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Lean Accounting and the Efficiency-Profitability Nexus in Manufacturing Firms

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Abstract

This paper analyzed how lean accounting metrics affect efficiency and profitability of manufacturing companies listed on the Nigeria stock exchange. The sample size of the study will consist of fifty-one (51) manufacturing firms that are listed in the Nigerian Exchange Group as at 31 December 2024. Through the sample size calculation method by Taro Yamane, a sample size of forty-five (45) firms was obtained, out of which thirty-nine firms that had all the required and consistent data between the years 2012-2024 were ultimately analyzed. The research design and method are ex-post facto and the panel least squares regression techniques. Employee productivity ratio, customer lead time, direct value stream cost, and lean efficiency ratio are proxies of lean accounting practices whereas asset utilization efficiency and net profit margin are proxies of efficiency and profitability respectively. The results indicate that lean accounting metrics cause significant effect on firm performance, and these effects differ in efficiency and profitability aspects. The ratio of productivity among the employees and direct value stream cost contribute greatly to the efficiency of asset utilization whereas lean efficiency ratio has a high positive effect on profitability. There is an inconsequential effect of customer lead time in the two models. The results further indicate that firm size and leverage condition the efficiency–profitability outcomes of lean practices. This underscores a dynamic efficiency–profitability nexus in which asset utilization efficiency acts as a foundational mechanism linking lean accounting practices to improved profit margins in Nigerian listed manufacturing firms. The indications suggest that lean accounting adds more reliably to efficiency than to profitability, which confirms that enhancing the operations are the most basic and instant results of the adoption of lean. The research concludes that the proper use of lean accounting practices improves the efficiency and profitability of the listed manufacturing companies in Nigeria. Out of the foregoing, this paper recommends the adoption of lean accounting in internal reporting frameworks and the option of aligning the decisions to finance with the goals of efficiency to prevent a decline in profitability due to high levels of leverage.

Keywords: Lean accounting metrics; Efficiency performance; Asset utilization efficiency; Profitability performance; Net profit margin

Introduction

The manufacturing companies with high competition and low-cost sensitivity are increasingly turning to accounting systems that go beyond the conventional cost accumulation that would enable them to operate efficiently and add value to the company. The concept of lean accounting has come up as a reaction to this requirement; it focuses on value stream orientation, waste removal, and timely information on performance that makes accounting activities consistent with lean philosophy of production. The applicability of lean accounting in enhancing efficiency and profitability in manufacturing economies like Nigeria where firms are forced to deal with the unpredictability of input prices, infrastructural bottlenecks and stiff market competition has become more pronounced. Even with the increasing popularity of lean practices, most of the manufacturing companies in Nigeria are still using traditional accounting that hides process-level inefficiencies and costs information misrepresentation [1]. The conventional absorption costing systems tend to generally allocate the overheads randomly, undermining the management understanding of the value-adding and non-value-adding activities. Consequently, companies can be faced with suboptimal utilisation of the available

assets, exaggerated cost of production, and deteriorating profit margins, despite engaging in operational improvement. Lean accounting attempts to resolve these weaknesses through embracing value stream costing, simplified measures of performance and efficiency oriented financial measures which are more reflective of operational realities. Primarily, the empirical data in Nigeria tend to reinforce the performance advantages of lean activities, especially the ones related to the reduction of lead time, cost efficiency, and responsiveness. According to recent findings, the dynamics of asset utilisation, cash returns, and value creation in manufacturing companies are improved through the enhancement of delivery cycle time and customer lead time [2,3]. The other lines of the literature also emphasize the application of direct value stream costing in lowering the cost of sales and increasing the profitability by providing better cost transparency [4-6]. Likewise, there is an indication that an increased ratio of the lean efficiency is correlated with better profitability and value-based performance metrics [6-11].

Despite these revelations, the current literature is still in bits. Most studies tend to study either operational efficiency or profitability individually and without a specific study of their relationship within the same analytical framework. Previous studies tend to use small sectoral samples, or use old data, or they failed to use control variables, questioning the generalizability and bias through omitted variables. Although direct value stream costing and lean efficiency ratios are two lean accounting tools that are discussed more and more, they are not often combined to interpret the results of both efficiency and profitability among listed manufacturing companies. This paper fills these gaps by investigating the effect of lean accounting on the performance (efficiency and profitability) of listed manufacturing companies in Nigeria. Placing lean accounting in the context of an efficiency-profitability nexus model, the study offers a comprehensive evaluation of the way, in which the lean-oriented accounting is eventually converted into enhanced asset utilisation and profit performance. This study has a threefold contribution. First, it expands the lean accounting literature in that it incorporates efficiency and profitability performance in one empirical design. Second, it offers recent data on listed manufacturing companies in Nigeria, which enhances the applicability of the findings to the modern policy and managerial decision-making. Third, the study reveals more about the strategic position of the accounting systems in facilitating the operation excellence and financial sustainability in the emerging economies because it emphasizes lean accounting as opposed to isolated lean practices. The rest of the paper is structured in the following way. Section Two gives the conceptual and empirical reviews, and the theoretical framework of the study. Section Three is a materials and methods. Section Four is the empirical results presented and discussed. Section Five concludes the study and indicates managerial and policy implications, limitations, and directions of future research.

Literature Review

Conceptual review

Lean accounting is an approach to management accounting which is consistent with lean production philosophy, is value-creating, focused on processes and transparent costs. The lean accounting system can do this as opposed to the traditional accounting system where the allocation of the costs is based on historical cost, the lean accounting system can track the value streams, and identify the activities that are not adding value and offer managers with timely and actionable information to make decisions. Lean accounting in the manufacturing setting is a tool that can be used to measure operational gains in financial performance and, more importantly, integrates the management of internal resources with the performance of the firms. The main lean accounting measures, taken into consideration within the given study, are employee productivity ratio (EPR), customer lead time (CLT), direct value stream costing (DVSC), and lean efficiency ratio (LER). EPR evaluates the efficacy of human capital in the production of outputs as compared to the input. The increased EPR of the firms implies that labour resources are utilized efficiently which contributes to lower production waste, higher capacity of running operations and this in turn boosts the efficiency of the asset utilization (AUE) which indirectly reflects on the net profit margin (NPM) through lower labour cost. CLT is a duration between receipt of an order and delivery of the products. Reduced and levelled lead times enhance responsiveness of operations, efficiency in inventory and idle capacity, thus enhancing AUE besides contributing to NPM by ensuring timely fulfilment and customer satisfaction [12].

DVSC offers specific cost information on individual production processes, which helps the managers to understand how inefficient the process is, how the managers can eliminate non-value-adding activities and how they can utilize resources more efficiently. DVSC promotes operational efficiency (AUE) and profitability (NPM) by lowering the price of sold goods and increasing the level of cost transparency. LER measures the general effectiveness of the transformation of inputs to outputs in the production activities. Companies that have better LER represent better utilization of materials, labour and working capacity, which translates into better AUE and better NPM.

The lean accounting also has efficiency and profitability which are intertwined. Efficiency gains (via improvement in AUE) lower the cost of operation and maximize the utilization of resources which give the environment of increasing the profit margin (NPM). On the other hand, improved profitability helps companies to invest in process enhancement, employee education, and technology, which

in turn boosts efficiency. This mutual relationship emphasizes the efficiency-profitability nexus, which emphasizes the simultaneous role of lean accounting activities in improving the operation and financial outcome in manufacturing companies.

In line with the conceptual review and the efficiency–profitability nexus, the study proposes the following null hypotheses (H_0):

H_{01}: Lean Accounting metrics have no significant effect on Asset Utilization efficiency (AUE) of listed manufacturing firms.

H_{02}: Lean Accounting metrics have no significant effect on net profit margin (NPM) of Nigerian manufacturing firms.

Resource-based view (RBV) theory

Resource-Based View (RBV) theory is another theory that was proposed by Wernerfelt (1984), which was later developed by Barney (1991) that assumed firms can gain a sustainable competitive advantage by creating and successfully using unique, valuable and imitable internal resources. These assets can be either tangible or intangible and such competencies like skilled labour, efficient processes, innovative systems, and excellent cost structures can be included (Barney, 1991). Such resources in manufacturing firms tend to dictate the efficiency with which a particular company converts inputs into outputs at the lowest possible waste as well as financial benefits. RBV is specifically applicable to lean accounting since lean practices are aimed at streamlining the internal operation and cost structure, which is a central element of the resources of a firm. The lean accounting indicators of direct value stream costing (DVSC) and lean efficiency ratio (LER) are the indicators of the effectiveness of using the firm internal resources. As an example, lower value stream costs are an indicator of high-quality process management, and high ratios of lean efficiency indicate high resource utilization in the basic production processes. These actions are in line with the focus of RBV to use internal strengths as a means of competitive advantage.

The empirical research also highlights the fact that resource efficiency contributes to the financial performance greatly. As an example, companies that have properly applied DVSC systems have lower cost of sales and higher profitability and companies with a higher LER make consistently better ROI, EVA, and asset turnover reports. In situations of production, such as Nigeria, the companies fight against infrastructural and economic barriers, and the key to maintaining the efficiency and profitability of the company lies in the process of utilizing and leveraging the internal reserves. The relevance of the RBV theory to this study is that its rationale the choice of such operational measures as DVSC and LER as significant indicators of lean accounting performance. This research brings its analysis into a well-developed strategy model because of matching the lean practice with RBV, which connects efficiency in resources with long-term financial prosperity.

Empirical review

In Nigeria, recent empirical research is playing an increasing role in ascertaining the application of lean accounting, cost transparency and operational efficiency in boosting the performance of manufacturing firms; albeit with significant methodological constraints. The latest findings provided by Nwafor and Olamide indicate that the successful implementation of direct value stream costing (DVSC) fulfills a substantial decrease in the cost of sales and also increases operating profit margins in large-cap manufacturing companies, to a considerable extent, owing to the increased visibility of cost at a process level. In a parallel manner, Ibrahim and Okon indicate that lean efficiency ratio (LER) and return on investment show strong positive correlation in companies that have adopted Industry 4.0 technologies, however, it is not replicable due to the use of proprietary efficiency indices. Usman and Ezeani also affirm that DVSC enhances the accuracy of cost forecasting and operating margin within the food and beverages industry but they are limited in generalization due to their sector-specific focus and the use of self-reported practices. At the same time, Adeoye and Chukwuemeka conclude that the proxies of lean efficiency enhance the returns on sales and operational focus of listed industrial companies, but do not disaggregate the specific lean practices. Okafor and Chinedu demonstrate that greater lean efficiency ratios would be an important predictor of Economic Value Added in Nigerian cement companies and Ogunlade reports that less direct value stream cost would increase EVA in manufacturing firms. Both studies however lack control of fluctuations in market demand, inventory movement, or disruption in the supply-chain which can be independent factors in value creation. The recent research on the topic done in 2021-2022 focuses mostly on lead time and cycle-time efficiency. Adeoye and Hassan record that shorter delivery cycle times have a positive impact on CROA and the efficiency of asset utilization within the FMCG companies, and Okafor and James indicate that stable customer lead times lead to better asset turnover and EVA in the auto-component firms. The same findings are observed by Adewale and Peters and Akinwale and Obi, which claim that the decrease in direct production costs and increase in lean efficiency ratios affect the better profitability and asset turnover [13]. However, such research usually does not control firm-specific factors including leverage, asset intensity, and risk exposure, which is subject to the omitted variable bias. These results are supported by previous studies conducted between 2018 and 2020 with significant limitations. Onyema and Kalu and Eniola and Sadiq demonstrate that the shortening of the lead time positively correlates with CROA, EVA, liquidity, and working capital efficiency, whereas Adebayo and Omole and Akintunde confirm that there are positive connections between the shortening

of the cycle time and lean efficiency, as well as profitability indicators [14,15]. Nevertheless, the narrowness in the range of industries covered, the lack of recent data, and the inability to use uniform measures of efficiency decreases the extrapolation of these studies. Foundational evidence of the benefits of lead time and responsiveness cycle reduction on cost efficiency, revenue growth, and asset utilization have been formed through the earliest Nigerian studies that include Ibrahim and Mustapha, Nwachukwu, Abiola, and Ifeanyi and Okeke [16-19]. However, these studies are based on small number of samples, SME-based design, survey data that relies on perception and is pre-2016, therefore, their inference is less applicable to existing listed manufacturing companies under modern competitive and technological settings.

In short, empirical literature is always upholding the positive correlation between lean accounting and operational efficiency and financial performance, although previous studies are inclined to analyze these aspects separately. The little available empirical evidence on the combination of efficiency and profitability in the same lean accounting framework is also lacking especially in relation to listed manufacturing companies in Nigeria-a major gap that this study aims to fill.

Conceptual framework

Source: Researchers' Model (2026)

As described in the conceptual framework, lean accounting metrics were measured as employee productivity ratio, customer lead-time, direct value stream cost and lean efficiency ratio; represents the independent variable. The dependent variables, efficiency and profitability of the operations of the firm were respectively measured using asset utilization efficiency and net profit margin. Control variables are firm size and leverage in order to take into consideration the differences in scale and financing structure that could also influence efficiency and profitability so that the observed effects could be mostly related to lean accounting practices.

Materials and Methods

The research design chosen in this study was ex-post facto research design, which is suitable as the research analyzes the past consequences of lean accounting to efficiency and profitability, based on historical financial and operating data. The population included all 51 Nigerian Exchange Group (NGX)-listed manufacturing companies on 31st December 2024 and five sub-sectors, including Industrial Goods, Consumer Goods, Healthcare, Agriculture, and Conglomerates (NGX, 2024). The sample size was calculated using Taro Yamane's statistical formula for sample size determination, and this gave a sample of 45 firms, out of which 39 firms were sampled based on judgment of the samples suitability with certain criteria, which included the following: a continuous listing between 2012 and 2024, provision of full financial reports, sub-sector classification and consistency of operation. The last sample was representative of sub-sectors and data reliability of the panel analysis with the following distribution; Industrial Goods (12), Consumer Goods (13), Healthcare (5), Agriculture (6), and Conglomerates (3). The audited annual reports of sampled firms and NGX Factbooks were used as sources of secondary data to extract the information regarding the period of 2012-2024. The measured variables are the following: independent variables are the employee productivity ratio (EPR), customer lead time (CLT), direct value stream costing (DVSC), and lean efficiency ratio (LER); efficiency outcome is the asset utilization efficiency (AUE); and profitability outcome is the net profit margin (NPM). Control variables were the firm size (FSIZE) and leverage (LEV). The researchers used the panel least squares regression to approximate the effects of the lean accounting metrics on efficiency and profitability alongside factoring in the heterogeneity at the firm level [20-21]. The models specified are:

Efficiency Model

$$AUE_{it} = \gamma_0 + \gamma_1 EPR_{it} + \gamma_2 CLT_{it} + \gamma_3 DVSC_{it} + \gamma_4 LER_{it} + \gamma_5 FSIZE_{it} + \gamma_6 LEV_{it} + \square_{it}$$

Profitability Model

$$NPM_{it} = \delta_0 + \delta_1 EPR_{it} + \delta_2 CLT_{it} + \delta_3 DVSC_{it} + \delta_4 LER_{it} + \delta_5 FSIZE_{it} + \delta_6 LEV_{it} + \varepsilon_{it}$$

Whereas here: EPRit = Employee Productivity Ratio for firm i at time t, CLTit = Customer Lead Time for firm i at time t, DVSCit = Direct Value Stream Cost for firm i at time t, LERit = Lean Efficiency Ratio for firm i at time t, FSIZEit = Firm Size for firm i at time t, LEVit = Leverage for firm i at time t, γj , δj = model-specific coefficients to be estimated (j = 0,1,2,...), $\square_{it}$, ε_{it} = model-specific stochastic error terms (capture unobserved influences). Apriori expectations: EPR, LER, and DVSC are expected to positively influence both AUE and NPM, while CLT is expected to negatively influence AUE and NPM (shorter lead times increase efficiency and profitability). Firm size and leverage are controlled for potential confounding effects.

Results and Discussions

Results

The Panel Least Squares result of Model 1 with AUE (Efficiency) as dependent variable is presented in (Table 1) below;

Table 1 shows panel least squares findings of Asset Utilization Efficiency (AUE), as the dependent variable. Since it involved cross-sectional and short time-series data, a static panel was used, which began with the fixed and random effect models. The fixed effect model proved to be more suitable as the Hausman test (Chi²

= 105.89, p = 0.0000) showed that it is more appropriate to test the hypothesis. The effect model with fixed effects is statistically significant (Prob(F-statistic) = 0.0000), and the value of R 2 = 0.796 indicates that the explanatory variables used, which are Employee Productivity Ratio (EPR), Direct Value Stream Cost (DVSC), Lean Efficiency Ratio (LER), Customer Lead Time (CLT), Firm Size (FSIZE), and Leverage (LEV) are useful in explaining the variation in AUE by about 79.6 percent. Individually, EPR (γ_1 = 0.242, p = 0.000) and DVSC (γ_2 = 1.016, p = 0.000) are positive and highly significant, indicating that higher employee productivity and effective management of production costs enhance asset utilization efficiency. LEV (γ_6 = 0.323, p = 0.000) is also positive and significant, suggesting that firms employing reasonable leverage achieve better operational efficiency. Conversely, FSIZE (γ_5 = -6.748, p = 0.000) is negative and significant, implying that larger firms may experience lower efficiency due to operational complexities. CLT (γ_3 = -0.054, p = 0.277) and LER (γ_4 = 0.024, p = 0.351) are statistically insignificant, suggesting limited direct effects on AUE during the study period.

Table 1: *Panel Least Squares Results for Model 1 (AUE).*

	Fixed Effect Model	**Random Effect Model**
C	5.8491 (10.4200) {0.0000}	5.5533 (10.500) {0.0000}
EPR	0.2422* (7.1042) {0.0000}	0.2023* (6.4519) {0.0000}
CLT	-0.0544 (-1.0893) {0.2771}	0.0058 (0.1275) {0.8986}
DVSC	1.0159* (11.7385) {0.0000}	1.0393* (12.7239) {0.0000}
LER	0.0240 (0.9342) {0.3511}	0.0371 (1.5429) {0.1240}
FSIZE	-6.7482* (-13.3850) {0.0000}	-6.8238* (-14.3413) {0.0000}
LEV	0.3225* (6.1553) {0.0000}	0.2901* (5.9603) {0.0000}
F-statistics/Prob	24.84 {0.000}	70.00 {0.000}
R- Squared	0.7959	0.60
Hausman Test	105.89{0.0000}	
Observation(	506	506
N		

Note: (1) bracket () are t-Statistics, (2) bracket { } are probability-values (3) *, ** , ***, implies statistical significance at %1. 5% and 10% levels respectively.
Source: Author's Compilation from E-VIEWS 9 Output (2026)

Table 2: *Panel Regression Result – Model 2 (NPM).*

	Fixed Effect Model	**Random Effect Model**
C	0.0675 (0.0738) {0.9412}	0.0733 (0.0930) {0.9259}
EPR	-0.0600 (-0.9634) {0.3364}	0.0065 (0.1306) {0.8961}
CLT	-0.1479** (-1.9523) {0.0522}	-0.2718* (-4.1713) {0.0000}
DVSC	0.7514* (5.2073) {0.0000}	0.5982* (4.8151) {0.0000}
LER	0.8782* (20.5371) {0.0000}	0.8171 (22.5464) {0.0000}
FSIZE	-2.7241* (-3.2333) {0.0000}	-1.8813* (-2.5710) {0.0107}
LEV	-0.2423* (-2.7404) {0.0066}	-0.1298 (-1.7496) {0.0814}
F-statistics/Prob	25.71 {0.000}	85.21 {0.000}
R- Squared	0.8035	0.67
Hausman Test	1.389{0.0065}	
Observation (N)	506	506

Note: (1) bracket () are t-Statistics, (2) bracket { } are probability-values (3) *, ** , ***, implies statistical significance at %1. 5% and 10% levels respectively.
Source: Author's Compilation from E-VIEWS 9 Output (2025)

The findings, in general, suggest a strong positive effect of such key lean accounting metrics as employee productivity and direct value stream cost management on the efficiency of asset utilization in the manufacturing employees of Nigerian manufacturing companies. Thus, the null hypothesis that lean accounting practices do not affect AUE is not rejected, which proves the fact that the given practices are significant drivers of the operational efficiency. The Panel Least Squares result of Model 2 with NPM (Profitability) as dependent variable is presented in (Table 2)

below; Table 2 shows the panel least squares results of Net Profit Margin (NPM) as an indicator of profitability. The cross-sectional data combined with short time-series data meant that, both the fixed and the random effect models had to be estimated at the same time; the Hausman test (Chi2 = 1.389, p = 0.0065) revealed that the fixed effect model would be better used to interpret the results. The fixed effect model is very important (Prob(F-statistic) = 0.0000), with an R2 value of 0.804, which implies that the explanatory variables are Employee Productivity Ratio (EPR), Customer Lead Time (CLT), Direct Value Stream Cost (DVSC), Lean Efficiency Ratio (LER), Firm Size (FSIZE), and Leverage (LEV), which cumulatively explained the variation in profitability of more than 80%. Among the predictors, LER (δ_4 = 0.878, p = 0.000) and DVSC (δ_3 = 0.751, p = 0.000) exhibit strong positive and significant effects, demonstrating that firms with better lean operational practices and optimized value stream costs achieve higher profit margins. In contrast, EPR (δ_1 = -0.060, p = 0.336) and CLT (δ_2 = -0.148, p = 0.052) are not statistically significant, suggesting that employee productivity and delivery lead times had limited direct influence on profitability during the study period. FSIZE (δ_5 = -2.724, p = 0.001) and LEV (δ_6 = -0.242, p = 0.007) are negatively related to profitability, implying that larger firms and those with higher leverage face challenges that reduce profit margins, such as increased costs or financial risk exposure. These results suggest that although not every lean accounting variable has a direct effect on profitability, lean efficiency and direct value stream cost management can be considered as important factors. Thus, the null hypothesis is rejected that the lean accounting practices do not affect the profitability because it is a positive factor in increasing the profitability of a firm.

Discussion of Results

The results associated with Hypothesis One that tested the effect of lean accounting metrics on efficiency (Asset Utilization Efficiency - AUE) indicate that there is high empirical evidence that lean accounting plays an efficiency-enhancing role in listed manufacturing companies in Nigeria. The fact that there is a positive and significant effect of direct value stream cost and employee productivity on AUE is in line with the process-efficiency argument by previous and recent studies. As an example, Adeoye and Hassan and Okafor and James also report the same finding, stating that asset utilization and asset turnover are improved due to the improvement in the delivery cycle and the increase in transparency in cost flows. These findings also confirm the stance of Omole and Akintunde and Adebayo, who state that lean practices enhance the capacity of the firms to transform their assets into productive outputs through minimization of idle capacity and operational wastes. The unimportance of customer lead time and lean efficiency ratio to the explanation of AUE, however, is an indication that not every lean dimension can be translated into efficiency gains in equal measure. This is contrary to the results of Adewale and Peters, in addition to Akinwale and Obi, which indicate high efficiency effects of lean efficiency ratios, but can be attributed to the scale of firms, sector composition and incorporation of firm specific controls in the current research like leverage and scale. With these controls, this research gives a more resolute and valid estimate of lean-efficiency associations, thus extending previous research that was usually malpractice by omitted variables bias.

Regarding Hypothesis Two, the measure of the effect of lean accounting practices on profitability (Net Profit Margin - NPM), the findings indicate that profitability is more selective to lean practices as compared to efficiency. The positive and high effect of lean efficiency ratio on NPM is in line with the recent empirical studies by Ibrahim and Okon, Okafor and Chinedu, and Ogunlade who discover that lean efficiency can enhance the value creation and profit margins by reducing waste and streamlining processes. Equally, the direct value stream cost shows a positive effect on profitability which makes the findings of Nwafor and Olamide as well as Usman and Ezeani who highlight improved operating margins and pricing effectiveness pertaining to increased visibility of the value stream. Conversely, the employee productivity and customer lead time were established to be not statistically significant in the profitability model implying that operational level efficiency gains may not necessarily translate into increased profit margin. The finding allows correcting the gaps in the previous research, including those explaining diverse effects of lean practices on profitability, like Adeoye and Chukwuemeka and Onyema and Kalu. The adverse and large effects of the firm size and leverage on the profitability also make the organizational scale and financial structure to moderate these as well, which is also empirically supported by the prior studies that did not possess the ability to control these firm-specific attributes.

Balancing the efficiency and profitability nexus

By reconciling the efficacy-profitability nexus between the empirical findings in Table 1 and Table 2, a sequential as opposed to a simultaneous relationship between efficiency and profitability is realized. The results indicate that lean accounting should initially be practiced in the form of greater functionality in terms of Asset Utilization Efficiency (AUE), which will subsequently be converted into profitability metrics, in the form of Net Profit Margin (NPM). This suggests that efficiency acts as a medium of transmission where lean accounting has an impact on the performance of firms. The efficiency model shows that lean accounting variables increases the capacity of firms to bring greater efficiency in the utilization of the assets meaning that the resources are better coordinated, idle capacity is minimized and the flow of

the processes is improved. These efficiencies, though, are not always a sure-footed way to greater profitability unless coupled with the effective control of cost and decision-making that puts the value stream at its center. That is the reason, why only a set of lean dimensions, namely Lean Efficiency Ratio, have strong and significant influence on profitability in the NPM model. These profitability findings also indicate that efficiency is not enough but it requires efficiency. The size and leverage of a firm are some of the factors that put a pressure of profitability downward implying that the operational complexity and financial commitments of the scale have the potential of cancelling the profitability gains imposed by the benefit of increased asset utilization. In this way, lean accounting-based efficiency should be planned with financial organization and cost control to provide the long-term profits increase. In totality, the interaction supports the idea that lean accounting improves efficiency initially and profitability will follow the efficiency gains after becoming converted into financial results. This highlights a vibrant efficiency-profitability nexus where efficiency of asset utilization is an underlying mechanism that connects lean accounting practices with high profitability in Nigerian listed manufacturing companies.

Conclusion and Recommendations

Conclusion

The results indicate that the lean accounting can produce more significant and consistent influence on the asset utilization efficiency implying that the use of value stream costing and workforce productivity increase improves the successful use of organizational resources and minimizes the waste of operations. In terms of profitability, lean practices that are directly associated with cost optimization and cost process efficiency only have a substantial positive impact on net profit margin, implying that efficiency gains do not necessarily lead to increased net income unless they lead to actual cost savings. The current research finds that lean accounting practices have a significant albeit a differentiated role in defining the performance outcomes of the listed manufacturing companies in Nigeria. The indications suggest that lean accounting adds more reliably to efficiency than to profitability, which confirms that enhancing the operations are the most basic and instant results of the adoption of lean.

Implications and recommendations

This means that lean accounting improves the profitability primarily because it leads to operational efficiency, which proves efficiency-profitability nexus in the Nigerian manufacturing companies. This implies that efficiency gains are to be managed purposefully and converted into cost-savings and price benefits in order to attain a sustainable profitability. Managers are thus called on to emphasize on lean accounting practices that enhance cost transparency, asset utilization especially direct value stream costing and productivity-oriented controls. Big companies, especially, ought to deal with the rigidity of operations that erode the effectiveness advantage of lean systems. Professional bodies and regulators are also supposed to encourage lean accounting adoption by training and practice guidelines. Out of the foregoing, this paper suggests the adoption of lean accounting in internal reporting frameworks and the option of aligning the decisions to finance with the goals of efficiency to prevent a decline in profitability due to high levels of leverage.

Limitations of the Study

There are some limitations that apply to this study. To begin with, it is based on only secondary data in the form of published financial statements which might not be able to completely reflect the depth and quality of internal lean accounting activity put in place by companies. Second, the sample is limited to listed manufacturing firms in Nigeria so the findings cannot be readily generalized to other sectors of the economy or unlisted firms. Third, although the panel regression results in control over firm-specific effects, the likelihood of unknown factors like managerial capability, technology use and market rivalry that affect the efficiency and profitability cannot be fully eliminated. Lastly, the research utilizes the use of the static panel models which does not necessarily capture the changes in efficiency and profitability that is dynamic over time.

The study can be expanded in future studies by adding primary data collected via surveys or interviews to better represent the internal lean accounting practices and extending the scope to include unlisted companies or other industries to increase generalizability, and by including other variables like managerial competence, use of technology and competition in the market. Furthermore, the usage of dynamic panel models or time-series would be able to give more information about the evolution of efficiency and profitability over time, whereas comparative analysis done across regions or countries would allow shedding light on the impact of contextual factors on the effectiveness of lean accounting practices.

Conflict of Interest

The authors confirm that they do not have any conflict of interest about the publication of this study. There were no financial, personal, or professional relationships that were related to the research, analysis, or conclusions made in this paper.

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