

Lean Accounting and Lean Business Philosophy in Nigeria: An Exploratory Research

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ABSTRACT

The idea of a lean business culture has greatly improved business results in terms of product quality, customer satisfaction, product market share and profitability in the advance countries in recent times. This exploratory research paper attempted to investigate the application of lean accounting as a strategy to achieve lean business philosophy in Nigeria manufacturing firms. The study population consists of 53 manufacturing firms listed in the Nigeria stock exchange with 2,246 employees selected based on the researcher's criteria. 50% of the population used as sample frame was selected at random. The formulated hypotheses were confirmed and the result obtained revealed that lean accounting correlated positively with lean business philosophy but due to ignorance, implementation is insignificant in Nigeria. The study suggested the need for full implementation of lean business culture and lean accounting to gain the total benefit of lean business philosophy which in turn through the multiplier effect will influence Nigeria economy positively.

Keywords: *Lean accounting, lean business philosophy, traditional costing methods, value stream mapping*

1. INTRODUCTION

According to Kumar [1], one of the Limitations and challenges experienced by manufacturers in Europe is the difficulty encountered in the measurement and quantifying the benefits flowing from lean manufacturing implementation. He suggested that organizations should involve accounting and finance department staff in carrying out the cost-benefit analysis (CBA) before and after the implementation to determine the level of improvement in their established performance metrics. The only effective way to resolve this problem is through the adoption and implementation of lean accounting methods as lean thinking applies to every aspect of an organization including finance and accounting processes [2]. The two major driving forces for lean accounting are the application of lean methods to company's accounting control and measurement processes to support lean business management to achieve lean business philosophy (LBP). The objectives of lean accounting include: elimination of waste and freeing up capacity, speeding up the process, eliminates errors and defects, and simplify the process to aid understanding. The above goals are achieved by fundamentally changing the accounting processes and motivate lean changes, improve and provide information suitable for control and decision-making by value stream managers, encourage understanding of customers' value and correctly assessing the financial impact of lean improvement [3]. The simple and visual information of lean accounting gives it an edge over traditional costing and management accounting methods [1].

The issue in this research paper bothers on the fact that lean manufacturing methodology introduced techniques which created gaps that have rendered traditional cost and management accounting methods inadequate and

inappropriate for the need of management of lean thinking organization [4]. The traditional accounting principles are unable to support lean business management and this provoked the search for accounting practices, principles and tools that will adequately aids lean activities measurement, proved simple reports of the lean improvement and track the value stream efforts to assist value stream managers in making informed decision. Secondly, from empirical evidences available in the advance countries, most manufacturers have adopted and implemented lean manufacturing techniques and lean accounting to manage their business activities but in Nigeria and other developing countries, the level of awareness and degree of implementation of lean accounting is in doubt [5, 6] This uncertainty therefore calls for investigation to enable generalization and proper documentation of results. The major objective of this paper is to assess the effectiveness of lean accounting techniques as a strategy to achieve lean business philosophy of manufacturing firms in Nigeria with a subsidiary goal of examining the effect of the degree of awareness on the level of implementation of lean accounting in manufacturing organizations in Nigeria. The research questions upon which attempt is made to provide answers in the course of the study includes: To what extent has lean accounting effectively supported lean business management to achieve lean business philosophy in Nigeria? And has the degree of awareness influenced the level of implementation of lean accounting in Nigeria? The hypotheses of the study are:

H₀₁: There is no significant relationship between lean accounting techniques and achievement of lean business philosophy in Nigeria manufacturing organizations.

H₀₂: The degree of awareness has not exerted significant influence on the level of implementation of lean accounting methods in Nigeria manufacturing organizations.

2. LITERATURE REVIEW

2.1 lean business philosophy and lean accounting

The establishment of management theory and philosophy primarily considers the fundamental principles that inspire the development and operations of a business enterprise, the nature and purpose of the business, its role in the society and moral obligations [7, 8]. Business philosophy is important to an organization and its management on the ground that it is an appellation that denotes a way of doing business or establishment of business outlook [9, 10]. Kotter defined it as a company blueprint which explains the company's overall goals, its purpose and outlines its values [9]. According to Fort [11], business philosophy can also be defined as a set of beliefs and principles that a company strives to achieve which is often referred to as a mission statement or company vision. According to Maskell & BMA Inc Team [4], the first lean accounting summit was held in Detroit, USA in 2005. The conference presenters created the definition of lean accounting as it stands now [12]. Experts in the field developed "The principles, practices, and tools of lean accounting" (PPT) which was published in the "Target magazine" of the Association of Manufacturing Excellence (AME) in 2006. As lean accounting methods continued to evolve, the PPT lays out the principal methods and shows how they fit together into a lean business management system. The PPT emphasizes not only the tools and methods of lean accounting but focuses on customer value and empowerment. Lean business philosophy sets the various components of lean activities such as lean production, lean marketing and sales, lean procurements, lean engineering etc and as a company develop with lean thinking, it becomes obvious that lean accounting is mandatory to create a lean management system, motivates the required changes and propels the achievement of ongoing lean transformation [4, 13].

2.2 Traditional and lean accounting.

Traditional accounting systems uses costing methods designed to support traditional management with information provisions that includes large and complex processes accommodating non-value work. These measurements and reporting activities are only suitable for mass production-style and cannot identify the financial impact of the lean improvements taking place throughout the company. The traditional accounting methods provides misleading information relating to quoting, make or buy, sourcing, product rationalization and profitability and this is considered are extremely harmful to companies with lean aspirations (Maskell, & [4, 14]. As a company progress with lean thinking, many fundamentals of its management system changes and traditional accounting, control and measurement

methods becomes inadequate and unsuitable [15]. Lean thinking organizations sought after clearer understanding of the true costs associated with processes and value streams and this need can only be supported by lean accounting [4]. The similarity between the two methods is that traditional accounting methods were codified into lean accounting principles while the superiority of Lean accounting is seen from the following performance criteria: It focuses on true performance measurements; prepares a simple summary of direct costing of the value streams; it enables decision-making and reporting based on a box score; it encourages preparation of financial reports on timely basis; the income statements are presented in plain language for easy understanding; it embraces radical simplification and eliminates transactions and control bottle-neck; it activates changes from a deep understanding of the value created for the customers; lean accounting eliminates traditional budgeting through monthly sales, operations and financial planning processes - SOFP ; it encourages value-based pricing; and has ability to track the financial impact of lean changes throughout the organization. The above reasons for implementing lean accounting methods motivate people in the organization to move lean improvement forward and assist the role of accounting function from mere bookkeeping and routine financial reporting to strategic partnering with the company leaders to achieve quick success [3, 4] It empowers continuous improvement at every level of the organization leading to increased customer value, growth, profitability and cash flow [16, 17].

2.3 Application of Lean Accounting

Lean accounting was initially developed to support lean manufacturing companies but today it is fast moving into financial services, healthcare, government and education. Although its uses outside manufacturing operations is yet to be properly documented. The following are some of lean accounting applications: **(i) Application to accounting processes:** lean improvement should be applied to all departments of an organization to have overall meaningful changes and excellent results. The reasons for the application of lean improvement methods to the accounting processes lays in its ability to refine company's operations, encourages finance department staff to learn about lean methods through actual hands-on experience and freeing up finance department time by removing waste in the process [4, 14], **(ii) Lean performance measurements:** The control of production and other processes is achieved by visual performance measurements at the shop-floor and value stream level. This measurement eliminates the need for the shop-floor tracking and variance reporting favoured by traditional accounting systems. The continuous improvement is motivated and tracked using value stream performance boards which is updated weekly and used by the value stream continuous improvement team to identify areas and level of improvement, initiate PDCA projects- Plan-Do-Check-Act or Plan-Do-Check-Adjust, and monitor their progress [16].

(iii) Financial Reports for Lean Operations: The lean operations report is classified into value stream costing, financial statements and transaction elimination. The value stream costing reports consists of a simple summary of direct costs of the value streams without overheads allocation to provide financial information that can be clearly understood by every worker in the value stream. This in turn leads to excellent decisions, motivate lean improvement across the entire value stream and show clearly accountability for cost

and profitability. Weekly reporting pattern provides excellent control and management of current costs by the value stream manager [3,16]. Lean accounting presents income statements in a simple easy to understand and use method. The statements do not include misleading data relating to standard costs and ambiguous variance figures favoured by traditional accounting methods. This makes it action oriented. It changes stakeholders question from what does this mean? To what should we do? [4].

2.4 Lean Accounting Principles, Practices, and Tools

The practices and tools of lean accounting are summarized into five principles shown below:

Table 1: Principles, practices, & tools of lean accounting

PRINCIPLES	PRACTICES	TOOLS OF LEAN ACCOUNTING
(A) Simple business accounting	Continuous waste elimination (transactions processes and reports).	(a) Value stream mapping; current & future state (b) Kaizen continuous improvement (c) PDCA problem solving
(B) lean Accounting for change	Management control & continuous improvement	(a) Performance measurement chart linking metrics to process, value streams, plant reporting business strategy, target costs, and lean improvement (b) Value stream performance boards containing break-through and continuous improvement projects (c) Box scores showing value stream performance
	Cost management	(a) Value stream costing (b) Value stream income statements
	Customer & supplier value and cost mgt	(a) Target costing
(C) Clear & timely Information provision	Financial reporting	(a) Plain English" financial statements (b) Simple, largely cash-based accounting
	Visual reporting of financial & non-financial performance measurements	(a) Primary reporting using visual performance boards; divisions, plant, value stream, cell/process in production, product design, sales/marketing, administration, etc.
	Decision-making	(a) Incremental cost & profitability analysis using value stream costing and box scores
(D) Planning from a lean perspective	Planning & budgeting	(a) Hoshin policy deployment (b) Sales, operations, & financial planning (SOPF)
	Impact of lean improvement	(a) Value stream cost and capacity analysis (b) Current state & future state value stream maps (c) Box scores showing operational, financial, and capacity changes from lean improvement. Plan for financial benefit from the lean changes
	Capital planning	(a) Incremental impact of capital expenditure on value stream box-score. Often used with 3P approaches
	Invest in people	(a) Performance measurements tracking continuous improvement participation, employee satisfaction, & cross-training (b) Profit sharing
(E) Strengthen Internal accounting control	Internal control system based on lean operational controls	(a) Transaction elimination matrix (b) Process maps showing controls and SOX risks
	Inventory valuation	(a) Simple methods of inventory valuation without the requirement for perpetual inventory records and product costs

Sources: AME, 2005

2.5 Value stream mapping

According to Keyte & Locher [7], all the activities (both value-added and non-value added) required within an organization to deliver a specific service to the end-customer is regarded as value stream.

Value stream mapping is a lean manufacturing technique used to analyze and design the flow of materials and information required to bring a product or service to a consumer [19]. Value stream analysis is the

identification of all the specific activities occurring along the value stream, represented pictorially in a value stream map. It enables detection of waste, unevenness and overburden, encourages sharing of vision, visual communication, permit changes and predict results. At Toyota, where the technique originated, the value stream mapping is known as "material and information flow mapping" [20]. Value stream can be applied to nearly any value chain and the key metric associated with value stream mapping is lead times. In my opinion, value stream mapping is important because lean business activities seek to save time in every operation on the ground that when this is achieved, excellent results will be also be achieved.

3. METHODOLOGY

The study employed a descriptive survey research design as it aids the conduct of exploratory and preliminary studies. The method also allows appropriate data collection, summary and interpretation of information with the view to clarifying the issues raised in the questionnaire [20,21] and also permits the determination and reporting information uninfluenced [22, 23]. The population of this study is made up of 53 manufacturing companies quoted in Nigeria stock exchange with 2,246 employees who have at least 5 years work experience in employment. Due to the

heterogeneous characteristic of the population, the companies were classed into the following strata: Breweries (7); Food, Beverages & Tobacco (14); Footwear (2); Industrial & Domestic Products (12); Packaging (8); Printing & Publishing (4) and Textiles (6). The sample frame of 1123 staff represents 50% of the population selected at random [24]. The reason for the 50% is to enable the researcher have large sample that will reduce sampling errors and achieve excellent result [25]. Primary data was used and the instrument for data collection was an 8 - term survey structured questionnaire with a 7 Likert scale response option as follows: very irrelevant (0), slightly irrelevant (1), irrelevant (2), no effect (3), slightly relevant (4), relevant (5) and very relevant (6). Out of 1123 copies of questionnaire administered to respondents who are independent of age and sex, 1100 valid response were received and analyzed. The questionnaire was validated by lean six sigma certified experts and accounting scholars. A pilot study conducted produced a correlation coefficient of 0.85 which shows a high degree of internal consistency and reliability of the instrument for data collection. The formulated hypotheses were tested using person product moment correlation statistical test instrument. The value of calculated (r) ranges from -1 to +1 signifying the strength of either negative or positive relationship between two variables [26]. The probability is 0.05 that a true null hypothesis will be rejected.

4. RESULTS

Table 2: Summary of hypothesis test results

H/N	Statement of Hypotheses	Test Results			Correlation	Remarks
		Cal "r"	LS(x)	Infre.		
0						
1	H ₀₁ : There is no significant relationship between lean accounting techniques and achievement of lean business philosophy in manufacturing companies Nigeria. (Q. 1,2,3&4)	0.76	0.5	$r > x$	positive	Reject H ₀ Do not reject H ₁
2	H ₀₂ : There is no significant relationship between awareness and implementation of LA manufacturing companies in Nigeria (Q.5,6,7& 8)	-0.47	0.5	$r < x$	negative	Accept H ₀ Do not accept H ₁

Source: Field work (2013)

4.1 Discussion of Result in Table 2:

Hypothesis 1: The **Table 3** set out the average summary of responses from question 1, 2, 3 and 4 of the questionnaire distributed. Very relevant and relevant had a total of 699 and 271 responses respectively to rank 1st and 2nd showing that lean accounting techniques is very relevant in lean business management and achievement of lean business philosophy. Question 1 & 2 were used to track the hypothesis 1. Question 1 asked the respondents to state the relevance of lean accounting in the achievements of lean business philosophy worldwide and response obtained was 98% very relevant. Question 2 limited the relevance and effectiveness of lean

accounting to Nigeria manufacturing environment and result was 12% very relevant. This implies that in general terms lean accounting moderated the achievement of lean business philosophy but has not exerted significant influence in Nigeria. To a large extent, the success of lean business management depends on the ability of management to account, measure and control lean activities of the value stream which is accomplished by providing appropriate and timely information to value team leaders. Pearson product moment correlation was used to confirm Hypothesis 1 with calculated "r" of 0.76 at 0.5 level of significance shown in **Table 4**. The "r" calculated of 0.76 is greater than 0.5 level of significance, therefore the

null hypothesis which says that there is no significant relationship between lean accounting techniques and achievement of lean business philosophy in Nigeria manufacturing organizations is rejected and the alternative hypothesis accepted. It means that lean accounting is responsible for about 76% positive variation in lean business management and achievement of lean business philosophy in manufacturing business environment due to its waste elimination ability, modern measurement applications resulting in visual methods, timely and simplicity of reports as well as quick management response. This result confirms the opinion of Emiliani; Cooper & Maskell; Ed.Stenzel; Snee and Mascitelli [2, 3, 16, 17, 27].

Hypothesis 2: The **Table 5** set out the average summary of responses from question 5, 6, 7 and 8 of the questionnaire administered. Slightly irrelevant and irrelevant had a total of 681 and 333 responses respectively to rank 1st and 2nd. Question 6 asked the respondents to state the degree of awareness of lean accounting concept in Nigeria manufacturing environment and the response obtained was 99% very irrelevant, showing that the degree of awareness of lean accounting techniques is non existing. The total industrial ignorance of the approach has limited the implementation to nothing, resulting in negative and insignificant support of lean business management and achievement lean business philosophy in Nigeria manufacturing sector. The “r” calculated of (0.48) is less than 0.5 level of significance, therefore the alternative hypothesis is rejected and null hypothesis accepted which says that: The degree of awareness has not exerted significant influence on the implementation of lean accounting methods in Nigeria manufacturing sector. In the course of this study, it was observed that Nigeria manufacturers have not adopted and implemented lean production. Large and complex production processes accommodating high non-value work are still in use. Traditional accounting methods with extensive control bottle neck are also still in use. Lack of implementation of lean manufacturing and accounting is as a result of the 48% negative degree of awareness in Nigeria manufacturing organizations. In conclusion, the study result shows that lean accounting

principle, practice and tools are vital back bones in the lean business management and achievement lean business philosophy. However, lean accounting methods have not been significantly implemented in Nigeria manufacturing organizations due to complete ignorance. Most CEO of manufacturing organizations and practicing accountants in Nigeria interviewed, claimed that they are not aware of the approach except for some staff of multinational companies and foreign based accounting firms. The result is in agreement with the opinion of Okpala; Rich, Esain & Bateman [28, 29].

5. FINDINGS, CONCLUDING REMARKS AND RECOMMENDATION

Based on the literature reviewed in the proceeding section and analysis of the hypothesis 1& 2 (appendix 1), the studies have the following theoretical findings: (i) Lean accounting was established to support lean business philosophy (ii) The result of hypothesis 1 is theoretical as manufacturing companies in Nigeria are yet to adopt and implement the programme (iii) it does not make use of traditional management accounting techniques (iv) the major benefit of lean accounting is the elimination of waste, simplicity of report and proper measurement of value stream activities (v) Lean accounting has been in use in advanced countries and evidence properly documented in the literature (vi) lack of experts and resources deficiency to carry out the improvement approach are limiting factors in Nigeria manufacturing sector. The study concluded that lean accounting method is a laudable technique worthy of implementation but have not been adopted by Nigeria manufacturing firms due to lack of awareness, expertise, finance and infrastructural deficiency. It is recommended that Nigeria manufacturing organization should endeavour to adopted lean in totality which will positively results in achievement of lean business philosophy and increase profitability, that more researches be conducted in this direction and manufacturing organizations should partner with researchers on the new concept and staff training on lean approach and implement should be embark upon to reap the benefit LBM.

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APPENDIX 1: (Test of statistical hypotheses)

Hypothesis 1

H₀: There is no significant relationship between lean accounting methods and achievement of lean business philosophy of manufacturing companies in Nigeria.

H₁: There is significant relationship between lean accounting methods and achievement of lean business philosophy of manufacturing companies in Nigeria

Table 3: Average response summary on relationship between lean accounting and lean business philosophy using questions 1, 2, 3 and 4 of the questionnaire administered.

	Sample Strata & No of companies	Sample Size	Response options							TVR	TVR %
			VR(6)	R (5)	SLR (4)	NE(3)	SLI(2)	I (1)	NO (0)		
1	Breweries (7)	527	350	139	23	1	2	2	0	517	47%
2	Food, Bev. & Tobac. (14)	213	158	45	0	3	2	1	0	209	19%
3	Footwear (2).	12	7	3	0	1	1	0	0	12	1%
4	Industrial/Dom. Prod.(12)	205	134	52	0	5	4	5	2	202	18%
5	Packaging (8)	67	36	24	2	2	0	0	0	64	6%
6	Printing & Publishing (4)	48	21	10	2	3	4	2	3	45	4%
7	Textiles (6).	51	29	20	2	0	0	0	0	51	5%
TOTAL		1123	699	271	29	15	23	58	5	1100	100%
<i>Percentage (%)</i>			<i>63.5%</i>	<i>24.6%</i>	<i>2.6%</i>	<i>1.4%</i>	<i>2.1%</i>	<i>5.3%</i>	<i>0.5%</i>	100%	
<i>Ranking</i>			<i>1st</i>	<i>2nd</i>	<i>4th</i>	<i>6th</i>	<i>5th</i>	<i>3rd</i>	<i>7th</i>		

Source: Field work 2013

Table 4: Calculation of Correlation

Options	Point (x)	Question 2&3 Response (y)	xy	x ²	y ²
VR	6	699	4,194	36	488,601
R	5	271	1,355	25	73,441
SLR	4	29	116	16	841
NE	3	15	45	9	225
SLI	2	23	46	4	529
I	1	58	58	1	3,364
NO	0	5	0	0	25
Total	Σ (x)21	Σ(y) 1,100	Σ(xy) 5,814	Σ(X²) 91	Σ(y²) 567,026

Source: Authors computation.

$$r = \frac{N \sum xy - (\sum x)(\sum y)}{\sqrt{N \sum x^2 - (\sum x)^2} \sqrt{N \sum y^2 - (\sum y)^2}} = \frac{7(5,814) - (21 \times 1,100)}{\sqrt{[(7 \times 91) - (21)^2]} \sqrt{[(7 \times 567,026) - (1,100)^2]}}$$

$$= \frac{40,698 - 23,100}{\sqrt{(637 - 441)} \sqrt{(3,969,182 - 1,210,000)}} = \frac{17,598}{\sqrt{(196)} \sqrt{(2,759,182)}} = \frac{17,598}{\sqrt{540,799,672}} r = -0.7567 (76\%)$$

The r calculated of 0.76 is greater than 0.5 level of significance. Rejected the null hypothesis and accept the alternative hypothesis.

Hypothesis 2

H₀: The degree of awareness has not exerted significant influence on the level implementation of lean accounting methods in Nigeria manufacturing organizations.

H₂: The degree of awareness has not exerted significant influence on the level implementation of lean accounting methods in Nigeria manufacturing organizations

Table 5: Average response summary linking degree of awareness to level implementation of lean accounting in manufacturing firm Nigeria using questions 5, 6, 7 and 8 of the questionnaire administered.

	Sample Strata & No of companies	Sample Size	Response options							TVR	TVR %
			VR(6)	R (5)	LR (4)	NE(3)	SLI(2)	(1)	NO (0)		
1	Breweries (7)	527	13	15	21	8	123	337	0	517	47%
2	Food, Bev. & Tobac. (14)	213	0	0	0	1	83	125	0	209	19%
3	Footwear (2).	12	0	0	0	1	1	6	4	12	1%
4	Industrial/Dom. Prod.(12)	205	0	0	0	1	94	107	0	202	18%
5	Packaging (8)	67	0	2	2	2	10	48	0	64	6%
6	Printing & Publishing (4)	48	2	3	3	4	9	24	0	45	4%
7	Textiles (6).	51	1	1	2	0	13	34	0	51	5%
TOTAL		1123	16	21	28	17	333	681	4	1100	100%
Percentage (%)			1.4%	1.9%	2.5%	1.5%	30.3%	61.9%	0.4%	100%	
Ranking			6th	4th	3rd	5th	2nd	1st	7th		

Source: Field work 2013

Table 6: Calculation of Correlation

Options	Point (x)	Response (y)	xy	x ²	y ²
VR	6	16	96	36	256
R	5	21	105	25	441
SLR	4	28	112	16	784
NE	3	17	51	9	289
SLI	2	333	666	4	110,889
I	1	681	681	1	463,761
NO	0	4	0	0	16
Total	Σ (x)21	Σ(y) 1,100	Σ(xy) 1,711	Σ(X²) 91	Σ(y²) 567,436

Source: Authors computation.

$$r = \frac{N \sum xy - (\sum x)(\sum y)}{\sqrt{N \sum x^2 - (\sum x)^2} \sqrt{N \sum y^2 - (\sum y)^2}} = \frac{7(1,711) - (21 \times 1,100)}{\sqrt{[(7 \times 91) - (21)^2]} \sqrt{[(7 \times 567,436) - (1,100)^2]}}$$

$$= \frac{11,977 - 23,100}{\sqrt{(637 - 441)} \sqrt{(3,972,052 - 1,210,000)}} = \frac{-11,123}{\sqrt{(196)} \sqrt{(2,762,052)}} = \frac{-11,123}{\sqrt{540,799,672}} \quad r = \underline{\underline{-0.4781(-48\%)}}$$

The r calculated of -0.48 is less than 0.5 level of significance. Reject alternative hypothesis and accept the null hypothesis.