

**MATERIAL RESOURCES MANAGEMENT AS MEANS TO SATISFACTORY PROFIT
AND ENVIRONMENTAL SUSTAINABILITY: LOOKING BEYOND COVID-19
PANDEMIC ERA**

Iliemena, Rachael Okwudili, PhD

Accountancy Department, Nnamdi Azikiwe University Awka, Anambra State

Egolum, Priscilla Uche, PhD

Accountancy Department, Nnamdi Azikiwe University Awka, Anambra State

Goodluck, Happiness Chibuzor

Banking and Finance Department, Federal Polytechnic Okoh, Anambra State

Ozue, Clement Chuks

Stores Unit, University Of Delta, Agbor, Delta State

ABSTRACT: *Material resources management has become a very necessary survival strategy for businesses in the Covid-19 pandemic period but this may have effect on product quality, by reducing sales and profit while there may not be visible effect on achieving environmental sustainability. Consequently, this study explored how a good balance can be achieved in material resources management, profit and still achieve environmental sustainability. The population and sample of the study were respectively made up 358 and 189 managers in Anambra and Delta state drawn from both public and private sectors. Due to large sample size and Covid-19 social distancing demand, an online survey was used for the study. The e-questionnaire was designed in a five-point Likert scale structure with some open space for unstructured responses. The result of the Z-test statistical analyses revealed, effective utilization of raw materials, material recycling, material re-use, reduction in material quantity usage are keys to satisfactory profit beyond Covid-19 pandemic era and guarantee environmental sustainability. By policy implication, there is need to constitute environmental monitoring agencies by the state governments who would be charged with the responsibility of tracing re-usable wastes in disposal places back to the producers for necessary penalties in order to encourage more environmentally sustainable processes and there is a wake-up call here on National governments, more particularly the Nigerian Government to begin to build policies that would ensure future availability of raw-material inputs especially as the activities of herdsmen are currently ravaging and discouraging local agricultural businesses which form the major source of raw materials for most production businesses. If policy measures are not taken in earnest, it constitutes a very huge threat to the existence of most businesses in Nigeria and even to environmental sustainability. As such, it is recommended that every business creates an environmental sustainability committee to be charged with the responsibility of assessing every business process to ensure compliance with sustainability requirements and waste management, use recyclable material resources alternatives and consider alternative packaging that would retain quality without increase in product prices.*

KEYWORDS: corporate resources, materials management, waste management, COVID-19, sustainability and profit.

INTRODUCTION

Material resource is considered the basic resource in every business, more specifically, manufacturing enterprises irrespective of size of business. It is a global phenomenon that where there is no input there will usually be no output as the manufacturing output is always an outcome of processed material inputs. Global evidence revealed that any business that lacks the necessary raw materials will not grow well as the constant availability of materials when needed, marks the survival of any manufacturing venture, *ceteris paribus*. However, population increase coupled with higher demand for materials due to increase in industries and business ventures have most impacts on materials availability to meet the increased requirement. As noted by Worrel, Allwood and Gutowski (2016) continuous increase in demand for these global resources will also increase its adverse impact on the environment. The increase in demand for materials has greatly reduced the availability of these materials. Material prices have increased as a result, even the prices of food items were even increased by huge percentages as agricultural input resources and output are not left out in this. The unprecedented increase in food items and other food products in Nigeria particular, aside the limited resources availability were noted to have emanated from the restriction on movement and huge demand for commodities ahead of the covid-19 lockdown in 2020 and price moderation is yet to be achieved. Beside the food industry, other sectors other than basic necessities are generally experiencing huge drop in product demand as even the prices of these commodities were affected due to external macro economic factors like increase in production cost arising from increase in basic material cost. The present Nigerian economy is experiencing what we can refer to as hyper inflation as there is even huge decrease in the value of the Nigerian currency when compared to other countries. Now business organizations that rely on imported materials for their production process spend hugely in international business due to exchange rate volatility and material scarcity. Other businesses that import already finished goods for sale in Nigeria are not left out in feeling this impact. The immediate effect of this is an upward shift in the operating margin of safety. Business organizations are now left with the challenge of figuring out ways to maintain either current profit margin or give up some part of its profit to maintain current market prices of their goods, all without altering quality of product. The way material resources are managed within an economic entity is an issue that can have a significant influence on the financial position of an entity (Miron, Focsan & Bota, 2016). “The profitability of an enterprise is an index of efficiency ... and management guide to greater efficiency” (Iliemena & Amedu, 2019). Currently, Nigerian firms have gotten to that stage where it begins to seek alternative ways to material management as a way of ensuring continued profitability and survival after the Covid-19 crises period. Business organizations and researchers need to look for better ways to materials management in order to ensure its availability for present business needs and its continuous availability for future operations with the environment in focus. This brings us to the present research which aims to investigate and identify;

1. The effect of effective utilization of raw materials on achievement of satisfactory profit beyond Covid-19 pandemic era.
2. The role of materials recycling in ensuring environmental sustainability.

3. The extent to which reduction in material usage quantity and reuse help in ensuring environmental sustainability.

4. The importance of good stores management practices for retention of satisfactory profit beyond Covid-19 pandemic era.

The above objectives were achieved by providing answers to certain questions as stated below;

1. What is the effect of effective utilization of raw materials on achievement of satisfactory profit beyond Covid-19 pandemic era?

2. What role does materials recycling play in ensuring environmental sustainability?

3. To what extent does reduction in material usage quantity and material re-use help in ensuring environmental sustainability?

4. What importance are good stores management practices for retention of satisfactory profit beyond Covid-19 pandemic period?

LITERATURE REVIEW

Material resources and satisfactory profit

This study defines raw materials as the elements used directly to manufacture products which are offered to the market for either immediate consumption or for further use in another stage of a manufacturing process. This is contrary to the definition given by Mankiw (2008; as cited in Iliemena, Egolum & Agu, 2021) which views materials as a term which houses all resources which individuals and businesses possess for use in the production of valuable consumer products. We consider this definition as rather shallow as raw materials are not only used for consumer products but also used as second-stage input resources. This is to say that the outputs of one business unit could be the inputs of another business unit, thus we classify all as material resources whether in the raw form or semi-processed form. The basic problem businesses are facing, especially those in the manufacturing sector is the consistent increase in material costs, effective utilization of the available resources therefore becomes a very necessity for firms, not just to make immediate profit but be able to retain customer patronage through an effective pricing system. An effective material management system is a management system that ensures good planning for material purchases, receipt, storage, access, usage and control. A business unit that has an effective material management system will hardly report expired materials, missing materials and excess material raw material requisition. The total production cost often bear unnecessary and avoidable costs associated with poor material management, an example is the cost of expired or pilfered materials, the indirect effect is that the products selling price is set in such a way as to recover all costs both avoidable and unavoidable, even though this may be recovered, it still has an effect of reducing profit. A practical illustration is given below for clearer understanding of this conceptual relationship even though part-fictional. BRIGHTGOLDEN FOODS acquired two bags of sorghum for its product known as Pap-Plus (Tombrown cereal food). Available information reveals that each production batch consumes two bags of sorghum but BRIGHTGOLDEN FOODS gets entitled to 20% discount on purchase price each time it acquires 3 bags in an order. It takes 6 months between one production batch and another while material requisition is made every 4 months. By the next production batch it may be discovered that a bag remaining from the last

purchase was already expired and with rotten grains. Now, given this scenario, the material cost of the extra one bag has already been recorded against the next production and this is also added to the cost of replacement and other associated costs. The implication is that if the business must maintain the same selling price whether the cost is added or not, then profit will greatly decline and if profit margin must be maintained then sales price must be increased. Either way, poor materials management has effect on customers, especially bearing in mind the law of demand which states that the higher the price is the lower the demand quantity while the lower the price is the higher the demand quantity. When product prices are continuously on the rise, the business is already positioned for collapse especially where marginal price increase is high. It is noted by Ogbadu (2009) that the total costs of materials can be reduced without compromising quality when purchases are made from the right supplier, at the right price, and we add, in the right quantity. Even though large quantity material order may have some economy of scale benefits and purchase of cheap materials that increase profit margin, it is also worthy of mention here that striking a balance with quality is also a good material resource management practice. More often, purchase of cheap materials end up in low quality but probably cheaper outputs. This is part of the reason it becomes very essential that a manufacturing business concern should have an effective material resources management system as an effective system enables proper enquiries and ensuring purchases from the right material supplier as a step to satisfactory profit. A satisfactory profit is seen as profit which on the minimum compensates for the business risks through costs and capital recovery and ensures good returns to owners of capital and it is a result of efficiency in the use of material resources alongside other factors. In the words of Worrel, Allwood and Gutowski (2016) “material efficiency entails the pursuit of technical strategies, business models, consumer preferences, and policy instruments that would lead to a substantial reduction in the production of new materials required to deliver well-being”. World Economic Forum (2020) revealed that sustainability and profitability can co-exist when businesses look beyond the bottom-line, and when ESG principles are built into the business strategy as a way of reducing risk would drive profitable growth. Shahbazi (2015) opine that improved efficiency and effectiveness in material resources management contributes to the reduction of environmental impact of global manufacturing by reducing the volume of industrial wastes, reducing resources consumption, energy demand and emissions. Ogbadu (2009) in his research stated that the major contributions of an effective material management system in ensuring profitability are obvious in certain decision areas which are; decisions whether to buy from suppliers or make raw materials, material purchases quality, quantity, economic price and supplier, scrap or surplus disposal, material transportation, received materials checks to confirm quality and quantity, storage and recording, and inventory control decisions.

Business Environmental Sustainability Concerns

The issue of environmental sustainability has over a decade become a global concern and as the days go by and with increasing number of businesses and people, more emphasizes are laid on the sustainability of the environment due to the impact of business and human activities on the environmental material and energy resources continuously leading to depletion and degradation (Iliemena, 2020). Hami, Muhamad and Ebrahim (2015) view business environmental

sustainability as changing the business environment, producing more output with less resources, less pollution, and generation of minimal waste from the business processes. Environmental sustainability as a concept will be achieved through business sustainability practices. A business is considered as being involved in sustainability practices when it is able to succeed in its activities without having negative effect on the environment as materials flow in and out of the business (Amedu, Iliemena & Umaigba, 2020). The principle of triple bottom line at the least need to be adopted and practices as a part of the operating policies. The triple bottom line philosophy emphasizes concern for profit, people and the planet. This is further explained in line with our study as;

Profit: the profit here represents satisfactory profit which we explained to mean excess of income over expenditure that is able to provide reward for business risk and ensure capital recovery good enough to put smiles on the faces of the providers of capital. Research evidence has it that the primary purpose of a business is to make satisfactory profit. However, when profit is focused on without considering other factors, business activities at this stage becomes so harmful to both the customers and the environment. Thus, from the purchase of production raw-materials to the waste disposal activities, satisfactory profit should be planned in such a way that no harm is caused to the society.

People: here our study focuses on the customers (the consumers of the product), indigenes of the community of the business and the employees of the business. Any material management practice adopted by a business as a way of achieving environmental sustainability, must be such that it causes no harm to the consumers, example here is the use of Artificial Sweeteners (AFS) for beverages (substitute for sugar) as earlier mentioned. The use of AFS even though reduces pressure on our sugar resource, considered cheap and more affordable but AFS is proven to cause brain tumors, weight gain, bladder cancer and many other health hazards (Tandel, 2021). Thus, resources management options for sustainability should be such that no harm is caused to any human whether employee, consumer or any other human category.

Planet: this is regarded as the general environment of the Business and not just the immediate environment. It entails the global impact of organizational activities. Every organizational process should be conducted in such a way that the future availability of materials for such processes is not hampered. In material inflow and outflow, the total negative impact on the environment should be at its barest minimum. In order words, organizational processes should avoid where possible; use of toxic materials, carbon emissions, water pollution and use of natural resources that are non-regenerative. Example includes using polymers for production instead of steel and utilization of solar energy in production rather than burning diesels or fuel as alternate power supply.

Material usage quantity reduction, reuse and recycling as environmental sustainability strategies

An organizations resources management system should be good enough to use the best and most efficient quantity input that will yield the best output quantity and quality. Iliemena and Amedu (2019) emphasized that production cost reduction can be seen as a decrease in cost or increase in cost-saving arising from the better use of resources in the production process, thereby ensuring profitability. However, this must be without compromise to the environment and in such a way that the availability of such material input in the future is not affected. This is the primary purpose of environmental sustainability. An ideal system of resources management and accounting practices accommodates environmental concerns which are a way of ensuring long-run corporate and environmental sustainability (Iliemena, 2020). One of the core principles that indicate efficient material resource utilization and management is the ability of a business organization to practice the 3Rs of material resources usage. The 3Rs of good material usage and management are;

– **Reduce** raw material quantity used without reducing the quality of output. The reduction of material quantity usage not only save money for the business enterprise but ensures their continued existence in the post covid-19 pandemic era. This will be achieved by avoiding excess materials order, prolonged storage of raw-materials by closing possibilities of material expiration and using product designs that uses fewer raw materials while constituting lesser or no harm to the environment. The Covid-19 era is characterized with scarcity in every respect; consequently, business survival strategies and environmental sustainability practices need to give more attention to reduction in quantity of material consumption. Worrel, Allwood and Gutowski (2016) in their study found that reduction in consumption quantity of materials is a necessary for for continuous availability of material resources in the future.

-**Re-use** raw material resources to reduce extra expenses that could have been incurred on purchasing new ones. Material purchase should consider buying used materials which is often less expensive but still as good as new ones (e.g. building materials). Product packaging materials should also be in forms that can easily be used at the least cost (e.g. paint bucket, milk tins).

-**Recycle** materials that can be recovered when recycled through the production process (e.g. leather, papers, nylon and containers) to minimize production cost which will directly increase profit, and also save the environment which will continuously be useful for continued business existence. If product packaging is done using bottles or containers, specific price reduction may be offered to customers that returned with containers of their last purchase, in this way, the environment is kept clean and production cost is saved. There was a time Star Maggi and Indomie noodles producers in Nigeria did something similar to this in the past, at that time, they requested customers to bring certain number of their product wraps and nylons for price rewards, in fact at the time, some overzealous customers walked from street to street picking the wraps just to qualify for the price but unconsciously tidying up the environment. Businesses in the production of bottled and sachet water are mostly needed to adopt this practice, particularly in Nigeria where their nylons and bottles are currently constituting environmental nuisance while they go on and on increasing

the prices of packaged water which is supposed to be one of the cheapest commodities. If this trend is allowed to continue, then over time, availability of the materials may not be guaranteed while the environment remains degraded.

Generally, adopting the 3Rs as a material resource management strategy helps to improve the environment while ensuring sustainability, by reducing the amount of resources that an organization requires in producing quality products, reducing the environmental impact of the production process, and sustain socio-economic growth by securing adequate supplies of materials in the future. To be successful such policies need to be founded on a good understanding of how minerals, metals, timber or other materials flow through the economy throughout their life cycle, and of how this affects the productivity of the economy and the quality of the environment (OECD, 2015; Iliemena, 2020). The World Economic Forum (WEF) in their 2020 annual meeting emphasized the need to turn the tides in Nigeria to e-waste in order to protect the environment and create safer jobs. This is also an adoptable practice as globalization has digitalized virtually every business practice and we have already mentioned here that the waste products of one manufacturing process can serve as input material in another process or can be recycled or reused. Adopting greener production practices will draw the economy closer to achieving the sustainable development agenda which is fundamental to achievement of the Sustainability Development Goals (SDGs).

Good stores management practices and satisfactory profit in the Covid-19 pandemic era

We have earlier noted that satisfactory profit is achieved when there is reward for business risks after capital recovery. The capital factor for the purpose of this study, are inclusively all expenses incurred in getting the goods or service produced and delivered to the customers. Even though production constitutes the major transformation of materials, good stores management practices are very relevant in ensuring that the production outputs retain their quality, quantity and even marketability. The Covid-19 has been noted to be characterized with increase in poverty level, hunger and scarcity. Hence, there is need for good stores management practices to reduce a lot of avoidable costs and implications as deliberate efforts need to safeguard resources using appropriate control measures. Good stores management represents an aspect of resources management which takes care of the inventory until sales are made. Inventory is the unit of material input or output held for either sales or production. Inventory management therefore can be regarded as a very relevant aspect of management. Anichebe and Agu (2013) opine that inventory management constitute one of the basic necessities for organizational success and growth since the ability of an enterprise to make profit depends on the quantity of the products sold while the quantity sold is also dependent on the product's quality. The essence of good stores management practices is for proper management of inventory. As stated by Ogbadu (2009) good management practices will minimize depreciation, pilferage, reduce wastes and availability of materials when needed. The motives and benefits from good store management practices include;

1. Ensure adequate security of inventory
 2. Different personnel for material purchase, receipt or release, and custody of input and output materials.
 3. Proper documentation of material flow
 4. Ensure continuous and undisrupted production and sales resulting from stock-out
 5. Prevent pilferage and places responsibility for resources (input material and output material) on a known person.
 6. Proper issue of goods for sale to reduce possibility of expired goods before sales
 7. Easy stock balance monitoring for raw-materials, work-in-progress and finished goods
- On the relationship between good store management practices and satisfactory profit, Panigrahi (2013) in his study indicated a significant negative relationship with profitability, even though good stores management was implied in the firms' knowledge of the inventory conversion period.

THEORETICAL VIEWPOINT

This study adopts the view point of the stakeholder theory and the Performance Improvement (PIT) Theory adopted in an earlier study on corporate resources management.

Stakeholder theory

The stakeholder theory of Freedman (1984; as cited in Freedman & Patten, 2004) consider a business organization as existing not just to make profit but also for the sake of value creation in the business environment, and in the 'people' as implied in this study. Thus, this theory is seen to be in line with the triple bottom line strategy for environmental sustainability discussed above. The stakeholders in this case are regarded as those who are directly or indirectly affected by the activities of an existing business. This includes the employees, customers, suppliers, providers of capital, lenders, government, creditors etc. by this study adopting this study, organizational material resources management processes are expected to properly avoid or reduce the possible negative effects of these activities on the stakeholders in a bid to make profit.

Going by this theory, we emphasize good ethical practices for businesses from the planning stage of businesses or any production process down to product delivery and usage. Business focus is expected to accommodate the interests of all stakeholder groups alongside the profit motive as this is a sure way to achieving sustainability.

The Performance Improvement (PIT) Theory

This theory as propounded by Iliemena (2020) is of the view that satisfactory profit can be earned through sustainability practices especially as it concerns the environment. Environmental consciousness is therefore the focal point of this theory as the key to firm sustainability in the long-run. The explanation is that as firms engage in business processes that are considered as safe to the environment and stakeholder considerations, it earns good reputations; reduce costs emanating from charges and impositions due to environmental unfriendliness. The good reputation of the business is explained to have the reward of attracting more customers and it is already known that

increase in market share is a very necessity for business survival. As emphasized by Iliemena, Egolum and Agu (2021), this should be inculcated as part of the business strategies and policy which will ensure material planning, purchases, storage, usage and waste disposal practices are all environmental friendly. On the contrary, bad business practices yields bad reputation which decreases sales and profit. By adopting this theory, material resources management practices should be such that enhances environmental sustainability. Through environmental sustainability a firm would be able to earn satisfactory profit.

Past empirical studies

Ogbadu (2009) studied how profitability can be achieved through effective materials management system using Benue Brewery Nigeria as case study. Survey research design was adopted for the study using interview and questionnaire approaches on a sample of 94 respondents. Test analyses using Chi-square method revealed there is significant positive relationship between materials management problems and the frequent breakdown of production plants. Siyanbola and Raji (2013; as cited in Iliemena & Amedu, 2019) conducted a study which aimed to determine the impact of cost control on the profitability of companies in the manufacturing industry. The study was undertaken as a case study of West African Portland Cement (WAPCO) while analyses of gathered data were carried out using Pearson product moment correlation co-efficient. The results of the empirical analyses confirmed positive impact of cost control on profitability. Going further, Wicker and Breuer (2013) examined the varied impacts of organizational resources on the severity of organizational problems as a theoretical study focused on organizational capacity. The main purpose of the study was to explore the influence of human, financial, infrastructure, and cultural resources on organizational problems using online survey of 19,345 respondents from non-profit sports club in Germany. Results of the regression analyses indicated that human resources (women on the board, secondary volunteers, etc.), financial resources (Herfindahl index), infrastructure resources (own facilities, and public facilities), and cultural resources are significant determinants of organizational problems. Panigrahi (2013) examined the impact of inventory management on working capital efficiency of Indian cement companies by exploring the relationship between inventory conversion period and profitability from 2001-2010. Their study found using regression analyses, that there is significant negative relationship between inventory management and profitability. Their finding implies that when inventories are held for longer days, profitability decreases but when inventories are held for shorter days, profitability increases. Hami, Muhamad and Ebrahim (2015) examined the relationship between sustainable manufacturing practices and environmental sustainability using innovation performance as mediating variable. This study employed structural equation modeling on survey data from 150 manufacturing firms in Malaysia. The results of the analyses showed that both internal and external sustainable manufacturing practices have significant positive impact on environmental sustainability, although, external sustainable manufacturing practices were found to yield greater impacts. Also in line with our concepts of study, Shahbazi (2015) in his thesis examined the influence of materials management efficiency on environmental sustainability and how material extraction, consumption and waste generation can be reduced without influencing the function or quality of a product or process. The study reviewed multiple empirical cases and studies using observations, interviews, waste stream

mapping, waste sorting analyses, environmental report reviews and company walkthrough to ascertain material efficiency and industrial waste management systems. Evidence from the study shows that material waste reduction, waste segregation and time-to-time calculation of material efficiency performance measures will improve materials efficiency and yield economic and environmental benefits. Barua, Gichira and Iravo (2016) investigated the effects of organizational resources and environmental factors on performance. The study used stratified and simple random sampling techniques to select 55 enterprises and 432 respondents respectively from a population of 495 managers in profit oriented government-parastatals in Kenya. Primary data for the study were generated using the questionnaire and interview methods while the secondary data for the study were gathered from the audited financial statements of selected parastatals. Coefficients between independent variables (firm resources and environmental factors) and (firm performance) elements obtained from factor analysis were computed to explore possible strengths and direction of relationships. Findings from the binary logistic regression revealed the existence of a significant relationship between organizational and environmental factors respectively with performance of parastatals in Kenya. Eboh and Chukwuka (2018; as cited in Iliemena, 2020) evaluated the effects of green business practices on organizational performance using simple random sampling technique to select 10 manufacturing firms in Nigeria and 543 respondents. The results of the linear regression analysis revealed that green business initiatives had significant and positive effect on the selected manufacturing firms' productivity. Their finding indicates that the implementation of green business practices in material acquisition, usage and production waste disposal yields significant positive effect on both the organization and its environment. Iliemena, Ijeoma and John-Akamelu (2019) examined the effect of inventory turnover period on equity of 22 manufacturing companies quoted on the Nigerian stock exchange using data from their financial statement disclosure regarding material-inventories component of corporate resources. The study covered a scope of 2012 to 2018 while regression co-efficient were used for data analysis. Evidence generated showed that the inventory turnover period has significant effect on equity of manufacturing firms. Since inventory management as an aspect of good store management practices, is found to have positive effect on equity, it is therefore expected that similar positive effect should exist with profitability which somewhat re-assures sustainability.

More recently, studies by Sutjipto, Sule, Sucherly, Kaltum and Prasetio (2019) investigated the influence of company resources and strength of industrial competition on competitive strategy of wholesales network industries in Indonesia. The data for the study were gathered from documentations of 35 sampled companies and analyzed using Partial Least Square (PLS)-Structural Equation Modeling approach. Finding revealed that that organizational resources and strength of industrial competition both have significant effect on competitive strategy. Iliemena (2020) carried out an enquiry which ascertained how environmental concerns by organizations, by way of environmental accounting practices affect corporate performance which is an easy indicator of business sustainability. The study generated its evidence from the oil and gas sector in the Nigerian environment for the periods 2012 to 2018. Secondary data were obtained were obtained for the study from the financial reports of quoted companies in the sector of study using ex-post factor research design. The data were tested using simple linear regression techniques and findings

revealed that environmental practices and accounting have significant positive effect on financial performance.

More recently, the study by Pham, Do, Doan, Nguyen and Pham (2021) examined the influence of sustainability practices on financial performance. Their study was carried out as an exploration into the annual reports of 116 listed Swedish companies classifying financial performance into market based and non-market based while GRI standards were used to measure sustainability. Research evidence of their revealed there is significant positive relationship between corporate sustainability and non-market based financial performance (ROE, ROCE and ROA) while the result was inconclusive for market based financial performance (Tobin's Q).

Lastly, Iliemena, Egolum and Agu (2021) studied how corporate resources can be used in achieving socio-economic sustainability of Nigerian firms in the post covid-19 pandemic era. Research emphases were laid specifically on human resources, financial resources, and capital resources of business organizations using survey research design while primary data were obtained from 76 Accountants in selected cities in Anambra state while the z-test statistics was used for data analyses. Evidence generated in the study revealed corporate resources are significantly useful in achieving the socio-economic sustainability of firms. The finding further implies that if efficient utilization of resources is not incorporated in business policies and strategies then sustainability beyond the pandemic period may not be guaranteed.

METHODOLOGY

The research approach adopted for this study was survey research design. The population of this study is made up of 358 managers in both public and private sectors in Anambra state and Delta state. The Taro Yamane formula as adopted from Iliemena and Amedu (2019) was used for sample size determination, thus we obtained a sample of 189 respondents using simple random method. Due to the large sample size and Covid-19 social distancing demand, an e-questionnaire was mainly used in this study to minimize personal contacts with respondents. The e-questionnaire was designed in a five-point Likert scale structure with some open space for unstructured responses. Z-test statistics was used as the procedure for data analyses and decisions taken at 5% significance levels.

$$Z = \frac{\bar{x} - \mu}{s / \sqrt{n}}$$

Where;

\bar{x} = Sample mean, μ = Population, n = Sample size, and $n-1$ = Degree of freedom

TEST RESULTS AND IMPLICATIONS

Hypothesis one: There is no significant effect of effective utilization of raw materials on achievement of satisfactory profit beyond Covid-19 pandemic era.

Hypothesis two: materials recycling play no significant role in ensuring environmental sustainability

Hypothesis three: Reduction in material usage quantity and material re-use do not significantly help in ensuring environmental sustainability.

Hypothesis four: good stores management practices are not significantly important for retention of satisfactory profit beyond Covid-19 pandemic period.

Table 4.1. One-Sample Kolmogorov-Smirnov (Z-Test) results

	(1) Effective raw material utilization and satisfactory profit	(2) Recycling and environmental sustainability	(3) Materials Reduction, Re-use and environmental sustainability.	(4) Good stores management and satisfactory profit
N	5	4	5	3
Normal Parameters ^{a,b}	Mean	14.0000	12.0000	11.000
	Std. Deviation	13.21000	14.311000	12.74000
Most Extreme Differences	Absolute	.313	.218	.246
	Positive	.313	.218	.246
	Negative	-.192	-.154	-.161
Kolmogorov-Smirnov Z	.648	.583	.720	.583
Asymp. Sig. (2-tailed)	.006	.001	.009	.000

a. Test distribution is Normal.

b. Calculated from data.

The results of the analysis in table column (1) above shows probability value of 0.006 for hypothesis one tested and this is clearly less than the 5% (0.05) level of significance chosen for this study. Given the above, we reject the null hypothesis that there is no significant effect of effective utilization of raw materials on achievement of satisfactory profit beyond Covid-19 pandemic era. This is somewhat in line with the research outcome of Ogbadu (2009) which found that there is significant positive relationship between materials management problems and the frequent breakdown of production plants. It is further in agreement with Wicker and Breuer (2013) that ineffective management of organizational resources culminates into greater organizational problems. Our outcome here further supports the findings generated by Barua, Gichira and Iravo (2016) that there is significant relationship between organizational and environmental factors respectively with performance. Also in line with this result is the work of Iliemena, Egolum and Agu (2021) which opine that business organizations need to efficiently deploy their human, capital, and financial resources in order to achieve socio-economic sustainability that would last into the post covid-19 pandemic era, as these resources were found to play crucial role in determining corporate success.

The result of the analysis for hypothesis two indicated in table column (2) above generated a P-value of 0.001. The probability value of 0.001 is also less than 5% significance level. Thus, here we further reject the null hypothesis that materials recycling play no significant role in ensuring environmental sustainability as this is countered by the available evidence. In line with this, earlier

study by Hami, Muhamad and Ebrahim (2015) showed that both internal and external sustainable manufacturing practices have significant positive impact on environmental sustainability, although, external sustainable manufacturing practices were found to yield greater impacts. Further, evidence from the study of Shahbazi (2015) shows that material waste reduction, waste segregation and time-to-time calculation of material efficiency performance measures (these are all products of recycling) will improve materials efficiency and yield economic and environmental benefits.

Table column (3) above indicates a P-value of 0.009 for hypothesis three on a two tailed test. The test result of 0.009 is less than our chosen significance level of 0.05. This implies that reduction in material usage quantity and material re-use significantly help in ensuring environmental sustainability. Thus, our hypothesis stated above is also rejected to align with the test result. The result here agrees with the earlier result generated by Eboh and Chukwuma (2018; as in Iliemena, 2020) which indicated that the implementation of green business practices in material acquisition, usage and production waste disposal yields significant positive effect on both the organization and its environment. Further in line, Iliemena (2020) found that environmental practices and accounting have significant positive effect on financial performance.

Further ahead, table column (4) above reveals that the generated Probability value of the data analyzed for hypothesis four is 0.000 which is less than error term of 0.05 (5%). This leads to the rejection of the null hypothesis that good stores management practices are not significantly important in retention of satisfactory profit beyond Covid-19 pandemic period as evidence revealed otherwise. In agreement with this finding, Panigrahi (2013) implied that when inventories are held for longer days, profitability decreases but when inventories are held for shorter days, profitability increases.

Policy implications of findings

1. There is need to constitute environmental monitoring agencies who would be charged with the responsibility of tracing re-usable wastes in disposal places back to the producers for necessary penalties in order to encourage more environmentally sustainable processes. Government may even engage men that would daily pick wastes in the environment that can be recycled into production processes and sold back to producers.
2. Policy measures should be taken by the government to curtail unnecessary price increases by way of possible written applications and justifications for businesses that want to increase their product prices and proper investigation carried out to ascertain approval or disapproval of such price increase.
3. Quality control agencies should be set up in every local government with the right to closely monitor business processes from time to time as a way of ensuring quality input materials and quality outputs. In Nigeria, even though we have the Standard Organisation of Nigeria (SON), it is clearly not enough especially given the number of businesses in the manufacturing sector and the need for closer monitoring.

4. There is a wake-up call here on governments, more particularly the Nigerian Government to begin to build policies that would ensure future availability of raw-material inputs especially as the activities of herdsmen are currently ravaging and discouraging local agricultural businesses which form the major source of raw materials for most production businesses. If policy measures are not taken in earnest, it constitutes a very huge threat to the existence of most businesses in Nigeria and even to environmental sustainability.

CONCLUSION AND RECOMMENDATION

In conclusion, effective utilization of raw materials, material recycling, material re-use, reduction in material quantity usage are keys to satisfactory profit beyond Covid-19 pandemic era and guarantee environmental sustainability. As such, it is recommended that every business creates an environmental sustainability committee to be charged with the responsibility of assessing every business process to ensure compliance with sustainability requirements and waste management. Businesses are hereby encouraged to build their strategies in a way that the available resources can meet the present needs and future business needs as in line with the PIT theory; it will earn them good reputation, increased sales for increased profit and increase their chances of survival. Other recommendations include;

1. Use of recyclable and re-usable material resources alternative to reduce costs and wastes disposal into the environment.
2. Offer financial and technical support to farmers and other producers of their input materials to ensure continuous availability.
3. Consider alternative product packaging options to retain quality without increase in product prices.

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