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Synchronization of Lean Accounting Alert and Entrepreneurial Sustainability among Micro Firms in Nigeria during Pandemic and Catastrophe: Using Confirmatory Factor Analysis

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Abstract:

This study focused on the synchronization of lean accounting alert and entrepreneurial sustainability in micro firms in Nigeria during pandemic and catastrophe era. The time horizon cross-sectional survey was adopted with time frame of 2020-2021 to experiment the alertness of lean accounting by professional accountants. Hence, from the 1875, only 370 were selected because they deem fit for the transformational change on lean adoption. The multi-stage cluster sampling technique was introduced in liaison with systematic sampling techniques to select the appropriate respondents. The instrument was administered, only 354 were credibly retrieved. The instrument was validated on face and content validity, while the internal consistency of the test retest was determined by using Cronbach Alpha coefficient with elimination of error and defect ($\alpha = 0.888$), elimination of waste ($\alpha = 0.874$) and product sustainability ($\alpha = 0.921$). To ascertain the principal component from the threshold the KMO and Bartlett's test were introduced for the sample adequacy and appropriateness of sphericity respectively. The Pearson Product Moment Correlation was utilized for analysis of the two hypotheses with SPSS version IBM 25. From the findings, lean accounting alert influence product sustainability. Based on the findings and conclusion, this study contributes to the knowledge that the practices and process of lean improvement, lean culture and lean thinking are major alertness to improve product sustainability in the micro firms in Nigeria. It could be recommended that elimination of waste, error and defect should be practice with lean process on lean thinking, lean culture and lean improvement.

Keywords: *Elimination of error and defect, entrepreneurial sustainability, elimination of waste, green entrepreneurship, lean accounting alert, lean enterprise, lean entrepreneurship, product sustainability*

1. Introduction

In the current era of global climate change, turbulent, disaster and covid-19 pandemic variants, much focus has been directed towards the substantive and structural elements of lean accounting alert and entrepreneurial sustainability to waste control, profitability, value creation, product standardization and ethics. The triple balance lines (TBL) of sustainability in accounting are planet, people and profit towards reducing waste, environmental negative impact and continuous improvement in enterprise. Accountant via the realization concept should maintain certain level of profitability index for enterprise to maintain their cash flow status. Hence, in the current catastrophe and deltacron variant, sustainability is imperative prior to the various challenges poses to enterprise, human, society, economy and environment. The term sustainability is broadly used to indicate programs, initiatives and actions aimed at the preservation of a particular resource or system. However, it actually refers to four distinct areas: human, social, economic and environmental to be known as the four pillars of sustainability. Entrepreneurial sustainability enables firms to generate income, increase patronage and boost its bottom line by making her enterprise and product more sustainable. When entrepreneurs reduced operations overhead, sustainability tend to increase benefits on her enterprise and product sustainability via innovative strategies, reputation and customer value (Lathabhavan, 2021; Almashkor, 2021). Entrepreneurial sustainability focuses on debugging pessimistic view and absurd impact about of an enterprise product and operations for the interest of the customer, society and environment. The product sustainability aims to achieve maximum growth rate via utilization of existing cash flow without increases in leverage or debt, with consideration of the people, profit and planet preservation. The product sustainability uses ethics and standard to facilitate cash flow, customer safety and profitability. The pillars of sustainability must always consider the economic, social, environmental, cultural and

security aspects (Ahmad, Mahmood, Ariza-Montes & Han, 2021). For sustainability to be achieved in these turbulent times, enterprises need to be alert on the strategies, process and tools of lean accounting.

The lean initiatives concept drawn from Toyota, aids in value stream costing, lean thinking, lean culture, lean production and lean improvement. The essence of lean is to save cost, manage time, improve on learning, increase investment and stimulate growth with patronage. This is achieved by minimizing cost, eliminating waste, pursuing zero degree defect and errors (Amusawi, Almagtome & Shaker, 2019).

The lean drives to achieving value chain increase in productivity by maximizing customer patronage, customer perception and customer value on flexible changes that stimulate satisfaction. The lean processes re-structure decision making toward product sustainability and customer satisfaction. Considering the work lean entrepreneurship gives room for innovative, creative, brainstorming and lean thinking that opens new channel of investment and growth that is sustainable. The sustainability aspect of lean creates hope and trust for the stakeholders' future in the enterprise, society and the customer value (Osman, Mamat & Ali, 2020). The lean entrepreneurial sustainability increases the return on equity (ROE), return on asset (ROA), return on investment (ROI), high internal rate of return (IRR) and return on capital employed (ROCE).

Lean accounting in an enterprise assist entrepreneur to guide and utilize their knowledge effectiveness to be result oriented in both short and long-term. Lean accounting guides entrepreneur on cost-benefit analysis that will justify the level of overhead and prime cost in alignment with realization of increased profit after tax (Ovharhe, Woko & Ogolo, 2021; Almashkor, 2021). Lean accounting assist entrepreneur in order processing, economic order quantity, lead time and demurrage. This is done by detecting error, minimizing waste, time management, just in time application and value stream costing. Lean influence on sustainability stimulates action towards customer requisition order, delivery time and strengthens the production system. Lean enable entrepreneur to control inventory cost (Ovharhe, Woko & Ezeocha, 2021). The problem a lot of enterprise is to manage their inventory cost daily, weekly, monthly and per annum. Lean creates continuous improvement on enterprise entrepreneurship process. This could be perceived as lean entrepreneurship.

Lean entrepreneurship guarantee speeds, swift take off time, expediting and follow-up, prompt inspection and monitoring of the enterprise process (Neamaha, Sabbar & Abdulridha, 2020). Streamlining the synchronization of lean accounting and entrepreneurial sustainability in Nigeria is to focus on its alertness and shock absorber in the micro firms. In the light of the above, this study would focus on the current pitfalls and catastrophe poses threat during the pandemic.

1.1. Purpose of the Study

This study investigates the emergence of lean accounting and entrepreneurial sustainability in Nigeria micro companies. However, the following specific objectives are:

- To investigate how the elimination of defect and error influence product sustainability
- To investigate how the elimination of waste influence product sustainability.

1.2. Hypotheses

The hypotheses were formulated in null form at 0.05 level of significance as:

- Ho₁: Elimination of defect and error does not significantly influence product sustainability
- Ho₂: Elimination of waste does not significantly influence product sustainability.

2. Literature Review

2.1. Theoretical Underpinning

2.1.1. Six Sigma Approach

Six-Sigma (6σ) is an approach use for process continuous improvement in an enterprise. While working at Motorola in 1986, Bill Smith an American engineer introduced the six-sigma. Six-sigma phenomena assume 99.99966% of entrepreneurial sustainability as free of defects and error (Khaw, Zailani, Iranmanesh & Heidari, 2019; Patel & Patel, 2021).

Six-Sigma strategies seek to improve entrepreneurial sustainability by sorting out bottlenecks responsible for causes of defects and errors that reduce the specifications and standard of the transformation process into predetermine goods and services in the enterprise. The viability of the six-sigma is towards yielding effective customer satisfaction and product sustainability which is favorable to the enterprise (Shafiq & Soratana, 2020; Patel & Patel, 2021). This is done by statistical analytical method of considering cost-benefit analysis from the empirical and statistical tool employed.

The process aid product sustainability and green entrepreneurship (or entrepreneurial sustainability) towards customer satisfaction by not endangering the environment and livelihood of the client (Geoffrey, 2017). The process also confirm with the five pillars for product survival: sustainability; entrepreneur, entrepreneurial, entrepreneurship, entrepreneurial eco-system and enterprise.

Enterprise that adopted and integrate lean entrepreneurship should operate with the six sigma in the long term and short-term consideration so the entire process should be beneficial towards sustainability. Also, the entrepreneurial sustainability process should produce long-term defect levels below 3.4 defects per million opportunities (DPMO). The 3.4 dpmo is based on a 'shift' of ± 1.5 sigma postulated by Mikel Harry. The statistical metric is based on the tolerance in the height of a stack of discs (Shafiq & Soratana, 2020); (Osman, Nordin & Rahman, 2020); (Patel & Patel, 2021).

For the purpose of this research, Six Sigma asserts that:

- Continuous improvement strategies seek to accomplish viable and forecasting results oriented processes that facilitate entrepreneurial sustainability.
- Enterprise processes should have features that can be identified, defined, measured, analyzed, improved, and controlled.
- Promoting enterprise and product sustainability with the involvement of the lean entrepreneurship.
- Fine-tuning demand that boost increase of return on investment and capital employed
- Synchronizing management involvement and line operations to yield credible results
- Participating in technical dashboard framework of lean policy and lean thinking with proficiency of sustainability

Six Sigma's drives to continuously improvement of all processes in an enterprise by application of lean culture and lean thinking not bonded to the 3.4 DPMO level (Patel & Patel, 2021). Enterprise fine-tune and regular convenient degree of lean sigma to improve and monitor the possible benefit of entrepreneurial sustainability. Hence, the lean entrepreneurship should determine the drive for area of specialty and application of the lean six sigma (LSS).

In accounting, synchronizing the LSS on cashier, budgeting and bursary are key area of advantage of lean accounting and lean entrepreneurship. The processes could also involve payment of local purchase order, vouchers, payroll, order processing and salaries. For the entrepreneurial sustainability, the vital key of LSS is integrated with the DMAIC which represents i. Define, ii. Measure, iii. Analyze, iv. Improve, v. Control methodology. Synchronizing the DMAIC correlates with LSS tactics provides credible means to categorically analyze the processes of the five pillars of sustainability and survival in an enterprise (Patel & Patel, 2021).

The backbone of LSS is that it employed quantitative techniques to identify key points of impact (KPI). When the KPI is recognized and streamline, it can be applicable as possible remedies to address entrepreneurial sustainability problems. A framework and dashboard need to be structure to control and manage this scenario. Also, this could strengthen and synchronized the five pillars of survival and sustainability.

2.2. Conceptual Framework

2.2.1. Concept of Lean Accounting

Lean accounting is streamlining accounting processes within an enterprise to maximize productivity, service quality, customer satisfaction, inventory control and profitability (Teixeira, Santos, Akkari & Munhoz, 2019). Lean practices are not related to reporting requirements, tax evasion and compliance, but rather to internal processes that are improving the corporate accounting process. Lean accounting is the management accounting system for a lean enterprise in the micro and macro setting. It provides the relevant financial and non-financial information for lean policy and decision making (Rehman, Malik, Baig, Rehman & Hashim, 2021).

Lean accounting can also be express as the auxiliary function of value stream and continuous improvement on lean entrepreneurship process in the micro and macro enterprise. The prospect is to constitute maximum lean enterprise efficiency by implementing just in time inventory process and careful consideration of quality delivery methods in the enterprise Ovharhe *et al.*, (2021). Lean accounting allows enterprise to provide relevant financial report according to their value streams rather than per unit costing. Traditional accounting does not aid lean enterprise accurately reports on the effectiveness and efficiency of lean process (Rehman *et al.*, 2021). Simultaneously, lean accounting allows micro enterprise or macro enterprise to lean process report. This facilitates perfect correlation between lean accounting and lean entrepreneurship in the enterprise.

2.2.1.1. Elimination of Waste, Defect and Error

The critical five element of lean accounting are; 1) Elimination of waste, 2) Elimination of error and defects, 3) Freeing up capacity, 4) Simplification of processes to help gain better understanding, and 5) Speeding up process (Rehman *et al.*, 2021). The critical elements were used as substitute to the traditional accounting (Naseem, fu, Mohsin, Rehman & Baig, 2018); Naseem, Mohsin, Hui, Liyan & Penglai, 2021). The current changes and dynamism call for lead improvement, lean thinking and lean culture to create workable metric for entrepreneurial sustainability via lean accounting process. The focus should be creating workable implementation and monitoring policy to address the financial performance in an enterprise for the short-term and long-term.

Lean implementation to an enterprise is the critical means of addressing waste elimination and actualizing metric for detection of defect and error. If these are achieved the enterprise will experience performance excellence in productivity, customer satisfaction, customer perception, customer value, brand value, profitability and swift patronage (Neamaha, *et al.*, 2020).

Elimination of waste is critical aspect of product sustainability. Customer perception, brand value and customer value are sensitive aspect of attraction to any enterprise about their product sustainability. If wastes are not properly well implemented, it will affect the product sustainability. Hence, lean professionals need to assess and frame the metric design to implement waste elimination process without affecting the product warrantee and guarantee. It is important to note that the product warrantee and guarantee are core value of product sustainability in the enterprise prestige to her client (Geoffrey, 2017).

Enterprise implements lean improvement and lean thinking for great regard for elimination of defect and error affecting the product specification and standard. It is of great delight to experience zero degree defect and error on any product and services over time. Elimination of error and defect give confident to the enterprise reputation in the market. It

also enhances customer trust on the firm's product. However, the concept of product sustainability will be accomplished in the long-run and short-run (Osman *et al.*, 2020).

However, a lot of firms in Africa, including Nigeria do employed lean tools to enhance their productivity, customer satisfaction, patronage and profitability with little regard for practicing lean accounting. This is because enterprise does adopt lean thinking and culture without implementing lean accounting processes by holding the traditional method. But, soon the traditional method will collapse on the use of lean accounting, because the traditional method favors the Activity Based Costing approach.

2.2.1.1.1. Analytical Framework

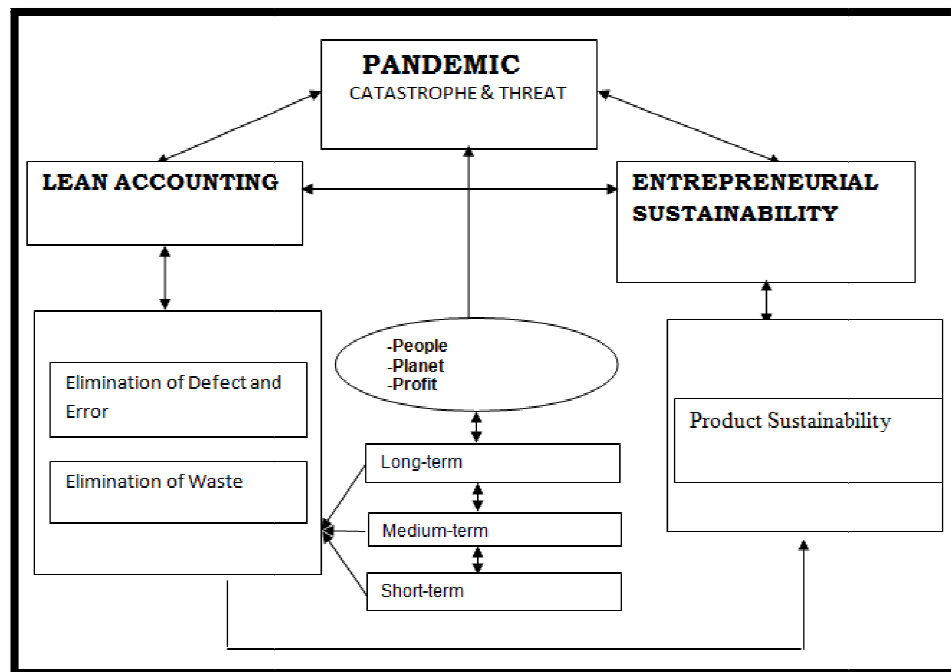


Figure 1: Analytical Framework of Lean Accounting and Entrepreneurial Sustainability

2.3. Entrepreneurial Sustainability

Entrepreneurial sustainability is an enterprise leadership phenomenon that anchors trust, benevolence and control of environmental, client, social and financial demands in relationship to ethical success and safety. The entrepreneurial sustainability adopts the green entrepreneurship phenomena that deal with ethical and safe practices on trying to maintain growth, increasing market share, customer satisfaction and swift patronage. Green entrepreneurship is anchor on the conservation, protection and nourishment of the profit, people and planet (Geoffrey, 2017).

The five pillars of sustainability and survival in this context are; entrepreneur, entrepreneurial, entrepreneurship, enterprise and entrepreneurial eco-system. The five pillars orchestrate the merchandizing activities of the sustainability in the green entrepreneurship. The green entrepreneurship just like the lean entrepreneurship supports reducing waste, product standardization, product justification, product specification, using sustainable material and resources (Osman *et al.*, 2020).

2.3.1. Product Sustainability

A product is the value stream and life of any enterprise that is created to provide satisfactory demands. Products are life stream of any enterprise, if you take away the product; the enterprise becomes a lifeless entity (Sze, 2018). Product could be tangible or intangible entity, size or size-less, visible or invisible, colorful or colorless. The potentials of product could not be over emphasize. Every customer satisfaction is traceable to a product; likewise customer dissatisfaction is link to a product obscurity and visibility by not meeting specifications, standards and satisfactory demands. The life-cycle span of any product is bent of its sustainability and survival in the market(Kemper, Hall & Ballantine, 2019). The sustainability of product is the livelihood of an enterprise in its long-term and short-term.

Product sustainability is the specification, ethical and standardized value of product benefit and usage without detriment to the environment, enterprise and client. Product sustainability builds customer trust and confident. Consumer advocate focuses on the benefit and hazard of product so as to safeguard the society and environment of odd impulses. Any negative or pessimistic features perceive on a product will affects its sustainability and eventually destroys it lifecycle. The sustainability is what pivots the survival of a product (Ahmad *et al.*, 2021). Without precise sustainability the lifespan of a product shrinks and may not survive any catastrophe, turbulent, threat and pandemic era.

It is the sustainability of product that generates revenue, profitability and shareholders benefits in the long-run. Furthermore, product sustainability are resultant outcomes of job creation, new venture creation, contribution to the national income, gross domestic product, gross national income, value added tax, per capital income, import, export and

sustainable socio-economic development policy. Product sustainability determines the flow and direction of enterprise venture in the business environment (Lathabhavan, 2021). Every entrepreneur is known by its product. An entrepreneur is nothing without a product. An enterprise cannot function or operate without product identification and sustainability.

The process of creating enterprise which entrepreneur function involve a phenomena such as originality, capability, skills, fine-tuning demands, risk appetite, risk orientation, brainstorming, branching network and environmental scanning. All these are attributed to sustaining the product. If no proper strategic plan for product sustainability the enterprise will sink in times of turbulence, catastrophe and pandemic.

2.4. The Five Pillars of Sustainability and Survival in Entrepreneurship

The five pillars of sustainability and survival are stronghold and strength to any enterprise which enable her to compete with rivals at any time. The pillars are the entrepreneur, entrepreneurship, entrepreneurial, entrepreneurial ecosystem and enterprise.

2.4.1. The Entrepreneur

This is a champion and playmaker in an enterprise, being seen as the champion-preneur (or champiopreneur) with charisma and capability to accomplished set goals. Champiopreneurs can adapt to the business environment. Hence, they can survive and sustained an enterprise climax in tough and turbulent times. This is anyone with potentials as idealist, visioner, missioner, dreamer, risk-taker, innovator, adaptor, organizer, learner, burden-bearer, convener, motivator and lot more. The entrepreneur has these features to function in any enterprise with the aid to convey her to the dream land. The entrepreneur is the actual individual that closes the gap. The entrepreneurs meet for the need of client. In doing this, the entrepreneur scan for opportunity in the environment and create a mindset to identity how to meet the opportunity. All an innovative and creative entrepreneurs' need is to identify an opportunity.

An entrepreneur major aim is not to generate profit. The major aim is to identify an opportunity that will be sustainable, because if an enterprise has a sustainable opportunity, she will create and innovate sustainable product and brand to meet that need. In doing so, they will create sustainable streamline of income(Lathabhavan,2021).

An entrepreneur is the light, wherever she goes its shines and illuminates the environment. Thus, he can see what others could not see with an imaginably vision. The sight enables her to break the long chain of poverty, setbacks, joblessness and disguised unemployment by just identifying opportunity in the environment (Sze, 2018).

The word entrepreneur is derived from a French word meaning go (entre) and between (preneur). Meaning entrepreneurs are champion (champiopreneur) that can survive and sustain any circumstances in an enterprise because they are image custodian, bridge builder, pacesetters, role model, change agents, leaders, coach and mentors.

2.4.2. Entrepreneurship

This is the process for throughput mechanism that orchestrates all activities in the enterprise by the entrepreneur. The process whereby that initiates entrepreneur actions to accomplish task and responsibility is the entrepreneurship. It could be view as the process which the enterprise breaks-down and moves to amend certain situation that needs maintenance and repairs during threat, turbulence, catastrophe and pandemic. Hence, it is the process that transforms the input to output needs. But, it is the quality of momentum or strength of the entrepreneurship that propels the speed is the entrepreneurial function; which is perceived as the ingredients or recipe of the product quality. The entrepreneurship process is what pivots the balancing of the enterprise. Without these balancing there will be a lot of problems and ambiguity in the system. Nevertheless, an entrepreneur identified client's need, pursuit it and transform it to consumable and beneficiary outcome for patronage. Whereas, entrepreneurship is the process of designing, structuring, establishing, prompting enterprise merchandizing function with aim of satisfying client demand and generating profit (Geoffrey, 2017).

2.4.3. Entrepreneurial

The recipe of the product determines the taste and quality. The entrepreneurial is the key driving code perceived as the recipe or ingredients being used by the entrepreneur in the enterprise to achieve its pre-defined purpose. Among these recipe and ingredient, includes; knowledge, learning, value, belief, skills, culture, behavior and attitude. Also in another view, the driver with the key code is perceived as the entrepreneur, while the enterprise is the motion object (i.e. vehicle), thus the activities being used to convene or propel the process in motion is the entrepreneurship.

The entrepreneurial is the brain box of the vehicle or recipe; knowledge, attitude, skills and behaviour of the entrepreneur. The current that facilitates the brain box is the entrepreneurship. The memory, storage and bank of idea, risk, vision, knowledge, attitude, skill and knowledge are the entrepreneurial. The entrepreneurial is the fashionable and quality material for design clothing, but the fashion designer (entrepreneur) depends on the entrepreneurial knowledge, skills, attitude to make the fashion more admirable to the client (Ahmad *et al.*,2021). The process taken to put all these pleasantries to that taste of the client is regarded as entrepreneurship. Hence, the *entrepreneur* functions in an *enterprise* by the process of *entrepreneurship* with *entrepreneurial* tools (recipe) with consideration to the *entrepreneurial ecosystem*.

This is necessary because it defines the actual term of entrepreneurial sustainability both long-term and short-term in the enterprise.

2.4.4. Entrepreneurial Ecosystem

The system that fashion an enterprise operations or its product sustainability are regulated by certain forces such as the legal, government, economy, completion, task forces, non-governmental organization, agencies and the society that determines the practices and standard of the direction of the enterprise

An entrepreneurial ecosystem or entrepreneurship ecosystem is the socio-economic and legal framework design to address the conduct of the enterprise. Ecosystems are being factors of the stakeholders. Agencies, organization, government and society are entrepreneurship stakeholders in the ecosystem. Stakeholders are any entity that has interest, actually or potentially, in the enterprise and environment (Lathabhavan, 2021). Entrepreneurship stakeholders may include government, institutions, entrepreneurs, consumer advocate, trade union, students, lawyers, labour union, client, consumers, non-governmental organization, and international aid agencies (Sze, 2018).

2.4.5. Enterprise

An enterprise is a temple of solution and citadel of learning, re-learning and un-learning opportunities that transform a raw entity into a predictable product and services. The essence of setting an enterprise is to sort out possible remedies which transform problem to positive outcome or resultant effect. It is the institution that lubricates or fabricates the systematic changes process from input to desired output within a given period of time.

Enterprise is a place for inventor and creator of goods and services (Kemper *et al.*, 2019). Entrepreneurs view enterprise as a new venture creation that utilized available resources into pleasant and beneficial product and services that can positively impact the society, government and the economy (Ahmadet *al.*, 2021). Enterprise can be micro and macro. Micro enterprises are small firms that operations at low scale level. They need time, resource and strength to growth into a large venture. Unlike, the macro that is large firms with magnificent strength because of it leverage, manpower, asset, technology, experience, market share, net worth and firm size (Geoffrey, 2017). Entrepreneur need patient to build an enterprise from small scale to large scale with the synchronization of the five pillars of sustainability and survival in place functioning properly.

2.5. Lean Accounting and Entrepreneurial Sustainability

Entrepreneurial sustainability and survival pillars in today's world are vital tools for triumphant victory for the life cycle of any enterprise. According to Ovharhe *et al.*, (2021) the sustainability and survival of any enterprise depends on its ability to survive the enterprise environment in the short-term and long-term. The enterprise environment is very reckless, troublesome, dynamic and competitive in this turbulence time especially with the ongoing pandemic. Hence, enterprise has to innovate, create and develop product to meet the needs of client for sustainability in the market, because customer perception, customer loyalty, customer taste and customer value are more dynamic in this times than ever. Forecasting the market trend base on the competitive parity and riskiness in the enterprise system is so cumbersome. Predicting the future on the basis of the firm vision and mission is not hundred percent guarantees. Product sustainability metric needs to be integrated as the course line of action. An important metric concept to ascertain the line action is to invoke the lean accounting alertness, lean enterprises and lean entrepreneurship. Lean concept approach makes important contribution to innovate, fine-tune and transform enterprise.

Lean accounting professionals should provide support framework and metric that are comprehensive, precise, consistent, time consideration and confident information that will transform the enterprise (Soliman, 2020). It stimulates enterprise in lean policy and decision making towards increasing productivity, profitability, market share, patronage and customer satisfaction. The augmentation of finance control can eliminate waste from the accounting process with lean thinking and lean culture implementation.

The lean accounting provides room for the lean culture to enhance continuous improvement and still following accounting rules and ethical standard. Constituted lean accounting provides trusted and confident information for investor to take risk on investment. The accounting department should conduct a thorough metric and assessment on the cost-benefit analysis before the adoption and full implementation of the lean practicing process (Osman *et al.*, 2020). Also, lean thinking clears doubt in ambiguity on traditional accounting method from sales, pricing, order requisition, economic order quantity and inventory control.

3. Methodology

The micro firms are always facing threat, tension and pitfalls during turbulent time in pandemic and disastrous situation. The study is focused on lean accounting alert and entrepreneurial sustainability across Nigeria with the central capital Abuja to curtail the situation. 1875 entrepreneurs were alerted about the lean adoption process along with bonafide accountants competent on lean accounting. Hence, only 370 entrepreneurs were selected because they deem fit for the transformational change on lean adoption. Attention was drawn to entrepreneurs that deal on catering services, tailoring and salon across the country to alert them of the benefits on adopting lean accounting process. The time horizon via cross-sectional survey was adopted with time frame of 2020-2021 to experiment the alertness of lean accounting by professional accountants. Multi-stage cluster sampling techniques on the basis of systematic sampling technique was adopted. The inclusive criteria were those entrepreneurs that inclined on adopting lean methods while accountants are to enlighten on lean process with application methods and diligent reports. Whereas, those that neglected lean financial report were deem to be excluded. It was bend on the fact that, across the regional zones an unbiased selection method was introduce systematically on making choices from those that are ready to be knowledgeable on the lean compliance, because some entrepreneur focused on using the lean tools and strategies without detail compliance with the lean accounting process. However, complete lean accounting process is new in the micro enterprise in Nigeria and Africa at

large. Hence, the lean metric for the assessment frame is focus on elimination of waste and elimination of defect and error that will enhance customer satisfaction, customer value, minimizing cost, facilitate swift patronage and profit. This will be a key point of attraction by the entrepreneurs in the micro enterprise to adopt lean accounting process compliance especially during pandemic and catastrophe.

From the 370 chosen, 10 from each were selected from the six geographical regions systematically with the central capital inclusive. The sample size was unavoidably reduced because of the pandemic, turbulent and catastrophe in certain states. The multi-stage cluster sampling technique was introduced in liaison with systematic sampling techniques to select the appropriate respondents. Thus, strict compliance of the pandemic variants was observed at utmost.

Twelve self-frame instrument items were constructed for the study to generate information from the respondent using 4-point Likert scale ranges from; strongly agree (4), agree (3) disagree (2) and strongly disagree (1). The instrument was validated on face and content validity, while the internal consistency of the test retest was determined by using Cronbach Alpha co-efficient with elimination of error and defect ($\alpha = 0.888$), elimination of waste ($\alpha = 0.874$) and product sustainability ($\alpha = 0.921$). To ascertain the principal component from the threshold the KMO and Bartlett's test were introduced for the sample adequacy and appropriateness of sphericity respectively. The Pearson Product Moment Correlation was utilized for analysis of the two hypotheses with SPSS version IBM 25.

4. Results and Discussion

However, for statistical analysis to be computed, the total of 370 copies of questionnaire was administered to the selected entrepreneurs in the micro firms, while 354 copies were completed and retrieved.

To conduct factor analysis for the confirmatory of the sample adequacy, the KMO test was introduced being supported with Bartlett's test to determine the sphericity.

The Kaiser-Meyer-Olkin (KMO) of (0.875) and Bartlett's Test matching approx. chi-square (2817.857) at 0.000 significance for measuring the sampling adequacy and sphericity to show the level of acceptability on confirming the principal component is less the 0.05 level of significance, meaning the corresponding proxy liaison with the first null hypotheses is rejected. Thus, indicating viability of the principle component.

The Kaiser-Meyer-Olkin (KMO) of (0.890) and Bartlett's Test; approx. chi-square (5098.541) at 0.000 significance for measuring the sampling adequacy and sphericity to show the level of acceptability on confirming the principle component is less the 0.05 level of significance, meaning the corresponding proxy correlates with the second null hypotheses is rejected. Thus, indicating viability of the principle component.

The KMO sampling size is greater than 50% (0.5) and less than 0.05 alpha level of significance. These shows the null hypotheses of the variables were rejected and the alternative hypotheses of the variable should be accepted. Since all the proxies exhibit significance value at 0.000, that further revealed that the predictor variable positively influence the criterion variable, in the nutshell;

- Ho₁: There is significant influence of elimination of error and defect on product sustainability in the micro firms
- Ho₂: There is significant influence of elimination of waste on product sustainability in the micro firms

Therefore, microfirms' suitability of the proxies shows that the variables viability and eligibility for subsequent tests to proof the authenticity of the KMO of sampling adequacy test and Bartlett's test of sphericity result to be adopted.

4.1. Test of Inferential Statistics

The application of the Karl Pearson's Product Moment Correlation Co-efficient was used for the inferential statistical hypotheses.

4.2. Test of Hypothesis 1

- Ho₁: Elimination of defect and error does not significantly influence product sustainability.

Correlations			
		Error-defect	Sustainability
Error-defect	Pearson Correlation	1	.879**
	Sig. (2-tailed)		.000
	N	354	354
Sustainability	Pearson Correlation	.879**	1
	Sig. (2-tailed)	.000	
	N	354	354

** . Correlation is significant at the 0.05 level (2-tailed).

Table 1: Pearson Test for Relationship between Elimination of Error and Defect and Product Sustainability

Using the Table 1 above, it was revealed that the Pearson's coefficient is 0.879 which indicate positive and very strong influence of elimination of error and defect on product sustainability is conveniently appropriate. The significance value of 0.000 which is less than the 5% significance level ($p = 0.000 < 0.05$) leads to the rejection of the null hypothesis. The study similarly observes KMO value of 0.875 of sampling adequacy and Bartlett's Test; approx. chi-square (5098.541) at 0.000 significance, which is less than the 0.05 significance level. This therefore reinforces the findings and on this basis, the null hypothesis is rejected while the alternate form of the hypothesis is accept therefore concluding that there is a significant influence of elimination of error and defect on product sustainability of micro firms.

This is in line with Rehman *et al.*, (2021) study suggested vital spectrum of lean accounting on how enterprise perceived lean accounting practices. They investigate the obstacles that engulf integration of lean accounting practices on Textile enterprise. They investigation explored lean as possible remedies for firms survival and sustainability with mitigation problems. There are many international studies on lean accounting (Amusawi *et al.*, 2019; Soliman, 2020; Teixeira *et al.*, 2019; 2020a; Naseem *et al.*, 2021; Naseem *et al.*, 2018), but there is no study conducted in Nigeria on lean accounting and entrepreneurial sustainability. But, they all corroborates why micro enterprise should practices lean accounting towards entrepreneurial sustainability especially in the pandemic and turbulence situation. More so, Almashkor (2021) study in Saudi enterprise among one hundred accountants and managers in revealed significant and positive impact of throughput accounting and lean accounting on cost reduction which is in alignment with the outcome of the above hypothesis outcome of the Pearson's coefficient of 0.879.

Additionally, Neamaha *et al.*, (2020) consider reduction of cost to improve product quality and customer value via lean production. The findings revealed that the application of lean accounting techniques posit chance to achieved the product sustainability of customer value and quality with the lean production. Solimani (2020) opined to make precise decision on waste elimination, reducing defect, avoiding error and continuous improvement with considering the traditional or modern accounting approach, the executives and CEOs see it fit to integrate the lean accounting process to improve products survival and sustainability. Patel and Patel (2021) utilized Lean Six Sigma methodology that support lean process and enterprise sustainability to investigate 223 articles published in 72 reputed journals from the year 2000 to 2019. The finding revealed that integration of Lean Six Sigma and other approaches with a focus on sustainability and the environment has emerged as a research field that anchors continuous improvement by cost reduction, eliminating error and defect, increasing quality, customer value, product sustainability and minimizing waste. Hence, from the empirical outcomes lean accounting contributes immensely to product sustainability in the short term and long term of micro enterprise.

4.3. Test of Hypothesis 2

- Ho₂: Elimination of waste does not significantly influence product sustainability

Correlations			
		Elimination of Waste	Sustainability
Elimination of Waste	Pearson Correlation	1	.772**
	Sig. (2-tailed)		.000
	N	354	354
Sustainability	Pearson Correlation	.772**	1
	Sig. (2-tailed)	.000	
	N	354	354
**. Correlation is significant at the 0.05 level (2-tailed).			

Table 2: Pearson Test for Relationship between Elimination of Waste and Product Sustainability

It could be revealed in the above 4.2 table that the Pearson's coefficient is 0.772 which revealed a positive and very strong influence of elimination of waste on product sustainability. The significance value of 0.000 which is less than the 5% significance level ($p = 0.000 < 0.05$) indicate rejection of the null hypothesis outcome. The result revealed that the KMO value of (0.890) sampling adequacy and Bartlett's Test; approx. chi-square (5098.541) at 0.000 significance which is less than the 0.05 significance level. This therefore reinforces the findings and on this basis, the null hypothesis is rejected while the alternate form of the hypothesis is accepted therefore concluding that there is a significant influence of elimination of waste on product sustainability of micro firms.

With data generated from the financial performance of healthcare system, Almusawiet *et al.*, (2019) evaluate their lean accounting information using value stream costing. The findings revealed that eliminating the waste is achievable and by adding value their product and services to be sustainable. In the same light, considering the financial performance of four leading firm in the Brazilian Stock Exchange, Teixeira *et al.*, (2019) findings reveal that lean implementations are the most credible ways of enhancing enterprise survival and her product sustainability. This is same experience Nigeria will have, when full application and implementation of the lean process is adopted both in the micro and macro enterprise. Finally, Naseem *et al.*, (2021) recently augmented a study in times of pandemic, catastrophe and turbulence circumstances. They strongly believed that enterprise should come up with policy-framework as lean implementation process that will counter entrepreneurs' psychological behavior. In Nigeria to tackle this kind of mindset, the lean philosophy and lean entrepreneurship need to be integrated in the micro and macro enterprise. This includes implementation of elimination of waste, continuous improvement, timing, elimination of error and defect should facilitate product sustainability in the short-term and long-term.

5. Conclusions, Recommendations and Contribution to Scholarship

5.1. Conclusion

The alertness of lean accounting in the developing nations is very vital. From the finding, lean accounting alert stimulates product sustainability. This rides continuous stream of lean entrepreneurship and lean entrepreneurship.

Catastrophe and pandemic seems to be the major negative factors threatening the globe. It is in the light of this that prompt research into lean accounting alert and entrepreneurial sustainability. From the findings the two hypotheses tested via Pearson Product Moment Correlation reveal there exist significant influences of elimination of waste increases product sustainability, while elimination of error-defect also influences product sustainability. This concludes that lean accounting alert has positive influence entrepreneurial sustainability.

5.2. Recommendations

The following recommendations were made from the findings.

- Elimination of waste, error and defect should be practice with lean process on lean thinking, lean culture and lean improvement.
- The leaders of micro enterprise should engage services of professionals in lean accounting alertness to train staff regularly
- Product sustainability should be control and anchor with the implementation of its five pillars

5.3. Recommendation for Further Studies

Itemized below are further recommended studies.

- Lean entrepreneurship and green entrepreneurship in developing nations.
- Lean culture and green entrepreneurship in the micro enterprise

5.4. Contribution to Scholarship

The contributions of knowledge in the study are comprehensively:

- The five pillars of sustainability and survival provides narrow escape for entrepreneurs in the micro enterprise to maintain continuous improvement during pandemic and disaster climax
- The practices and process of lean improvement, lean culture and lean thinking are major alertness to improve product sustainability in the micro firms in Nigeria.
- Green entrepreneurship and lean entrepreneurship are vital drives towards achieving product sustainability

6. References

- i. Ahmad, N., Mahmood, A., Ariza-Montes, A., & Han, H. (2021). Sustainable businesses speak to the heart of consumers : Looking at sustainability with a marketing lens to reap banking consumers' loyalty. *Sustainability*, 13(7). <https://doi.org/10.3390/su13073828>
- ii. Almashkor, I.A.S. (2021). The effect of integration between throughput accounting and lean accounting on cost reduction (applied study in Saudi industrial sector). *Journal of Management Information and Decision Sciences*, 24(1), 1-14
- iii. Almusawi, E. G., Almagtome, A. H., & Shaker, A.S. (2019). Impact of lean accounting information on the financial performance of the healthcare institutions: A case study. *Journal of Engineering and Applied Sciences*, 14(2), 399-599. DOI:10.36478/jeasci.2019.589.599.
- iv. Geoffrey, J. (2017). *Profits and sustainability. A History of green entrepreneurship. Oxford University Press. ISBN 978-019-870697-7.*
- v. Kemper, J., Hall, C., & Ballantine, P. (2019). Marketing and sustainability: Business as usual or changing worldviews? *Sustainability*, 11(3). <https://doi.org/10.3390/su11030780>
- vi. Khaw, S. M., Zailani, S., Iranmanesh, M., & Heidari, S. (2019). Do lean manufacturing practices have negative impact on job satisfaction. *International Journal of Lean Six Sigma*, 10(1), 257-274. doi:10.1108/IJLSS-11-2016-0072
- vii. Lathabhavan, R. (2021). Sustainable business practices and challenges in Asia: A systematic review. *International Journal of Organizational Analysis*, ahead-of-print (ahead-of-print).
- viii. Naseem, S., fu, G. I., Mohsin, M., Rehman, M. Z.U., & Baig, S. A. (2018). Volatility of Pakistan stock market: A comparison of garch type models with five distribution. *Amazonia Investiga*, 7(17), 486-504, <http://www.udla.edu.co/revistas/index.php/amazonia>.
Naseem, S., Mohsin, M., Hui, W., Liyan, G., & Penglai, K. (2021). The investor psychology and stock market behavior during the initial era of COVID-19: A Study of China, Japan, and the United States. *Frontiers in Psychology*, 12(16).<https://doi.org/10.3389/fpsyg.2021.626934>
- ix. Neamaha, M, F. Sabbar, A., & Abdulridha H. (2020). Lean accounting techniques in the e-commerce and its impact on efficiency of performance: An empirical study in the branches of insurance companies. *International Journal of Innovation, Creativity and Change*, 14(7), 1388-1389
- x. Ovharhe, O. H., Woko, E. B., & Ezeocha, V. U. (2021). Remote working: Entrepreneurial risk and entrepreneurial survival in the micro firms in Niger-Delta, Nigeria (Covid-19 Pandemic Prospects). *International Journal of Small Business and Entrepreneurship Research (IJSBER)*. 9(4), 11-28.
<https://www.eajournals.org/https://doi.org/10.37745/ejsber.2013>
- xii. Ovharhe, O. H., Woko, E. B., & Ogolo, T. M. (2021). Competitive risk strategy and entrepreneurial satisfaction among fast moving consuming goods in Nigeria during covid-19 pandemic using confirmatory factor analysis. *International Journal of Multidisciplinary Research and Growth Evaluation*, 2(6), 267-272. DOI: <https://doi.org/10.54660/anfo.2021.2.6.15>

- xiii. Osman, A. A., Mamat, R., & Ali, M. (2020). Lean transformational sustainability models: A critical review. *Advances in Business Research International Journal*, 6(2), 1-18. doi:10.24191/abrij.v6i2.1058
- xiv. Osman, A. A., Nordin, N., & Rahman, M.F. (2020). Measuring lean culture: Designing a research instrument. *Journal of Modern Manufacturing Systems and Technology (JMMST)*, 5(1), 7-17. DOI: <https://doi.org/10.15282/jmmst.v5i1.5821>
- xv. Patel, A.S., & Patel, K.M. (2021). Critical review of literature on Lean Six Sigma methodology. *International Journal of Lean Six Sigma*, 12(3), 627-674. <https://doi.org/10.1108/IJLSS-04-2020-0043>
- xvii. Rehman, M., Malik, E., Baig, S., Rehman, H., & Hashim, M. (2021). Lean accounting awareness: A qualitative study on lean accounting perception. *International Journal of Management (IJM)*, 12(6), 28-42. DOI: 10.34218/IJM.12.6.2021.002
- xviii. Shafiq, M., & Soratana, K. (2020). Lean readiness assessment model – a tool for Humanitarian Organizations' social and economic sustainability. *Journal of Humanitarian Logistics and Supply Chain Management*, 10(2), 77-99. doi:10.1108/JHLSCM-01-2019-0002
- xix. Soliman, M. (2020). Lean accounting and value stream costing for more efficient business processes. *Novićević Čečević, Đorđević/Economic Themes*, 58(4), 573-592. DOI 10.2478/ethemes-2020-0032
- xx. Soliman, M. (2020). Lean accounting vs financial management: Awareness and overview (February 9, 2020). Available at SSRN: <https://ssrn.com/abstract=3534862> or <http://dx.doi.org/10.2139/ssrn.3534862>
- xxi. Sze, J. (2018). *Sustainability: Approaches to environmental justice and social power*. New York University Press.
- xxii. Teixeira, H.F., Santos, N. M. B. F., Akkari, A.C.S., & Munhoz, I.P. (2019). Lean accounting: Economic-financial performance of companies with lean manufacturing. *International Journal of Advanced Engineering Research and Science*, 6(5), 444-451. 10.22161/ijaers.6.5.59

Appendix

Questionnaire

Please Tick [] in the appropriate place

Personal Data

1. Name of Enterprise
2. Gender:
 - a. Male []
 - b. Female []
3. Marital Status:
 - a. Single []
 - b. Married []
4. Age:
 - a. 20 – 29 []
 - b. 30 – 39 []
 - c. 40 – 49 []
 - d. 50 – 59 []
 - e. 60 and above []
5. Educational qualification/equivalent:
 - a. FSLC []
 - b. SSCE []
 - c. HND/OND []
 - d. First Degree []
 - e. Masters []
 - f. Ph.D []
6. Number of years in the Enterprise:
 - a. less than 2 years []
 - b. 2 – 5 years []
 - c. 6 – 10 years []
 - d. above 10 years []

Please carefully tick (√) the option as it relates to your perception of the questions.

- 1 = Strongly Agree
 2 = Agree
 3 = Disagree
 4 = Strongly Disagree

Lean Accounting Alert

S/N	PART A: Elimination of defect and error	1	2	3	4
1.	The lean pattern of eliminating error is new means of continuous improvement to the micro firms				
2.	This application of lean accounting will increase savings				
3.	The approved towards zero defect will increase our product standards				
4.	Lean method is the best approach to increase customer value because of low defect				

Table 3

PART B: Elimination of waste		1	2	3	4
1.	Eliminating waste is good for micro enterprises				
2.	Minimizing waste increase profitability				
3.	Lean process of evaluating waste is appropriate for micro firms growth				
4.	Lean method enhance our efficiency and competency on waste elimination				

Table 4

PART C: Product Sustainability		1	2	3	4
1	Product sustainability is vital for the environment and society				
2	Sustainability is the backbone of micro enterprise strength in the long-term				
3	Profitability improves continuously if sustainability is certain				
4	The life span of an enterprise depends on her sustainability				

Table 5: Entrepreneurial Sustainability