enugu state. It shows that 158(58.1%) of the respondents strongly agree that their firm has a good relationship with the society in its distribution practices, 97(35.7%) of them agree to this, and 9(3.3%) of them were undecided to this assertion, while 4(1.5%) of them disagreed, 4(1.5%) of them strongly disagree. This implies that the firms under study have a good relationship with the society in its distribution practices with mean and std of  $1.52 \pm 0.80$ . The table also shows that 144(52.9%) of the respondents strongly agree that manufacturing firms gain better profit when they go about their distribution in a way that does not negatively affect the environment, 110(40.4%) of them agree to this assertion, while only 4(1.5%) of them were undecided, 8(2.9%) of them agreed and 6(2.2%) of them strongly disagreed. This implies that manufacturing firms gain better profit when they go about their distribution in a way that does not negatively affect the environment with mean and std of  $1.61 \pm 0.84$ . Finally, the table shows that 121(44.5%) of the respondents strongly agree that the type of distribution system adopted by manufacturing firms directly impact its profitability, 133(48.9%) of them agreed to this, while 7(2.6%) of them were undecided, 4(1.5%) of them disagreed and 7(2.6%) strongly disagreed. With a mean and std of  $1.69 \pm 0.81$ , this implies that the type of distribution system adopted by manufacturing firms directly impact its profitability.

**4.2 Testing of Hypotheses**

**Hypothesis One**

**H<sub>1</sub>:** Green procurement does have a significant effect on the output of manufacturing firms in Enugu state

**H<sub>0</sub>:** Green procurement does not have any significant effect on the output of manufacturing firms in Enugu state

**Table 4.2.1. Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.899 <sup>a</sup>	.808	.807	.33534	.322

*Source: SPSS Version 26*

- a. Predictors: (Constant), Green procurement
- b. Dependent Variable: Output of manufacturing firms

**Table 4.2.2. ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	127.458	1	127.458	1133.435	.000 <sup>b</sup>
	Residual	30.362	270	.112		
	Total	157.820	271			

*Source: SPSS Version 26*

- a. Dependent Variable: Output of manufacturing firms
- b. Predictors: (Constant), Green procurement

**Table 4.2.3. Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.169	.045		3.743	.000
	Green procurement	.820	.024	.899	33.667	.000

*Source: SPSS Version 26*

- a. Dependent Variable: Output of manufacturing firms

**Result Summary**

R = .899, R<sup>2</sup> = .808, F = 1133.435, T = 33.667, DW = .322

**Interpretation of the Result**

A linear regression analysis was conducted to determine the effect of green procurement on the output of manufacturing firms in Enugu state. (table 4.2.1 – 4.2.3) shows that there is strong positive relationship between green procurement and output of manufacturing firms (R- coefficient = .899). The R square, the coefficient of determination, shows that 80.8% of the variation in output of manufacturing firms can be explained by green procurement with no autocorrelation as Durbin-Watson (.322) is less than 2. With the linear regression model, the error of estimate is low, with a value of about .33534. The regression sum of the square 127.458 is more than the residual sum of the square 30.362 indicating that the variation is due to chance. The F-statistics = 1133.435 shows that the model is significant. The extent to which green procurement impact output of manufacturing firms

with .899 value indicates a positive significance relationship between green procurement and output of manufacturing firms which is statistically significant (with  $t = 33.667$ ) and  $p = .000 < 0.05$ .

**Decision Rule**

Reject null hypothesis (Ho) if P-Value < 0.05 and do not reject Ho if otherwise

**Decision**

Since the P-Value  $000 < 0.05$ , we reject the null hypothesis (Ho) and then conclude that green procurement does have a significant effect on the output of manufacturing firms in Enugu state.

**Hypothesis Two**

**H<sub>1</sub>:** Green distribution does have a significant effect on the profitability of manufacturing firms in Enugu state

**H<sub>0</sub>:** Green distribution does not have any significant effect on the profitability of manufacturing firms in Enugu state.

**Table 4.2.4 Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate	Durbin-Watson
1	.932 <sup>a</sup>	.870	.869		.29528	.281

*Source: SPSS Version 26*

- a. Predictors: (Constant), Green distribution
- b. Dependent Variable: Profitability of manufacturing firms

**Table 4.2.5. ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	156.896	1	156.896	1799.476	.000 <sup>b</sup>
	Residual	23.541	270	.087		
	Total	180.438	271			

*Source: SPSS Version 26*

- a. Dependent Variable: Profitability of manufacturing firms
- b. Predictors: (Constant), Green distribution

**Table 4.2.6 Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	.234	.039		6.066	.000
	Green distribution	.902	.021	.932	42.420	.000

*Source: SPSS Version 26*

- a. Dependent Variable: Profitability of manufacturing firms

**Result Summary**

$R = .932, R^2 = .870, F = 1799.476, T = 42.420, DW = .281$

### Interpretation of the Result

A linear regression analysis was conducted to examine the effect of green distribution on the profitability of manufacturing firms in Enugu state. (table 4.2.4 – 4.2.6) shows that there is strong positive relationship between green distribution and profitability of manufacturing firms (R- coefficient = .932). The R square, the coefficient of determination, shows that 87.0% of the variation in profitability of manufacturing firms can be explained by green distribution with no autocorrelation as Durbin-Watson (.281) is less than 2. With the linear regression model, the error of estimate is low, with a value of about .29528. The regression sum of the square 156.896 is more than the residual sum of the square 23.541 indicating that the variation is due to chance. The F-statistics = 1799.476 shows that the model is significant. The extent to which green distribution impact profitability of manufacturing firms with .932 value indicates a positive significance relationship between green distribution and profitability of manufacturing firms which is statistically significant (with  $t = 42.420$ ) and  $p = .000 < 0.05$ .

### Decision Rule

Reject null hypothesis ( $H_0$ ) if  $P\text{-Value} < 0.05$  and do not reject  $H_0$  if otherwise

### Decision

Since the  $P\text{-Value} < 0.05$ , we reject the null hypothesis ( $H_0$ ) and then conclude that green distribution does have a significant effect on the profitability of manufacturing firms in Enugu state.

### 5.1 Summary of Findings

- i. Green procurement has significant effect on the output of manufacturing firms in Enugu state
- ii. Green distribution has significant effect on the profitability of manufacturing firms in Enugu state

### 5.2 Conclusion

Based on the findings, it can be concluded that implementing green procurement and green distribution practices can have a positive impact on manufacturing firms in Enugu state.

The first finding suggests that green procurement, which involves the use of environmentally friendly materials and suppliers, can significantly affect the output of manufacturing firms in Enugu state. This indicates that using green procurement practices can lead to higher production efficiency, improved product quality, and ultimately increased revenue for these firms.

The second finding suggests that green distribution, which involves using environmentally friendly transportation and logistics practices, can significantly impact the profitability of manufacturing firms in Enugu state. This indicates that using green distribution practices can reduce transportation costs, improve supply chain efficiency, and ultimately increase profits for these firms.

### 5.3 Recommendations

- i. Manufacturing firms in Enugu state should adopt green procurement practices that prioritize the use of environmentally friendly materials and suppliers. This can be achieved through the development of green procurement policies and guidelines, and the establishment of partnerships with green suppliers.
- ii. Manufacturing firms should provide education and training to their employees on sustainable business practices such as green procurement and green distribution. This can help employees understand the importance of sustainability in business and motivate them to implement these practices in their day-to-day.

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