

AN EVALUATION OF ACTIVITY BASED COSTING (ABC) ADOPTION IN SELECTED FOAM AND MATTRESS COMPANIES IN KADUNA STATE OF NIGERIA

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Abstract: This study assessed how Activity Base Costing (ABC) was used in a few Kaduna State mattress and foam manufacturing companies. Because overhead is not factored into product units, traditional costing methods do not provide correct cost information, which has had an impact on many manufacturing enterprises, particularly Nigerian foam and mattress producers. The sample of 80 respondents was selected from the cost and management accountants, research and development departments, marketing divisions, and sales and distribution divisions of the selected foam and mattress businesses in Kaduna State using only primary data. All 80 questionnaires were completed and sent. Ordinary least squares (OLS) regression analysis, tables, and percentages were used to analyse the data and assess the hypotheses. The results of the study show a strong and positive association between the adoption of ABC, the implementation challenges, and the degree of benefit achieved, but a negligible and adverse relationship between the categories of staff involvement. The inquiry came to the conclusion that, in relation to the difficulties and problems experienced, the benefits of adopting ABC surpassed the costs. As a result, the study recommended, among other things, that seminars, conferences, and workshops be held for all types of people interested in the adoption of ABC.

Keyword: Activity Based Costing, Level of personnel involvement, Foam and mattress companies

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1. INTRODUCTION

Understanding costs and how component behaviour affects costs is becoming more and more important for organisations. The best way to understand costs and how to distinguish between competing techniques to cost measurement, such as activity-based costing (ABC), standard costing, throughput accounting, project accounting, and target costing, among others, are still up for debate. Managers and employees are therefore unsure of the best practises to apply. A closer study indicates that the different costing methods don't necessarily have to compete with one another; rather, they can coexist, be harmonised, and mixed. However, in a competitive business environment, businesses seeking to maintain or boost their competitiveness need accurate and useful cost information.

In order to succeed in this new environment and get past the over-generalizations of earlier costing systems, enterprises must act quickly and produce high-quality products at reasonable costs. Production organisations face rising competition in today's global economy. For senior managers to make educated judgements, costing information must be exact and current. Traditional costing methods that allocate overhead based on volume are no longer applicable in a manufacturing environment where overhead has rapidly grown and direct labour has dropped as a result. These traditional costing approaches frequently overstate product costs and promote poor strategic decision-making, claim Johnson & Kaplan (1987) and Johnson (1990).

The innovative costing method known as Activity Based Costing (ABC), on the other hand, was developed to solve the drawbacks of traditional costing techniques. ABC was created by Cooper in 1988a, 1988b, and 1988 with Kaplan. It is a way of costing that aids managers in selecting the ideal product mix and competitive strategies by directly connecting overhead costs to cost elements like goods, processes, services, or customers.

Adamu (2014) asserts that ABC can radically change how managers choose the structure of their product line, establish product prices, select the locations of component suppliers, and assess emerging technologies. Manufacturing operations will result in unrealistic product costs under the conventional costing system, claim Kumar and Mahto (2013), and unrealistic costs may result in operational losses for the company. This is due to an advancement in production-related technology and rising manufacturing indirect expenses.

The use of ABC has been suggested as a way to get out of this situation. This costing approach was developed to provide a reasonable cost of manufacturing activities to assist businesses in developing effective pricing

strategies that would ensure realistic returns to the organisation (Oniyama, 2011). This assertion is supported by Oniyama (2011), who contends that activity-based costing is the optimum approach in the context of severe global business competition that has driven up industrial overhead costs. The ABC approach offers a more accurate and realistic manufacturing cost of operations in order to enhance organisational production processes. ABC have indicated reasonable improvement, specifically about cost reduction, and performance measurement (Joshi, 1998).

Although there are numerous accounts of ABC implementations in significant manufacturing organisations in the literature, there are few accounts of ABC adoption by small manufacturing organisations, especially the Foam and Mattress industries in Kaduna State, which seem to be tiny businesses (Yahaya, 2014). A closer look reveals that small manufacturing businesses are prevented from implementing an ABC costing system due to a number of factors, including a lack of data, technical capacity, financial resources, and adequate computerization. The main problem can be a lack of data because it is difficult to collect and analyse the required data properly and affordably. Small manufacturing organisations must be exceedingly picky about the data and analysis they use to calculate overhead costs because to the high cost of the information required for ABC and the frequent budgetary restrictions they face. Additionally, the lack of resources experienced by small businesses necessitates the implementation of specific cost management techniques (Welsh & White, 1981). However, it is a method that will require the least amount of financial investment and enable a small business to acquire accurate product pricing information.

Making money comes first for profit-making companies like foam and mattress makers (Orannefo, 2018). The time expense must be deducted from the revenue before the business can assess or decide on the profit figure. To determine the actual profit made for the period, a detailed calculation from the expenses incurred must be made. The majority of manufacturing companies, including those that make foams and mattresses, continue to use the arbitrary old costing approach, which assigns overhead costs to the quantity of goods or services using an absorption rate (Orannefo, 2018). This shows that the costing system either underpriced or overvalued some products, which would ultimately lower the profit and competitive advantage of the enterprises. According to Welsh and White (1981), these elements enhanced client profitability and product distribution channels. Manufacturing companies, including those producing foam and mattresses, were compelled to adopt activity-based costing

in place of the conventional costing system due to the expansion and instability of the global business environment in order to distribute overhead costs among the various goods and services they are producing for their clients. The study's main presumption is that ABC has integrated enough overhead attribution to raise the realistic nature of precise decision-making tools for determining approach costs for products.

Furthermore, a workable and economical approach to implementing ABC in small business settings, particularly the foam and mattress industry, is proposed. This strategy methodically delivers trustworthy cost information to the decision-maker in order to develop business goals, calculate product costs, and improve the cost structure. If a business cannot afford these resources, the ABC strategy might not work. This essay addresses these problems in order to understand the complexity or difficulties the ABC system presents.

The study's main objective is to assess how ABC has been used to the foam and mattress industries in Kaduna State. To do this, figure out how many categories of personnel participated in the ABC implementation in the foam and mattress industries in Kaduna State, the degree to which those industries adopted the ABC implementation, and the difficulties and challenges encountered during the ABC implementation in those industries in Kaduna State. In order to better understand the circumstances surrounding how ABC adoption affects the foam and mattress industries in Kaduna State, the following questions are posed: How much does the magnitude of benefits received affect the adoption of ABC implementation by foam and mattress producers in Kaduna State? How much does ABC implementation in foam depend on the category of individuals involved? How much does ABC implementation in foam depend on the level of problems and challenges encountered?

The following hypotheses are developed and put to the test in light of the aforementioned specific aims:

H01: There is no significant correlation between the level of benefits derived and the adoption of ABC by foam and mattress companies in Kaduna State.

H02: There is no significant correlation between the difficulties and challenges encountered and the adoption of ABC by foam and mattress companies in Kaduna State.

H03: There is no significant correlation between these three factors.

This study examines the effectiveness of ABC adoption in a small sample of Kaduna State's foam and mattress firms. The results of this study

will assist management in understanding the benefits and relevance of ABC implementation at Nigerian foam and mattress industries as well as other manufacturing organisations. By contrasting the ABC system with the conventional method of allocating overhead costs to products, managers in operating units in the foam and mattress industries as well as other Nigerian Manufacturing industries will be able to comprehend why traditional costing methods allocate overhead expenses arbitrarily and why ABC is the best method to apply in the treatment of overheads.

2. LITERATURE REVIEW

2.1. Concepts of ABC

For more than 20 years, the traditional costing approach has been constrained by its inability to include overhead in product units. To get over these restrictions and allow companies, particularly those in manufacturing, to adopt volume-based costing, the activity-based costing (ABC) methodology was developed. The ABC approach makes managing overhead costs easier and aids in determining how each client influences supplier costs.

Organizations must alter to reflect the evolution of global business operations. The two stages of the ABC model are allocating costs to cost pools inside an activity center and allocating costs to a product based on the number of activities it consumes. The costs of the product can be distorted by non-volume cost factors, including setup times, setup counts, ordering times, and order counts.

Due to its capacity to assess changes in enterprises' ABC adoption status over the past ten years and offer users comparative data, ABC has attracted interest in the UK. Businesses are becoming more aware of the drawbacks of letting their current cost systems lapse, which has increased interest in ABC.

In summary, the ABC approach has transformed how firms manage costs and allocate resources, overcoming the drawbacks of conventional costing systems.

2.2. Theoretical Framework

The activity-based pricing method is the subject of various hypotheses. As a result, two theories were taken into account in this study: the change theory and the activity-based management (ABM) approach/theory.

2.2.1. The activity-based management (ABM) theory and approach

According to the activity-based management theory, management as a discipline focuses on the management of activities and develops plans to increase the value

of services or products customers receive and the profit made by providing these values or services (Cokins, 1999). The goal of the theory is to identify the areas where a company is losing money so that those operations can be changed or enhanced to boost profitability. This suggests that the theory is intended as a way of analyzing the profitability of a company by taking a close look at each of its business operations to identify strengths and flaws.

The planning, execution, and measurement of actions are the three main tenets of ABM theory, a management philosophy that aids businesses in surviving in the cutthroat business environment. By reducing or eliminating non-value-added operations, ABM improves the process as a whole by using the data gathered through ABC. This idea was taken into account because it applies the principles of activity-based costing, an accounting technique for allocating expenses to certain activities at every level of the company. Because management is concentrating on successfully and efficiently managing employee activities with the aim of boosting productivity, profitability, and organizational competitiveness, it may also be utilized as a foundation for management decision-making.

2.2.2. Change theory

The need for a change from antiquated to more modern approaches is emphasized by Kurt's (1939) Change Theory, which was developed in the nursing field. He created a three-stage paradigm dubbed the unfreezing, change, and refreeze model, which calls for integrating and letting go of destructive patterns. Traditional costing methods lost their relevance in a manufacturing setting with rising overhead and declining direct labor. Traditional costing methodologies tended to skew product costs and lead to poor strategic decision-making; hence, it was required to move to the new activity-based costing (ABC) method (Johnson & Kaplan, 1988; Johnson, 1990). Managers may now easily link overhead costs to cost objects like products, processes, services, or customers, thanks to the adoption of this new costing model.

In order to address these problems and properly connect overhead expenses to cost objects, activity-based costing (ABC) was developed. The second step, change, involves a transformation of attitudes, sentiments, and actions. The ABC methodology corrects the flaws in traditional costing methods, enabling managers to set price strategies that are more precise and practical. To ensure that the ABC system becomes the standard operating practice, thorough implementation is essential. Failure to implement ABC could lead to bad strategic choices and affect the profitability of the firm.

2.3. Empirical review

A survey of significant Indian manufacturing firms was conducted by Joshi (1998). The results show that the impact is frequently limited in its applications and breadth. According to ABC's users, there has been a noticeable improvement, particularly in terms of cost cutting and performance monitoring.

ABC was examined by Al-Khadash and Nassar (2010) in order to better understand how it was applied in Jordanian industrial shareholding businesses. The information was gathered using a cross-sectional mail survey of finance managers who submitted information on the financial performance of their organisations from Jordanian shareholding enterprises for the year 2009. Regression analysis was used to explore the connection between ABC awareness and the degree of ABC adoption. The results showed that although financial managers are very aware of ABC, ABC implementation is not very widespread.

Egbunike, Egbunike, and Mofolusho (2013) explored the necessity to develop activity-based costing systems (ABC) in accounting procedures among industrial firms in Nigeria as the country strives to be among the top 20 economies in the world by 2020. As main sources of information, 50 copies of structured questionnaires were given to a variety of managers, auditors, and accountants at the manufacturing companies. The questionnaires were fully filled out and 45 copies were sent back. The T-test of difference between means was used to statistically examine the three hypotheses. The findings indicated that very few Nigerian manufacturers use ABC. The small size and low ICT level of the manufacturing sector may have contributed to this discovery.

Ezeagba (2014) investigates the relationship between activity based costing (ABC) and organisational efficiency in Nigeria. For the study, a sample of two manufacturing businesses in South East Nigeria was taken. The published annual reports and accounts of the chosen firms served as the source of secondary data. Using the Moment Correlation Analysis, the data were analysed and the hypotheses were examined. The results showed that the adoption of the ABC strategy has a significant impact on the amount of profits attained by manufacturing enterprises. This makes the case that manufacturing companies should attempt to understand the cost drivers within their own businesses in order to accurately predict the cost of their products.

In 2015, Mahal and Hossain looked into how the ABC approach was used in a few particular Bangladeshi businesses, including those in the service, technology, and industrial sectors. The study gathered information on activity-based costing (ABC) from a number of international journals and looked into a few unique circumstances in distinct countries. With the use of the data

acquired, the study was able to highlight the implications of activity-based costing (ABC) on a number of international journals produced by developed countries, particularly those that contrast US and European enterprises. Based on the analysis of publications, the study found that using ABC in these distinct fields is a little bit different. Because of this, ABC must be used while considering the features of that industry.

Nweze and Uzoamaka analysed the effectiveness of Nigeria's small manufacturing businesses and activity based costing (ABC) in 2016. 12 manufacturing firms were sampled for the study from the 88 small manufacturing businesses in Imo State. The published annual reports and accounts of the chosen firms served as the source of the data. The data was examined using Spearman's Correlation using SPSS 20 version. The findings demonstrated that activity based costing (ABC) significantly and favourably affects the productivity of Nigerian small manufacturing firms. The findings suggest that organisations should consider using ABC to reduce costs generally and boost profits.

Similarly, Oranefo (2018) looked into how activity-based costing (ABC) affects the production performance of Nigerian manufacturing businesses. 20 manufacturing firms were chosen at random among the 47 activity-based costing (ABC)-using manufacturing enterprises listed on the Nigerian Exchange Groups (NGX) between 2011 and 2016. Regression analysis and Chow test analysis were applied to the data in order to analyse the results and assess the hypotheses. The findings indicate that implementing the ABC strategy has a significant impact on how well inventories are managed in manufacturing businesses. Manufacturing businesses should therefore make an effort to understand the organisational cost factors in order to accurately and successfully price their products.

In order to ascertain the use of ABC and its effects on the productivity of SMEs in Lagos State, Nigeria, Mohammed (2019) performed research. From a total of 5,984 SMEs in the Local Government of Lagos State, 536 respondents who matched the study's predetermined criteria were chosen at random. With the help of statistical tools like Pearson's Product Moment Correlation, ANOVA, and ANCOVA regression, the data were analysed and the hypotheses were evaluated. The results showed that SMEs in Lagos State, Nigeria, implement the ABC approach indistinguishably the same way.

Similar to this, George, Nzewi, and Tochukwu (2022) examined whether activity-based costing (ABC) adoption has improved the financial performance of consumer goods manufacturing firms in Nigeria. Data on company costs,

return on capital used, asset turn over, current ratios, financial gearing, and earnings per share were gathered using time series from the annual audited financial statements of the companies listed on the Nigerian Exchange Groups (NEX) for the years 2009–2018. Every company producing consumer goods that used activity-based costing and was listed on the Nigerian Exchange Groups (NEX) was included in the study. The framework for the study was quasi-experimental research. The effect of the financial performance of the consumer goods sector was evaluated using the ordinary least square (OLS) method of econometric regression with the Chow test for structural stability. The findings demonstrated that activity-based costing (ABC) had no appreciable effect on the financial performance of Nigerian consumer products companies.

Mohammed and Sallah (2022) evaluated the present and future issues referred to in the literature about the use of activity-based costing (ABC) in Malaysia. The study included smart libraries with significant networking and sharing for new development paradigms, as well as 1,725 scientific papers that were published on the web and categorised (based on data). The research included works that were released between 1991 and 2022, with a focus on the literature review that prepares the ground for future bibliometric analysis-based activity-based costing (ABC) research. The publications that are commonly mentioned in papers, evaluations, and the nations with the highest efficacy were used to collect data, as well as the most important writers who discussed this topic (ABC) in their study findings. Using the VOS viewer tool, the data for significant works and projects were evaluated. According to the findings, activity-based costing (ABC) can potentially enhance management and customer service in the services industry. Similar to this, Tan and Feng (2023) reviewed and examined the necessary literature to investigate the benefits and drawbacks of activity-based costing in comparison to traditional approaches for resolving cost estimating difficulties. The research strategy for the study was library-style. The study showed that ABC is more adapted than traditional costing techniques to a sophisticated production process and a complicated and dynamic market environment.

3. METHODOLOGY

The investigation was conducted using a descriptive survey research approach. The researcher wanted to get feedback from the respondents without offering any kind of incentive, hence the descriptive survey design approach was used. The audience can freely submit information using this type of research technique (descriptive survey design) without being pressured or being made

to do anything. The primary method of data collection for the study was the dissemination of a questionnaire. The questionnaire was divided into two parts. Part A deals with the demographic characteristics of the respondents, whereas Part B examines the research issue, which is an assessment of the adoption of activity-based costing (ABC) by foam and mattress businesses in Kaduna State.

The responses were weighted using a 5-point Likert scale, with each response receiving a score of 5, 4, 3, or 2. With the choices Strongly Agree, Agree, Strongly Disagree, Disagree, and No Idea, the questionnaire was closed-ended. The population of the study consists of every employee of the marketing, sales and distribution, R&D, and cost and management accounting divisions. This study considered both small and large mattress firms that were situated in Kaduna state, even though a total of ten (10) foam and mattress enterprises were discovered. Major businesses in this context are those with staff between 25 and 99, while small firms are those with less than 25 employees. There are no personnel in the cost and management account departments of the two (2) companies. For this survey, a total of 80 respondents from 10 different firms were considered.

The choice of ten (10) foam and mattress companies with head offices, branches, or subsidiaries in Kaduna State was supported by the fact that Kaduna State is one of Nigeria’s commercial states, in contrast to Lagos and Kano States, which are the locations of the majority of head offices, branches, or subsidiaries of foam and mattress companies in Nigeria. The ten (10) foam and mattress corporations based on Nigerian company law also have traits in common with almost all other foam and mattress companies there. The perspective or opinion of these specific respondents from these companies would therefore be regarded as sufficient or trustworthy for generalisation and recommendations regarding the research topic matter. The model specification for the study was:

$$ABC \text{ implementation} = f(\text{Benefit of Adopting ABC}) \tag{1}$$

Where Benefit of Adopting ABC is proxies as Level of Category of Personnel Involvement (LCPI); Level of Benefit Derived (LBED); and Difficulties and Challenges Encountered (DCEN), equation 1 is restated as:

$$ABCIM = B_0 + B_1LCPI + B_2LBED + B_3DCEN + U \tag{2}$$

Where:

- ABCIM = Activity Based Costing Implementation
- LCPI = Level of Category of Personnel Involvement
- LBED = Level of Benefit Derived

- DCEN = Difficulties and Challenges Encountered
- B0 = Constant Terms
- B1, B2, B3, B1 = Coefficients of the Independent Variables

4. RESULTS AND DISCUSSION

For this examination, the data presented in this paper was acquired on the ground. The study hypotheses will be evaluated and assessed using this as the framework. Eighty (80) copies of the questionnaire were sent, and all of them were completed and returned.

Table 1: What is the level of the acceptability of ABC adoption in your organization?

<i>Options</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Agree	39	48.75%
Disagree	13	16.25%
No Idea	8	10.00%
Strongly Agree	13	16.25%
Strongly Disagree	7	8.75%
Total	80	100%

Sources: Field work, 2023

Table 1 shows the 39 respondents (or 48.75%) who agreed that ABC adoption in the sampled foam and mattress sectors was appropriate. Thirteen respondents, or 13.25 percent of the total, disagree with the aforementioned claim. In contrast, 8 respondents, or 10.00% of the total respondents, expressly said that they were unaware of the ABC adoption, while 13 respondents, or 16.25% of the total respondents, strongly agree with the aforementioned assumption. The implementation of ABC in the tested foam and mattress manufacturers is also not acceptable, according to 7 respondents, or 8.75% of the total respondents.

Table 2: Level of involvement of categories of personnel in the implementation of ABC

<i>Options</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Agree	34	42.50%
Disagree	18	18.75%
No Idea	7	8.75%
Strongly Agree	17	21.25%
Strongly Disagree	7	8.75%
Total	80	100%

Sources: Field work, 2023

Table 2 displays the level of involvement that various staff groups had in ABC adoption within the organisation. 34 respondents, or 42.50% of the workforce, from the cost, management accounting, and sales and distribution divisions feel fully involved. While 18 replies, or 18.75% of the research and development and marketing department workers, disagree with their full involvement, 7 responses, or 8.75% of the total respondents, categorically refute having no awareness. In addition, compared to 17 respondents who represent 21.25% of respondents, 7 respondents, or 8.75% of respondents, strongly disagree with their involvement in the implementation of ABC. This demonstrates that management accountants, cost accountants, and the sales and distribution unit were more closely involved.

Table 3: Level of importance of different factors in the decision of implement ABC

<i>Options</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Agree	31	38.75%
Disagree	12	15.00%
No Idea	12	15.00%
Strongly Agree	19	23.75%
Strongly Disagree	6	7.50%
Total	80	100%

Sources: Field work, 2023

Table 3 displays the relative importance of different factors in the foam and mattress testing companies’ decisions to use ABC. While 12 respondents, or 15.0% of the total respondents, disagree with the claim that rising overhead expenses are critically important, they are unaware of the importance of ABC implementation to their organisation. Similarly, 6 respondents, or 7.50% of the total respondents, strongly disagreed that the issue’s critical importance was caused by traditional cost systems’ failure to provide useful cost information, while 19 respondents, or 23.75% of the respondents, gave the issue a great deal of critical importance. This suggests that factors like rising overhead costs and the inability of current cost systems to give useful cost information are more crucial in influencing the decision to implement ABC than they are in driving the decision to adopt competition.

Table 4 outlines the extent of the ABC implementation’s advantages for the sampling foam and mattress businesses. Thirty-one respondents, or 38.75%, agreed that there is a high level of profitability since two or more things are made utilising the same components and assembly line with little modification. 12 respondents, or 15.00%, disagree with the benefit asserted and instead

Table 4: To what extent is the benefit derived in an organization adopting ABC implementation

<i>Options</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Agree	31	38.75%
Disagree	12	15.00%
No Idea	12	15.00%
Strongly Agree	19	23.75%
Strongly Disagree	6	7.50%
Total	80	100%

Sources: Field work, 2023

highlight the low profitability. Furthermore, only 12 respondents, or 15.0% fewer, weren’t confident about the benefit they had received. Contrarily, 19 respondents, or 23.75%, strongly agree with the claim that the ABC implementation will provide high levels of profitability, while 6 respondents, or 7.50%, strongly disagree. A corporation will gain from the ABC system by using the ABC approach, it is proposed by comparing the responses from both sides of the respondents, as a business will raise its profitability, take the position of fulfilling its aim, and follow its growth plan.

Table 5: Level of success attributable to ABC systems in relation to areas of application

<i>Options</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Agree	31	38.75%
Disagree	13	16.25%
No Idea	7	8.75%
Strongly Agree	23	28.75%
Strongly Disagree	6	7.50%
Total	80	100%

Sources: Field work, 2023

The ABC system’s level of effectiveness in relation to its application areas is shown in Table 5. Thirty-one respondents awarded all of the application areas—stock valuation, product/service pricing, budgeting, efficiency control, and product profitability—high ratings for success, whereas thirteen respondents, or 16.25 percent, disagreed and gave them medium or low ratings. While 23 respondents strongly concur that they have given ABC systems credit for much of their achievement, 7 respondents (8.75%) strongly disagree. The high level of effectiveness of the ABC systems, however, is strongly disagreed with by 6 respondents, or 7.50%. The perspectives of the many responders indicate that

the ABC technique has been extremely successful in its numerous fields of application.

Table 6: Difficulties encountered in the implementation of ABC in different areas of application

<i>Options</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Agree	33	41.25%
Disagree	13	16.25%
No Idea	10	10.50%
Strongly Agree	22	27.50%
Strongly Disagree	2	2.50%
Total	80	100%

Sources: Field work, 2023

Table 6 demonstrates that there were some application areas where using ABC was easier than others. For instance, 13 respondents, or 16.25%, stated they had no trouble adopting ABC in some areas, whereas 33 respondents, or 41.25%, indicated they had some difficulty utilising ABC to identify activities and choose cost drivers. 10 respondents, or 10.50%, distinctly indicate they don't know. In a similar vein, 22 respondents—or 27.50% of the overall population—strongly concur that using ABC and connecting particular activities to cost drivers is highly difficult, while just 2 respondents—or 2.50%—strongly disagree.

Table 7: Factors militating against the implementation of ABC

<i>Options</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Agree	32	40.00%
Disagree	13	16.25%
No Idea	7	8.75%
Strongly Agree	19	23.75%
Strongly Disagree	9	11.25%
Total	80	100%

Sources: Field work, 2023

In table 7, the percentage distribution of the barriers to ABC adoption is displayed. 32 respondents, or 40.00%, agree that activities are hard to define, while 13 respondents, or 16.25%, disagree and 7 respondents, or 8.75%, are undecided. However, 9 respondents representing 11.25% strongly disagree that it is not difficult except depending on the approach used, whereas 19

respondents representing 23.75% believe that describing activities to assigning costs to cost objects is challenging.

Table 8: Reasons for rejecting the implementation of ABC after considering its implementation

<i>Options</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Agree	40	50.00%
Disagree	13	16.25%
No Idea	6	7.50%
Strongly Agree	13	16.25%
Strongly Disagree	8	10.00%
Total	80	100%

Sources: Field work, 2023

Table 8 presents a percentage distribution of the factors that respondents considered before deciding not to adopt ABC. 40 respondents, or 50.00% of the total, agreed to reject the concept of adopting ABC because they were happy with the current system, whereas 13 respondents, or 16.25% of the total, disapproved because they were aware of it. However, 6 respondents, or 7.5%, are undecided about whether to approve or disapprove the ABC adoption. In contrast, 13 respondents representing 16.25% strongly agreed that the ABC adoption should be rejected because of the low percentage of overhead costs, while 8 respondents representing 10.00% strongly disagreed with the rejection because the manufacturing process is simple and easy to track costs.

Table 9: Descriptive statistics

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
ABCIM	80	2.35	1.432	1	5
LCPI	80	2.46	1.404	1	5
LBED	80	2.5	1.492	1	5
DCEN	80	2.4	1.437	1	5

Source: STATA 14 Output Results

The minimum and maximum values of 1 and 5, respectively, support the inference that the data for the ABCIM of the sampled firms are widely separated from the mean by 2.35 and have a standard deviation of 1.432. This data was discovered by closely reading table 9. The LCPI has an average score of 2.46 and a standard deviation of 1.404. The fact that the smallest value is 1 and the greatest value is 5, respectively, suggests that the data are well outside of the mean. Respondents who work in the cost, management accounting,

and sales and distribution departments received an average score of 2.46 and demonstrated high levels of involvement as a result of their comprehensive training and understanding of the ABC system.

The lowest value of 1 and maximum value of 5 in the LBED data show a similar fluctuation from the mean value of 2.5, which is supported by the data’s standard deviation of 1.492. The median of 2.5 indicates that respondents believed ABC adoption would result in high levels of profitability because the same materials and assembly line are used to produce the items.

Table 9 likewise shows an average DCEN of 2.4 and a standard deviation of 1.437, showing that the data for DCEN is widely dispersed from its mean as indicated by the minimum and maximum values of 1 and 5, respectively. Table 9 likewise shows an average DCEN of 2.4 and a standard deviation of 1.437, showing that the data for DCEN is widely dispersed from its mean as indicated by the minimum and maximum values of 1 and 5, respectively. The average of 2.4 suggests that respondents are aware of the challenges or issues with utilising ABC to identify activities and select cost drivers based on their professional experience.

Table 10: Result of the correlations matrix

<i>VAB</i>	<i>ABCIM</i>	<i>LCPI</i>	<i>LBED</i>	<i>DCEN</i>
ABCIM	1.0000			
LCPI	-0.0374	1.0000		
LBED	0.0260	0.0936	1.0000	
DCEN	0.0164	0.0128	0.0400	1.0000

Source: STATA 14 OUTPUT RESULTS

The study’s variables are listed in table 10 along with the findings of the Pearson’s pairwise correlation analysis. This analysis shows the correlation strength between pairs of variables, which ranges from -1 to +1, with diagonal values of 1.0 denoting perfect correlation between each variable and itself. The direction of the link is shown by the coefficients, which quantify how closely related the variables are to one another. Positive correlations between ABCIM, LBED, and DCEN are seen in Table 10 with coefficients of 0.2604 and 0.1647, respectively. These findings suggest that an increase in LBED and DCEN causes an advantageous rise in ABCIM. But with values of -0.0374, the correlation between ABCIM and LCPI is unfavorable and significant, showing that a unit rise in LCPI would more likely have a negative impact.

Table 11; Results of multicollinearity test

Variable	VIF	Tolerance (1/VIF)
ABCI		
LCPI	1.12	0.7810
LBED	1.38	0.6140
DCEN	1.39	0.6204
Mean VIF		1.12

Source: STATA 14 Output Results

VIFs greater than 5 with tolerance levels close to 0 are an indication of extreme multicollinearity across explanatory factors, according to Cohen et al. (2013). Table 4’s mean VIF of 1.12 and the explanatory variables’ individual VIFs being all within the threshold of 5, with tolerance levels greater than 0.1, demonstrate that the model being used has imperfect multicollinearity and data fitness.

Regression Results and Hetttest Tests

Table 12: Regression results and other tests

Variable	ABCI		
	Coeff	T-Value	P-value
LCPI	-0.1508	-1.32	0.192
LBED	0.2359	3.06	0.003
DCEN	0.2829	2.47	0.016
CONS	1.2273	2.65	0.010
R ²	0.1407		
Adj R ²	0.1068		
F-Stat	4.15		
P-value	0.0039		
Hetttest Chi ²	0.23		
P-Value	0.4217		

Source: STATA 14 Output Results

Data from the study’s ordinary least squares (OLS) regression are shown in table 12. While the degree of benefit gained (LBED) and difficulty faced in various application areas (DCEN) are favourably connected with ABC implementation, the level of category of personnel participation (LCPI) appears to be adversely correlated with ABC implementation. The correlation between the LCPI and ABCI has a negligibly negative coefficient value of -0.1508. In other words, Nigerian foam and mattress companies’ application of ABC

is negatively impacted by the LCPI. There is a significant positive correlation between LBED and ABCIM, with a coefficient value of 0.2359. This implies that a high level of profitability is achieved when the ABC technique is used with the same components and assembly. With a correlation coefficient of 0.2829, DCEN and ABCIM show a statistically significant positive association. This implies that the more challenges and problems experienced in different application areas, the larger the benefits of ABC implementation for the foam and mattress industries in Nigeria. The coefficient value of the constant (CONS) is 1.2273 at a 5% level of significance. This shows that there is a positive, significant correlation between ABC adoption and implementation, presuming that every other variable remains constant. This result suggests that other model factors were substantial enough to affect the benefits of ABC implementation.

The complete variance in the dependent variable may be explained by the explanatory factors collectively to the extent that the multiple coefficient of determination, or R^2 , of 1407, implies. Thus, 14.07% of the overall variance in the adoption of ABC in specific Nigerian foam and mattress businesses may be attributed to the LCPI, LBED, and DCEN. According to the Adjusted R-square, even after taking into account the degree of freedom, the model could only explain around 10.68% of all systematic variations in implementation on adoption.

This shows that there are more factors at play in the influence of LCPI, LBED, and DCEN on the ABCIM of specific foam and mattress sectors in Nigeria in addition to those that the stochastic disturbance term has been able to take into account. The output variable of a few selected foam and mattress companies in Nigeria exhibits a statistically significant correlation with the explanatory variables ($F\text{-stat} = 4.15$; $F\text{-prob} = 0.0039$), which is explained by the well-formulated regression equation.

The results of the heteroscedasticity test are H-test χ^2 of 0.23 and Prob > χ^2 0.4217, respectively, according to Table 12. This shows that the model is homoscedastic and that the constant variance null hypothesis is satisfied. The study's results, as given in Table 12, do not, therefore, show perfect heteroscedasticity because the change in the residual or error term is unrelated to and does not affect the study's results.

The first hypothesis states that the degree of category of people involvement has no discernible effect on the ABC implementation of foam and mattress businesses in Kaduna State. Comparing Tables 1, 2, and 8's results from the logistic regression to Table 12's results, it can be shown that the level of

employee engagement is not statistically significant. This means that even if a large majority of respondents approved of ABC's adoption and a number of employees from various departments and units participated, there isn't a probability it will have a substantial impact on the selected foam and mattress businesses in Kaduna State. This implies that involving personnel from the marketing, research and development, cost and management accounting, and sales and distribution departments, among others, may not have a significant impact on the business. This demonstrates that the chosen foam and mattress companies in Kaduna State, Nigeria are not significantly impacted by the level of category employee involvement in the implementation of ABC, and thus the null hypothesis should be accepted. Al-Khadash and Nassar (2010) and Egbunike et al. (2013) also found that while financial managers have a strong comprehension of ABC, implementation is neither very high nor very low. This study's findings are consistent with these findings. The outcomes conflict with the outcomes.

According to the second hypothesis, there is no significant correlation between the degree of advantages realised and the adoption of ABC implementation in Kaduna State's foam and mattress industries. Comparing the results of Tables 4 and 5 with the logistic regression as displayed in Table 12, the degree of benefit produced is favourably and statistically significant at 5%. This suggests that implementing ABC at the selected foam and mattress businesses in Kaduna would boost their profitability and enable them to achieve their objectives and implement their expansion strategy. This demonstrates that the alternative hypothesis is preferred to the null hypothesis and that the magnitude of benefit achieved has a substantial influence on ABC adoption in the selected foam and mattress sectors in Kaduna State. The findings are in line with those of Nweze and Uzoamaka (2016) and Oranefo (2018), who found a strong positive correlation between the amount of benefit realised and ABC adoption. The results are in contrast to those of Mahal and Hossain (2015) and Mohammed (2019), who found no appreciable variation in how SMEs in Lagos State, Nigeria, used the ABC technique.

The third hypothesis holds that the problems and difficulties encountered did not materially affect the adoption of ABC in the foam and mattress sectors in Kaduna State. When the outcomes of Tables 3, 6, and 7 are contrasted with the outcomes of the logistic regression as displayed in Table 12, the challenges and hurdles encountered are favourably and statistically significant at 5%. This demonstrates that adopting ABC adoption in the selected foam and mattress businesses in Kaduna may present some difficulties, particularly

when defining activities and selecting cost drivers to allocate costs to cost items. This demonstrates that the alternative hypothesis is preferable to the null hypothesis and that the degree of problems and challenges experienced has a significant impact on the implementation of ABC adoption in the selected foam and mattress sectors in Kaduna State. The findings are in line with those of Mohammed and Sallah (2022) and Tan and Feng (2023), who found that the adoption of ABC is more challenging and complex than the traditional costing methodology due to the dynamic nature of the market environment. These findings differ with those of George et al. (2022), who demonstrated that activity based costing (ABC) has little to no effect on the financial performance of consumer products companies in Nigeria.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

In light of the aforementioned analysis findings, the study comes to the following conclusions:

The level of involvement is not statistically significant even if the majority of respondents accepted ABC's implementation and category of personnel's involvement across multiple departments and units at the selected foam and mattress companies in Kaduna State. This suggests that not every worker involved in the ABC implementation fully comprehends the different costing tasks.

The adoption of ABC improved profitability and gave the selected foam and mattress enterprises in Kaduna during the study period a standing attitude to reach the target and pursue growth. The level of benefit generated is statistically significant and positive in these results. This shows that the deployment and adoption of the ABC system have been quite successful over the research period in its numerous application areas.

Adoption of ABC in the selected foam and mattress companies in Kaduna has proven to be positively and statistically significant due to challenges encountered in defining activities and selecting cost drivers to allocate costs to cost objects. The use of the ABC system must therefore be understood in its whole, encompassing stock valuation, product/service pricing, budgeting, efficiency monitoring, and product profitability, as well as how to assign expenses to each cost object.

According to the study's findings, existing ways of allocating overhead were considered insufficient for boosting global competitiveness, and old cost

systems' inability to offer meaningful cost was the main driver behind the organisations' choice to use ABC.

5.2. Recommendations

The management of the chosen foam and mattress companies should first schedule seminars, workshops, and conferences for all categories of staff involved in the adoption of ABC in order to familiarise and better understand the many costing systems applicable to the organization's cost drivers. As a result, the participants' knowledge and comprehension will grow, improving the likelihood for the enterprises to realise large cost savings, lower product costs, or even cost reduction that results in high profit. Second, the management of the selected foam and mattress companies in Kaduna State should provide all the necessary conditions for full ABC execution. Employees, particularly those in the departments of sales and distribution, research and development, marketing, and cost and management, will be encouraged to become more knowledgeable, skilled, and capable of treating all costing activities in relation to cost drivers, which will lower costs and boost the company's profitability.

Third, despite the difficulties, the management of the selected foam and mattress businesses in Kaduna State ought to make an effort to think about the implementation because, in the long run, the benefits outweigh the drawbacks because it enables the identification of inefficient products, departments, and activities and the allocation of more resources to profitable products, as shown in the table.

Finally, activity-based costing approaches should be used by Nigerian foam and mattress makers so they can price their products fairly and accurately and compete on a global scale. Making this a reality will allow us to compete with goods produced in wealthy countries and greatly boost value.

5.3. Limitations of the study

The following limitations apply to the use of primary data and surveys in examining how ABC adoption affects Nigerian manufacturing enterprises, notably foam and mattress producers:

Due to certain respondents' wish to maintain their anonymity when discussing their opinions on a specific feature of activity-based costing (ABC), there is a chance that their answers about the adoption of ABC in the selected foam and mattress companies are biased.

Second, some respondents declined to comment or opted not to respond to some questions out of a sense of confidentiality. If the respondents had given input, the study's conclusions would have been different.

Finally, because the software used to analyse the data gathered and generate useful output does not feasibly explain the causes and motives for the behaviour of the variables, some variables are believed to be more complicated.

5.4. Directions for future research

The study's analysis of the adoption of ABC in a few Nigerian foam and mattress businesses led to the following recommendations being made:

Empirical research should be conducted utilising a case studies method in both organisations that have already implemented ABC and in businesses that have rejected it. As a research tool, the case study should focus on understanding the dynamics present in a real-world situation. The approach may be based on a single or multiple case study designs that represent different design situations.

A similar study would be conducted in other industries for the purpose of comparison, such as the construction materials industry, the chemical and paints industry, or other specialised businesses. This would make it simpler to draw general conclusions regarding the efficacy of the ABC methods implemented by a few carefully selected foam and mattress companies in Nigeria.

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Declaration of conflict of interest

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