



GREEN MANUFACTURING AND COMPETITIVE PERFORMANCE OF MANUFACTURING SMALL AND MEDIUM ENTERPRISES IN MAKURDI METROPOLIS OF BENUE STATE

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Abstract: *This study examined the effect of green manufacturing practices on the competitive performance of manufacturing small and medium enterprises in Makurdi metropolis of Benue State. The specific objectives were to assess the effect of green product design and ascertain the effect of green efficient process; on competitive performance of manufacturing small and medium enterprises in Makurdi metropolis of Benue State. The study adopted a survey research approach, using questionnaire administration for data generation from 138 respondents of the selected manufacturing small and medium enterprises in Makurdi Benue State. The data were analyzed using descriptive and inferential statistics. The t-test and p-values from regression analysis (statistical package for social science, version 25.0) was used for test of hypothesis. Findings showed that green product design ($t = 7.94$, $P = .013$) and green efficient process ($t = 9.23$, $P = .004$) had significant/positive effect on competitive performance of manufacturing small and medium enterprises in Makurdi metropolis of Benue State. The study concludes that green manufacturing practices (green product design and green efficient process) can be considered an effective and potent tool for provoking competitive performance (in terms of operational efficiency and conformance to specification) as they have potentials for enhancing the competitive performance of manufacturing small and medium enterprises through creating a robust and well sought out management strategy of green product design and green efficient process that incorporates the environmental and end users' concerns into their organizations' process. The study recommends amongst others that management of manufacturing small and medium enterprises should emphasize a more sustained and improved structure in green product design that projects a more ideal minimizing waste in the product through the use of less material, designing products with recycling or re-uses capabilities. This will help in enhancing conformance and increased competitive performance for manufacturing firms.*

1.0 INTRODUCTION

1.1 Background of the Study

With the increase in the demand of products, manufacturers are setting up industries in and around countries to meet the demand. Natural resources are strained and industries face challenges of energy waste minimization, waste management, and compliance to regulations and policies; thus, necessitating manufacturing practices that incorporates the concern of both the environment and human lives. Manufacturing is pivotal to the growth and development of the economy of any nation. As such, no economy can exist without the manufacturing sector. Consumer taste, needs and demand continue to increase both locally and internationally. With these changes and at the forefront of those approaches and strategies are green manufacturing practices, which began to represent the most prominent space and scope in which operating organizations compete and began to change the axes and

frameworks of competitive indicators and under which standards of competitive performance have developed (Madah, 2023; Ahmad *et al.*, 2023).

In Nigeria, firms have shifted to competing within supply chains by reducing cost of production, increasing flexibility, continuous quality improvement, and improvement on delivery (Adekunle and Omoregbe, 2022). Customers are changing their behavior by integrating environmental considerations into their lifestyles. As a result, purchasing decisions are made based on how well these products satisfy their needs and the effect they have on the natural environment (Ekanem *et al.*, 2023). Industries are striving to enhance performance by meeting the needs of their customers effectively. The cost of energy is going up due to the world experiencing energy crises more frequently than ever, which has led to the necessity to reduce fuel consumption and use of renewable energy (Nwankwo and Nwankwo, 2022). Consumption of natural resources such as fuel, minerals, water, and food is on the rise every day with their availability shrinking. Therefore, it is paramount to conserve and manage resources in order to enhance performance. The need for manufacturing small and medium enterprises to engage in green manufacturing by engaging in practices that use less natural resources and more renewable resources with little or no pollution, keeps resonating (Mbang *et al.*, 2020; Ahmad *et al.*, 2023).

Green manufacturing assumes that manufacturing firms evolve because of changes in the environment, and smart firms recognize the evolution of the industry and seek new opportunities because of these changes (Opoku *et al.*, 2023). The aim of green manufacturing is to promote sustainability by ensuring that manufacturing activities enhance stakeholders' interests, as well as maximize economic, social values and environmental sustainability. GMP can be done by encouraging organizations to adopt green innovation as the creation of green products that are environmentally friendly, to expand competitive advantage through operational efficiency and a wide range of organizational knowledge, conformity and innovations (Azeem *et al.*, 2021), increasing consumers' willingness to pay for a friendly product environment and promoting green products (Zwingina *et al.*, 2023). GMP is expected to minimize waste and pollution if implemented correctly (Dinesh *et al.*, 2018). Consequently, this study seeks to examine the effect of green manufacturing practices on competitive performance of manufacturing small and medium enterprises in Makurdi metropolis of Benue State.

1.2 Statement of the Problem

The direct impact of investments in environmental management practices, such as green design, green process, green packaging and green supply chain, on competitive performance in terms of innovation, improved product quality and delivery, cost containment, and operation efficiency is still up for debate. Thus, a number of researchers (examples are Mbang *et al.*, 2020; Onayemi *et al.*, 2023) have confirmed the idea that green operations and competitive performance are positively correlated. It has been demonstrated that many industrial companies improperly disposed of waste goods without taking into account how they might improve the efficiency and enhance competitive performance of the company, creates a gap.

Observations are that, in spite of the determination of government and its stakeholders towards ensuring manufacturing practices that are environmentally friendly and

incorporating, reports are clear that unwholesome practices detrimental to humans and the environment abounds. The worry stems here that though these practices are existing but companies by error or omission are not yielding the benefits that could aid them to having competitive performance. Thus, this study seeks to examine the effect of green manufacturing practices on competitive performance of manufacturing small and medium enterprises in Makurdi metropolis of Benue State.

1.3 Objective of the Study

The broad objective of this study is to examine the effect of green manufacturing practices on competitive performance of manufacturing small and medium enterprises in Makurdi metropolis of Benue State. The specific objectives are; to;

- i. assess the effect of green product design on competitive performance of manufacturing small and medium enterprises in Makurdi metropolis of Benue State.
- ii. examine the effect of green efficient process on competitive performance of manufacturing small and medium enterprises in Makurdi metropolis of Benue State.

1.4 Statement of Hypotheses

The following hypotheses are tested in this study.

H₀₁: Green product design has no significant effect on competitive performance of manufacturing small and medium enterprises in Makurdi metropolis of Benue State.

H₀₂: Green efficient process has no significant effect on competitive performance of manufacturing small and medium enterprises in Makurdi metropolis of Benue State.

2.0 LITERATURE REVIEW

2.1 Conceptual Clarification

2.1.1 Concept of Green Manufacturing

The concept of green manufacturing is a relatively new concept that can be viewed as a product of the 1990s, it was first introduced in Germany in the early 1990s to fulfill the market's greener expectations by extending the "waste reduction" idea proposed by lean manufacturing, in the sense of reducing waste and pollution as well as optimizing the use of raw material and energy to minimize the environmental and health risks (Maruthi and Rashmi, 2015; Paul *et al.*, 2014). According to Deif (2011), green manufacturing can be defined as an efficient approach required in the design and production activities necessary for new product development and production system operations aimed at minimizing environmental impact. Reducing hazardous emissions, eliminating wasteful resource consumption and recycling are examples of green manufacturing activities. Further, Maruthi and Rashmi (2015) opined that green manufacturing is a sustainable approach that makes a special focus on product development and operations to decrease the impact on the environment. In addition, green manufacturing concept draws attention not only to the environment, but also addresses how to minimize potential environmental damages that arise in the cause of manufacturing (Jatmiko and Prestianto, 2022).

Green Manufacturing is a 'new' manufacturing model that puts into consideration environmental sustainability and resource optimization throughout the product life cycle (Deif, 2011). The model aims at maximizing resource efficiency and minimizing negative

impacts to the environment while reaping maximum economic and social benefits. Green manufacturing puts emphasis on abating the environmental effect by reducing, reusing, recycling, and remanufacturing which leads to source reduction, optimization of resource consumption, and enhancing use intensity (Shang and Li, 2010; Fore and Mbohwa, 2014). Green manufacturing dimensions also include green design and development, green supply chain management, investment recovery, and efficient processes (Rehman and Shrivastava, 2013; Shrivastava and Shrivastava, 2017). Green manufacturing involves recycling, waste reduction management, regulatory compliance, environmental protection, and pollution management (Orji and Wei, 2016).

Green manufacturing is a manufacturing method that reduces pollution and waste and is done through design and search for renewable ways to manufacture products that does not harm the human health and the environment (Parasd and Sharma, 2014). To Verma and Sharma (2016), green manufacturing is a manufacturing model that reduces the amount of waste and pollution, reduces the depletion of natural resources, and ensures the rationalization of materials and the reuse of waste to help make products more efficient. Consequently, green manufacturing is a strategic approach that integrates greenness in the design, processing, packaging and supply chain management of its product life cycle (Adekunle and Omoregbe, 2022). Green manufacturing is a comprehensive system for all production stages embodied in the form of a sustainable approach to the design activities involved in the process of producing or developing products or operating the system in order to reduce environmental impact, reduce the depletion of natural resources, rationalize the use of raw materials and recycle them to make those products more efficient (Madah, 2023).

i. Green product design

Green product design is defined as a set of project practices whose aim is at the creation of eco-efficient products and processes, it aims to design and develop an environment-friendly product to minimize the environmental impact through product life-cycle analysis (Al-Ghwayeen and Abdallah, 2018). It is a new approach to the product's design and it involves identifying environmental aspects connected with the product and including them in the design process of product development (Nowosielski *et al.*, 2007). Karlsson and Luttrupp (2006) state that green design is a sustainable solution of products and services changes that reduce negative sustainability and maximize positive sustainability and impacts economic, environmental, social, and ethical throughout and beyond the life-cycle products. Green product design seeks to solve the increasing negative effects industrial progress has on the environment (Odia, 2022).

ii. Green Efficient Processes

Green efficient processes are those processes that use green energy, and minimize on wastage of resources with no rejects and rework required on products (Okunuga *et al.*, 2022). The processes generate less undesirable wastes by minimizing the production of solid wastes and reducing the emission of greenhouse gases (Abdul-Rashid *et al.*, 2017). According to Amos *et al.* (2018), one of the most significant areas of gain in performance optimization for companies in the manufacturing sector, and particularly in the small and medium sub-sector would be in the area of operational efficiency, further stating that an overall efficient system requires paying attention to all areas of production, procurement, fabrication, assembly, testing, packaging and distribution, and keeping in check the non-essentials.

2.1.2 Concept of Competitive Performance

Competitive performance is viewed as the company's ability to carry out its activities in a distinct way or ways that other competitors cannot imitate, and in what makes the competitive advantage the most prominent (Uchegbulam and Akiniele, 2015). It is also defined as the ability of the working departments to continuously move the production factors towards the most efficient activities (Razavi *et al.*, 2016). Also, it can be seen as a company's ability to provide products with high performance and quality through creativity in designing these products in order to achieve competitive advantages on more than one level (Danielsen and Framnes, 2017).

Afum *et al.* (2023) view competitive performance as the extent to which an organization's products and services meet the expectations of its customers. It indicates the potential of the supply chain to provide products and services to the customers (Li and Zhang, 2018). The competitive performance concepts and SME performance requirements are changing as a result of the ongoing changes that manufacturing SMEs are experiencing within organizations today (Bolaji *et al.*, 2020). Manufacturing SMEs require high-performing individuals alongside green manufacturing technologies to meet their objectives, deliver the products and services in which they specialize, and, ultimately, gain a competitive advantage (Marei *et al.*, 2021). Zwingina *et al.* (2023) averred that the main aim of engaging in business is to consistently outperform competitors and deliver sustainable products, give superior values to shareholders or returns to the owners while satisfying other stakeholders.

Measures of Competitive Performance

There are various opinions and approaches that identified the most important dimensions on the basis of which it is possible to understand the content of the competitive performance of the operating organizations such as operation efficiency and product conformance to specification as supported by studies of Mbang *et al.* (2020) and Madah (2023).

i. Operational Efficiency

This refers to the capability of an organization to deliver products or services to its customers in the most cost-effective manner possible while still ensuring the high quality of its products, service and support (Ahmad *et al.*, 2019). Operational efficiency looks at an organization's capabilities and performance. It also looks at an organization's ability to minimize waste of inputs and maximize resource utilization so as to deliver quality, cheaper products and services to their customers. It is a useful measure utilized in managing the available resources. Mbah *et al.* (2019) viewed operational efficiency as the capability of a service sector to deliver products or services to its customers in the most cost-effective manner possible while still ensuring the high quality of its products, service and support.

ii. Product conformance to specifications:

It is defined as "the ability to produce goods and services according to their specific specifications reliably and consistently" (Slack, 2018) and the advantage may appear in conformity as consistency or similarity between the product and the requirements or performance that meets the requirements, as the goal of conformity is to determine whether the final result of the manufactured product complies with the initial requirements or not (Liepina *et al.*, 2014) and when the primary goal of meeting the needs and expectations of the

customer is achieved, the product is considered high quality regardless of the quality of the design specifications.

2.2 Theoretical Framework

The Institutional Theory

This study is anchored on institutional theory as baseline theory for this study which was introduced in the late 1970s by John Meyer and Brian Rowan, the theory examines how company operations are influenced by external pressures (Hirsch, 1975). The theory assumes that organizations operate within a social network and a strong motivating force behind firm behavior is socially based and it is embedded within institutions and interconnected organizational networks (Iacobucci and Hopkins, 1992). These social-cultural pressures forced organizations to persuade adoption of green manufacturing practices and structure is emphasized (Scott, 1992). The institutional theory provides a theoretical lens through which manufacturing firms can adopt practices that promote the future of the sector, including factors such as culture, social environment, and legal as well as economic environments.

The institutional theory posits that enterprises embrace certain strategies to gain legitimacy or acceptance within society. Hirsch (1975) further supports this view by stating that the theory explores the influence on a firm by external pressures. Zhang (2018) argue that institutional pressures may cause firms to engage in proactive environmental practices such as green manufacturing. Firms that yield to these pressures are perceived to be more legitimate and are likely to gain competitive advantage and hence improve performance (Darnall *et al.*, 2008).

2.3 Review of Related Empirical Studies

Enyi *et al.* (2024) study investigated the effect of green production on the performance of small and medium enterprises in North Central Nigeria. The study established that there was positive relationship between the dimensions of green production and performance of Agro-processing small businesses in Nigeria. It is concluded that green production through green products, green processes and operations, green use and green end-of-life management can improve the performance of small and medium enterprises in North Central, Nigeria. Ekanem *et al.* (2023) determined how green manufacturing operation affected organizational performance in a selected Nigerian manufacturing companies in Akwa Ibom State. The findings indicate that green manufacturing packaging and design have a significant impact on organizational performance in specific Akwa Ibom State manufacturing enterprises.

Madah (2023) determined the extent to which green manufacturing strategies are applied in two Iraqi companies belonging to the public sector, as well as diagnosing the level of competitive performance in the two companies under study, in addition to shedding light on the impact of applying these strategies (green efficient processes) in reducing the costs of products and their role in providing a large financial return for the company and in a way that contributes to enhancing its competitive performance and increasing its productivity. Opoku *et al.* (2023) study investigated the combined effects of inventory, green design, supply and lean manufacturing practices on the sustainable performance (environmental [EP], social [SP] and economic [EcP] performances) of food manufacturing enterprises in emerging economies like Ghana. The study's results revealed that inventory and green manufacturing practices directly influenced sustainable performance (SP, EP, and EcP), while lean manufacturing

practices had an insignificant influence on economic performance. Supply management, on the other hand, significantly improved only economic performance.

Chukwukadiba and Nnamani (2023) determined the effect of green innovation on competitive advantage of manufacturing firms in Enugu State, Nigeria. The study revealed that green product innovation had a positive significant effect on the market share of a firm. The statistical results is given as; (Green product design innovation $\beta = .230$; $t=4.272$; $p>000.05$). The study revealed that green efficient process innovation had a positive significant relationship with a firms cost of production. Alao *et al.* (2023) determined the effects of green intellectual capital on environmental sustainability of listed manufacturing firms in Nigeria. The study discovered that the green intellectual capital had significant effect on the environmental sustainability with the adj. $R^2 = 42.3\%$, $F(6,421) = 53,176$, $p\text{-value} < 0.05$.

Agbo *et al.* (2022) study evaluated the effect of sustainable business practices on the performance of Aluminum manufacturing firms in Enugu State. The findings indicated that High Quality efficient goods had positive significant effect on the profitability of aluminum manufacturing firms in Enugu State $Z(95, n = 182) = 6.041 < 9.043$, $p < .05$. Innovation design had positive significant effect on sales growth of aluminum manufacturing firms in Enugu State, $Z(95, n = 182) = 6.560 < 7.227$, $p < .05$. Adekunle and Omoregbe (2022) examined how sustainable environmental performance is impacted by sustainable manufacturing practices in table water companies registered by National Agency for Food and Drug Administration and Control (NAFDAC) In Lagos. The study found that the investigated sustainable manufacturing practices (sustainable product design, sustainable packaging, and sustainable waste management) have a positive and significant impact on the environmental performance of table water companies.

3.0 METHODOLOGY

This study adopted the survey research design approach, in particular the descriptive research design. The population of this study comprised of 147 top level managers, middle level managers and lower level managers of selected manufacturing SMEs operating in Makurdi and fully registered with Benue State Ministry of Industry, Trade and Investment and with the small and medium enterprise development agency of Nigeria (SMEDAN); and have operated for over five years.

The sample size for the study comprises of the entire population of 147 respondents, hence the census sampling technique was adopted since the number is of manageable size for the researcher.

The data for this study were collected through questionnaire administration. Structured questionnaire was designed to collect responses from the respondents. The questionnaire is divided into two sections (Section A and section B) for ease of administration and convenience. Section A is based on personal data of the respondents while section B contains questions on the study variables using five-point Likert-scale which constitutes strongly agree, agree, undecided, disagree and strongly disagree.

The researcher made use of the content and construct validity for this study. A pilot test was carried out on thirty managers of manufacturing SMEs in Makurdi who were not originally part of the main study. Cronbach alpha was used for test and re-test to ensure reliability of

the instrument. The test-and re-test method is used to test the dependent and independent variables used in the study. The preliminary analysis of this study shows that the research instrument is valid and reliable for further analysis.

Primary sources of data for this study were obtained mainly by means of questionnaire. The structured questionnaire was the chief instrument design and was used to collect data on green manufacturing practices as the basis for competitive performance of manufacturing SMEs in Makurdi metropolis of Benue State. The questionnaire was subjected to reliability and validity tests in the course of the study. The experience gained from the pilot study was used to modify' the original plan for the study proper where necessary, while ensuring that the research instruments measured exactly what they were designed for.

The variables in this study are green manufacturing practices (independent variable) and competitive performance (dependent variable). The green manufacturing practices (independent variable) is made up of two dimensions namely; green design and green efficient process. Competitive performance (dependent variable) is to be measured by operational efficiency and product conformance to specification.

The model that was employed for this study is multiple regression analysis model which involves the independent variable (green manufacturing practices), and the dependent variable (competitive performance). Therefore the following model specifications to test the formulated hypotheses are as follows:

The model for this research is given as

$$CP = f(GMP) = GDE, GEP \dots\dots\dots (1)$$

Where

CP = Competitive Performance

GMP = Green Manufacturing Practices

GDE= Green Design

GEP = Green Efficient Process

The regression model, thus is given as

$$CP = x + \beta_1 GDE + \beta_2 GEP + e \dots\dots\dots (2)$$

Where

x = Intercept of the regression

$\beta_1 - \beta_2$ = parameter estimates

e = error term

Descriptive and inferential statistics of the data was carried out prior to evaluate the effect among the variables. Regression analysis was used to estimate the effect of green manufacturing practices on competitive performance of manufacturing SMEs in Makurdi metropolis of Benue State.

4.0 RESULTS AND DISCUSSION

A total of one hundred and forty seven (147) copies of questionnaire were distributed to respondents in the selected manufacturing SMEs chosen for this study, out of which one hundred and thirty eight (138) were successfully filled and returned.

Regression Analysis

Table 1: Model Summary

Model	R	R Square	Adj.R Square	Std. Error of Estimate	Durbin Watson
1	.893 ^a	.797	.790	0.8013	2.04

a: Predictors (constant), Green Product Design, Green Efficient Process.

b. Dependent variable: Competitive Performance

Source: SPSS printout (Version 25.0 for windows output), 2024

Table 2: Regression Coefficient Result

Model	Beta	T	Sig
1 (Constant)	1.003	12.03	.000
Product Design	.891	7.94	.013
Efficient Process	.875	9.23	.004

Dependent variable: Competitive Performance

Source: SPSS regression print out (version 25.0 for windows output), 2024.

Table 3: ANOVA^b for the overall significance of the model

Model	Sum of squares	Df	Mean square	F	Sig
Regression	80.004	2	40.001	17.95	.001 ^θ
Residual	71.685	135	0.5310		
Total	151.689	137			

a. Predictors: (constant); Green Product Design, Green Efficient Process.

Dependent variable: Competitive Performance

Source: SPSS regression print out (version 25.0 for windows output), 2024.

Regression Model Explained

In the model, green product design and green efficient process were used to predict the competitive performance of manufacturing small and medium enterprises in Makurdi, Benue State. The F-statistics of regression model showed that the result is significant, as indicated by a value of the F-statistic, 17.95 and it is significant at the 5.0 percent level. The coefficient of determination (R-square), indicates that the model is reasonably fit in prediction, that is, 79.7 % change in manufacturing small and medium enterprises competitive performance was jointly due to green product design and green efficient process, while 20.3 % unaccounted variations was captured by the white noise error term. It showed that green product design and green efficient process had significant effect on competitive performance of manufacturing small and medium enterprises in Makurdi, Benue State.

4.4 Discussion of Findings

(i) Assess the effect of green product design on competitive performance of manufacturing small and medium enterprises in Makurdi, Benue State.

The analysis of research question one was to assess the effect of green product design on competitive performance of manufacturing small and medium enterprises in Makurdi, Benue State. From table 1, the (R^2) statistic was 0.797. Taking into the record the contribution of the explanatory variable in competitive performance of manufacturing small and medium enterprises, from table 2, the beta value for green product design was 0.891. The beta value apparently indicated that the predictor variable of green product design had a positive effect on competitive performance of manufacturing small and medium enterprises (t -computed 7.94 > t -critical 1.960, $p=0.013 < .05$). Therefore, the null hypothesis was rejected.

The findings of this investigation agree with Enyi *et al.* (2024), Ekanem *et al.* (2023), Opoku *et al.* (2023), Chukwukadibia and Nnamani (2023), Alao *et al.* (2023), Adekunle and Omoregbe (2022), amongst others; who all avers that identifying environmental aspects connected with the product and including them in the design process of product development, gives a sustainable solution of products and services changes that reduce negative sustainability and maximize positive sustainability and impacts economic, environmental, social, and ethical throughout and beyond the life-cycle of the products. Green product design seeks to solve the increasing negative effects of industrial progress. Green product design aims at reducing or eliminating hazardous material, minimizing waste in the product through the use of less material, designing products with recycling or re-uses capabilities and designing products for re-manufacturability and appropriate shapes and volume for minimal space consumption during storage and transportation and can enhance sustainability in competitive performance.

Therefore this study concludes that there is a positive/significant effect of green product design on competitive performance of manufacturing small and medium enterprises in Makurdi Benue State.

(ii) Ascertain the effect of green efficient process on competitive performance of manufacturing small and medium enterprises in Makurdi, Benue State.

The analysis of research question two was to assess the effect of green efficient process on competitive performance of manufacturing small and medium enterprises in Makurdi, Benue State. From table 1, the (R^2) statistic was 0.797. Taking into the record the contribution of the explanatory variable in competitive performance of manufacturing small and medium enterprises, from table 2, the beta value for green efficient process was 0.875. The beta value apparently indicated that the predictor variable of green efficient process had a positive effect on competitive performance of manufacturing small and medium enterprises (t -computed 9.23 > t -critical 1.960, $p=0.004 < .05$). Therefore, the null hypothesis was rejected.

The findings of this investigation also agree with Enyi *et al.* (2024), Madah (2023), Chukwukadiba and Nnamani (2023), Alao *et al.* (2023), Agbo *et al.* (2022), amongst others; who all avers that green efficient process is one of the most significant areas of gain in

performance optimization for companies in the manufacturing sector, and particularly in the small and medium sub-sector. Operational efficiency in an overall efficient system requires paying attention to all areas of production, procurement, fabrication, assembly, testing, packaging and distribution, and keeping in check the non-essentials. Efficient processes do not only meet but also exceed the quality conformance standards, and also use minimum resources to create value addition in innovative ways. Green processes enable firms to reduce material cost variance, improve on process efficiency and effectiveness, and reduce negative effects to the environment.

Therefore this study concludes that there is a positive/significant effect of green efficient process on competitive performance of manufacturing small and medium enterprises in Makurdi Benue State.

CONCLUSION

The study concludes that green manufacturing practices (green product design and green efficient process) can be considered an effective and potent tool for provoking Competitive performance (in terms of operational efficiency and product conformity to specification) as they have potentials for enhancing the competitive performance of manufacturing small and medium enterprises through creating a robust and well sought out management strategy of green product design and green efficient process, that incorporates the environmental and end users' concerns into their organizations' process.

RECOMMENDATIONS

Sequel to the findings and conclusions above, the following recommendations are made:

- i. Management of manufacturing small and medium enterprises should emphasize a more sustained and improved structure in green product design that projects a more ideal minimizing waste in the product through the use of less material, designing products with recycling or re-uses capabilities. This will help in enhancing conformance and increased competitive performance for manufacturing firms.
- ii. Management of manufacturing small and medium enterprises should focus more on developing and enhancing green efficient process, as this will help improve organizations ability to meet up and exceed the quality conformance standards, and also use minimum resources to create value addition in innovative ways.

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