Activity-Based Costing for Better Production Management in the Nigerian Pharmaceutical Industry

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ABSTRACT

Activity-based Costing (ABC) is a powerful tool to use by a business organization for ensuring accuracy and effectiveness in its production cost management and avoiding cost distortion, so as to work towards achieving sustainable growth and development in the era of globalization and complex business environment. This paper aims to figure out the impact of the ABC on production management efficiency in the Nigerian pharmaceutical companies. The methodology used is the interview of key personnel of Ugolab productions Nigeria Limited, and review of academic and professional literature on ABC application. Conclusions are drawn from theoretical analysis and discussion of results. This research adds insight into management accounting system of production cost determination for proper pricing, using activity based costing. Based on the analysis conducted on the application of ABC as costing method, it is clear that ABC helps management to make informed costing decisions and better production management. This paper recommends that Pharmaceutical manufacturing companies should provide capacity building training to their staff in relevant departments to ensure that they understand how to use the ABC system and accelerate its use in their company. They should also establish research and development (R & D) department or collaborate with a relevant University or research institute for the conduct of research on new methods or systems of production and provision of high quality products at the most cost effective way to their customers, like the ABC method.

Keywords: ABC, production management, Costing System, R & D department, pharmaceutical company

INTRODUCTION

Production Management is the management of all company activities that support the input–output cycle. Initially, production or manufacturing sections were the only places where the phrase “production management” was used. The system, nevertheless, has developed over time and is now often used to refer to the administration of daily business operations of all units that ultimately direct toward the final service or product. Production management seeks to maximize the efficiency of both the manufacturing process and broader corporate operations. Thus, profit maximization and business expansion are ensured by effective production management (Tsarouhas, 2023). New trends in production and operations management require every action that aims to boost productivity, and maximize profitability. Therefore it might take the form of cost reduction initiatives or the elimination of non-value added activities with the use of such tools as Activity based costing for better production management.

Activity-based costing is an accounting technique which identifies the activities which a firm performs and then assigns indirect costs to cost objects. Activity - Based costing (ABC) system was first demonstrated by

Johnson and Kaplan (1987) as a new, advanced method for calculating production costs. The conventional or Traditional costing systems (TCS) use a single, volume-based cost driver to assign manufacturing overhead to units produced. This is the first reason behind deforms of the cost of products. For this reason, TCs oftentimes report in exact product costs, the second reason is traditional costing system which fails to allocate non-manufacturing costs that also are associated with the production of an item, such as administrative expenses (Marx, 2009). Activity Based Costing is motivated by a belief that traditional (general ledger) accounting information is all but useless to managers who are interested in evaluating the effectiveness of resource allocation decisions in their companies. Activity-based costing (ABC) was developed and has been advocated as a means of overcoming the systematic distortions of traditional cost accounting and for bringing relevance back to managerial accounting. By using ABC, Ugolab productions Nigeria limited aims to optimize resources allocation, reduce cost, ultimately resulting in improved production management efficiency and enabling the company to maintain its competitive edge in the Nigerian pharmaceutical industry.

The Nigerian pharmaceutical sector is a multibillion naira industry with under utilized potentials that can contribute to the economy as well as improve the lives of its citizens. It is regarded as an important component of the Nigeria's health care industry and an important contributor to the Nation's Gross Domestic Product (GDP) (Siyanbola *et al*., 2012). It uses huge resources in their operations, such as machine, materials, money, and technology, which are characterized with complex processes to carry out their activities. As the demand for quality health care rises, understanding the current state of the industry, key trends, technological advancement, better production management and financial performance is crucial for stakeholders seeking to capitalize on emerging opportunities.

This study focuses on Ugolab productions Nigeria Ltd. as a case study due to the researcher's prior knowledge of the company's use of Activity –based Costing. Ugolab productions Nigeria Ltd. stands out as a pioneer in the application of ABC amongst pharmaceutical companies in Nigeria, making it an ideal candidate for in-dept examination. Ugolab productions Nigeria limited engages in the manufacture and marketing of pharmaceuticals and animal health products. It operates through the Pharmaceuticals Product Group and Animal Health Product Group segments. The company was founded on November 10, 1988 and is headquartered in Kano, Nigeria. The main ABC work is factory faced (established in Club road). In their head office it is used for administrative work.

This paper aims to examine the impact of Activity-based costing (ABC) on production management efficiency and to evaluate it's effectiveness in reducing production costs, product quality improvement and enhancing profitability in the Nigerian pharmaceutical company

LITERATURE REVIEW

Conceptual Review

Activity-based costing is a way to figure out how much something costs that focuses on the things that are done to make the product. It is a better way to determine how much each cost object should pay. It is a method for figuring out how much something costs that looks at the activities of an organization and assigns the cost of each activity's resources to all products and services based on how much of each they use (Upadhyay, 2017). ABC is a cost allocation strategy that involves initially assigning overhead costs to activities and allocating them to goods, orders, or customers depending on how much they utilize these activities (Huang et al., 2014). The ABC costing method is the foremost approach for enhancing operational efficiency and competitiveness inside enterprises (Tran & Thao, 2020). Furthermore, the refined treatment of overhead cost by using ABC system can facilitate the identification of how individual customer influences the cost of supply (Innes & Mitchell, 2009). An overhead allocation based on activity centers avoids a common consequence of traditional output-based costing system particularly under cost low volume products by overheads based on activity centers facilitate the targeting of unnecessary, wasteful, resource

usage and the costly effects of over complex ways of running a business process (Innes and Mictchell, 2009). This technique, which is popularly known as Activity-based costing (ABC), is a system that focuses attention on the costs of various activities required to produce a product or services (Baird et al 2010). This system is in favour of many organizations in order to provide "true" information for their strategic decision-making. Activity-based costing is a system that will reduce the level of arbitrary cost allocation associated with "traditional" costing system and result in more accurate product cost (Baird et al 2010).

Aranoff et al (1998) said that there are two purposes of activity-based costing. The first purpose is to prevent cost distortion. Cost distortion occurs because traditional costing combines all indirect costs into a single cost pool. Cost distortion is prevented in ABC by adopting multiple cost pools (activities) and cost drivers. The second purpose is to minimize waste or non-value-adding activities by providing a process view. The process of converting a business costing methods or systems from traditional costing systems to ABC systems depends on several key success factors which include: Change management, Continuous education and training, Communication, Cultural acceptance, and Executive management support (Aranoff et al., 1998).

The growing industrial complexity and product diversity have made the emergence of ABC system for growing firms as a powerful tool for decision making purpose, the major advantages of ABC systems are: Its primary advantage is that it allocates the overhead costs with a direct causal link with the real resources consumed (Rchid et al., 2013). ABC recognizes the interdependencies of cost drivers to activities. It enables the management to see where the most important costs occur as well as what provides them. Decisions about improving pricing, marketing, product designing and product mix can be made more efficiently by implementing an ABC system. ABC system is the suitable method for correct and accurate information, redeploying a resource from a non-value-added to a value-added activity. By identifying the weak product lines and accurate costs, ABC helps to increase organizational efficiency and profitability. Completely eliminating a non-value-adding activity ABC can takeout costs, Identifying and correcting an error that was not budgeted for but would have caused an expense had it not been corrected. Provide Growth by removing a bottleneck that was causing a capacity constraint. It helps industrial marketers in three ways; it results in cost estimates to use in pricing, guides industrial marketers to adjust in negotiations to yield significant cost reductions and indicates areas for change in operations to permit cost reductions that will allow the company to satisfy customer wishes better (Jim & woodruff, 2019)

ABC system is costlier to maintain than a traditional costing system. According to Blaxill and Haut (1991) some companies miss the point as overhead is not only about cost, more fundamentally it is about process (Blaxill & Hout, 1991: 93). The implementation process of ABC system is very complex for managers to understand and it produces numerous data, activity measures and requires collecting, checking process etc. Because of complexity of the process the decision making process becomes lengthy. Resistances from the management as managers are accustomed to using traditional costing systems to run their operations. ABC data can easily be misinterpreted as there are huge amount of irrelevant data. In practice, as managers insist on allocating all costs to costs objects, this results overstated cost and understated margin results mistakes in pricing. If no one in the organization looks at the new ABC cost and profitability information, the project team becomes disappointed. Consultants are not familiar with companies' operation and problems. Hence they failed to support management in some cases. Resistance arises because people feel threatened by the suggestion that their work could be improved (Jim & woodruff et al, 2019).

Production management on the other hand, deals with decision making related to production process so that the resulting goods or services is provided according to specifications, in the amount and by the schedule demanded and at minimum cost. (Daneshjo et al 2013). Production management is concerned with the management of all activities involved in the provision of goods and services, and it is the central part to the manufacturing process. Its responsibility is resource planning as well as controlling the processes involved in converting raw materials and components into the finished goods and services required to satisfy the needs and wants of the existing and potential customers (Cole, 2004).

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Empirical Review

Askarany and Yazdifar (2011) carried out an investigation into the mixed reported adoption rates for activity-based costing in Australia, New Zealand and the UK. Data were obtained from the primary sources through the administration of questionnaires to 2041 registered CIMA members in Australia, New Zealand and the UK in 2007 (1175 in Australia, 366 in New Zealand and 500 in the UK) followed by 56 interviews. The selection of the total number of CIMA members for each country and also the selection of each individual member in each country was based on the total numbers of registered and qualified CIMA members in each country who were working in managerial accounting sections of organizations in 2007. The findings revealed that 42.6% of organizations in Australia are adopting activity-based costing at some level and the extent of adoption of activity-based costing in New Zealand and the UK is 38% and 36.4%, respectively.

Maiyaki (2011) investigated the practicability of activity-based costing in the Nigerian retail banks with samples from 3 branches of First Inland Bank in Ilorin, Bauchi and Kano respectively. Using non-structured interview as instrument, the study revealed that 90% of the employees of the selected banks do not have the knowledge about activity-based costing system. On whether the system is practicable, most of the respondents were positive. However, they considered the implementation of the system to be difficult because some tasks overlap and involve more than a department.

Elhamma (2012) carried out an empirical investigation on the adoption and diffusion of activity-based costing in Morocco. The study was based on data collected using questionnaires sent to enterprises based in Morocco. Of the 412 questionnaires sent out, a total of 76 questionnaires were returned. The study revealed that the adoption rate of the activity-based costing method in Moroccan firms was 12.9%. This rate was 21.87% in large enterprises and 3.33% in Small and Medium Scale Enterprises. It was 14.58% in Industrial firms and 7.14% in other enterprises. The study provided additional knowledge on the status of activity-based costing adoption and diffusion in Morocco.

Job and Okparachui (2012) conducted a case analysis to investigate whether activity-based costing is being used by manufacturing firms in Calabar Export Processing Zone (CEPZ) of Nigeria. The study examined the limitations of the traditional costing systems in overhead cost allocation in product diversity. Survey and exploratory research design were employed in the study. The population of the study consisted of twenty-five manufacturing firms with more than 500 employees in Calabar Export Processing Zone of Nigeria. Stratified random sampling technique was used to select 8 sample firms. Primary data were obtained through the administration of questionnaire to 40 respondents. The results of the analysis revealed that 25 firms (representing 62.5%) of the sample are users of activity-based costing system.

Salawu and Ayoola (2012) investigated activity-based costing adoption among manufacturing companies in Nigeria. The primary data were sourced through questionnaires administered to the Management Accountants of 40 selected manufacturing companies in South Western part of Nigeria. Descriptive statistics was employed to analyze the data. The study reveals that 60% of the respondents have adopted activity-based costing. Familiarity with and adoption of activity- based costing was found to be across the manufacturing, as more than half of the sample are familiar with it.

According to Oranefo (2018), this study aims to determine how Activity-based Costing affects manufacturing enterprises in Nigeria. This study used ex-post facto research. Yearly time series data, including total cost, inventory, revenue, income, and operating profit, were extracted from the annual financial reports of the selected production companies. The hypothesis was tested using regression and Chow tests. The investigation shows that the ABC technique improves inventory management in manufacturing organizations. The research also reveals that the ABC approach boosts manufacturing business income. Finally, the ABC technique of costing affects manufacturing business profits. The research found that product cost is the most significant factor in production Profits. This research suggests that manufacturers

should understand their cost drivers to price their goods correctly. Based on the study, manufacturing companies should have a comprehensive understanding of their goods' costs and process activities. Advanced manufacturing companies with several product lines should use ABC.

According to Effiong S.A & Akpan A.E (2019), this study examined how ABC affects industrial productivity. Traditional cost accounting needs to be corrected and more accurate because it gives too much cost to one product and not enough to another. Activities-based cost accounting was made to show a more accurate picture of how the activities that go into making a product or service affect costs. The population of the study was made up of 1,356 manufacturing staff members of companies in Nigeria. A sample size of 309 staff was randomly selected using the Taro Yamane formula. The study used a descriptive survey method based on questionnaires. The data were looked at with ordinary least square Regression. The findings show that the ABC technique makes the manufacturing process more efficient. ABC uses more than one cost driver, like direct labor, to determine how much to spend on overhead. A good understanding of ABC and how to use it would help manufacturing companies gain a competitive edge and work more efficiently.

Pham et al (2021) examined the impact of the Activity-based-costing (ABC) approach on the performance of enterprises in Vietnam. This study is grounded in agency theory, uncertainty theory, sociological theory, and an extensive literature survey, culminating in the development of a comprehensive model consisting of seven hypotheses. A sample of 1,008 observations was collected from a population of 112 mining businesses to conduct research. The collected data was subjected to statistical analyses, including Cronbach's alpha, Exploratory Factor Analysis, and Regression. The study's findings indicate that the effective implementation of Activity-Based Costing (ABC) in manufacturing enterprises in Vietnam is influenced by two significant factors: environmental unpredictability and a market-oriented approach. Activity-Based Costing (ABC) has been found to have a statistically significant and favorable impact on business performance. This finding provides support for the notion that promoting the use of activity-based costing (ABC) can facilitate the steady and sustainable growth of manufacturing enterprises, leading to continuous enhancements in their market position and overall firm performance.

Theoretical Review

Activity-Based Management Theory: The theory states that management is a discipline that focuses on the management of activities as the route to improving the value received by the customer and the profit achieved by providing this value (Cokins et al 1999). The terms "ABC" and "ABM" should not be used interchangeably. ABC is a tool for determining the costs of activities and the outputs that those activities produce. ABC, by itself, is not enough for continuous improvement of the company. On the other hand, ABM is a management philosophy that focuses on the planning execution and measurement of activities and helps companies to survive in the competitive world of business. ABM uses the information obtained through ABC to reduce or eliminate non-value added activities, and as a result, improve the overall process (Oranefo, 2018).

ABM theory underpins ABC by providing a framework for identifying, analyzing and improving activities which is essential for ABC to accurately assign cost to these activities. In other words ABM defines the activites, and ABC assigns the cost to those activities

TQM as easy as ABC: According to Steve R. Letza & Ken Gadd (1994), fundamental to TQM is the continuous improvement of business processes and activity based costing (ABC) is essentially an accounting system that measures the use of resources by activities. ABC therefore can generate the accounting information that is needed for TQM to evaluate costs.

Supply Chain Costing & Activity-Based Perspective: The purpose of the research paper "Supply Chain Costing: An Activity Based Perspective "by Binshan, Collins, Robert (2001) is to help managers to improve their understanding of logistics costs and the accounting for those costs in order to optimize use of the total

cost approach to managing logistics processes. This paper discusses the history and evolution of logistics management and ABC, the driving cost factors affecting the key logistics activities, and the use of ABC system to help improve the allocations of logistics costs to specific cost objects. It also includes managerial implications and implementation techniques for an ABC system.

ABC, A Powerful Tool for Pricing: In his journal, John C Lere (2000) told that ABC is a powerful tool for pricing than traditional costing system. The reason is under ABC, for each unit, batch or product level activity, a cost driver is identified which determines cost per unit. According to him, when the resource consumption for an order is typical of total expected company resource, both traditional cost system and ABC system estimates will be same. They will differ if orders are not typical of total expected company resource usage.

According to Chen F. Frank (1996), a journey to cost-effective approach to advanced factory management through ABC approach can be achieved with the following steps: (1) Identify / define factory activities (2) Obliterate unnecessary activities as much as possible (3) Identify cost driver for each activity (4) Select necessary control/management functions to minimize/automate cost drivers (5) Cost-effective advanced factory management system

Hughes Andrew (2005) mentioned in his study that ABC/ABM enables firms to focus on its activities and products; it traces cost-to-cost drivers. ABC information, by itself, does not invoke actions and decisions leading to improved profits and operating performance. Management must institute a conscious process of organizational change and implementation if the organization is to receive benefits from the improved insights resulting from an ABC analysis.

ABC for planning & decision making: Kelline et al (1999) has done a research showing how ABC can be applied in the academic institution, i.e., colleges, universities. According to ABC approach, activities of the universities are categorized into four main parts- instruction (teaching), research, public service and administrative activity and thus costs related to these activities are allocated on the basis of time spent for each activity. Sheu et al (2003) enclosed that the traditional standard costing systems are irrelevant in most cases for management decisions because they are “too late to aggregated and too distorted”. Moreover, the measures fail to consider especially the presence of committed costs and related capacity limitations that lead to bottlenecks. Two alternative philosophies, TOC and ABC have been offered to overcome some of the failures of standard costing for improving managerial decision making and provide more relevant information for evaluating the economic consequences of resource allocation decisions.

Application of ABC in logistic business: Stapleton et al (2004) said that how ABC can be used as a tool for determining true costs of marketing and logistics activities and help firms make better decisions based on more accurate costing information. Thomas J. Goldsby & Darid J. Closs (2000) in their research has found that activity based costing (ABC) has become an analytical method of interest to many logistics organizations throughout the world.

ABC for E-Business: Roztocki Narcyz (2001) emphasizes on the implementation of ABC in technology or e-business sector. Since overhead cost is very high in this sector ABC is considered to be very useful here. To consider the decision of implementing ABC a new ratio has been introduced which is called overhead to total cost (OT) ratio.

OT Ratio = Overhead Cost / Total Cost

Simulating ABC: Beck & Nowak (2000) in their journal tried to merge discrete event simulation with ABC to provide an improved costing, planning and forecasting tool. In simulation, physical items flow through the sequence of manufacturing operations and in ABC costs flow through the model driven by define activity drivers. Thus the combination of these two can be figured out as follows;

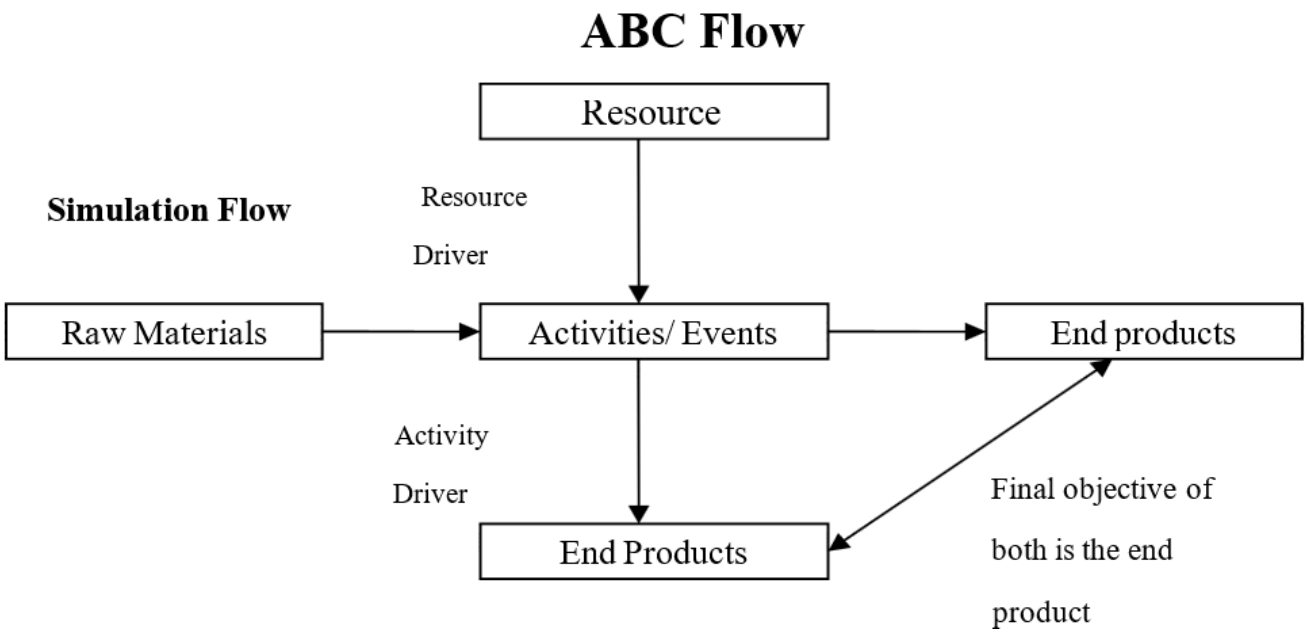

Figure: Interaction of ABC and Simulation Model Flow Adapted from Ostrenga et al (1992)

The research work has shown that the combination of ABC concepts and discrete-event simulation model may obtain the range of expected product costs.

Activity Based Life Cycle Costing: Emblemsvag Jan (2001) has introduced a new method for life cycle costing called activity based life cycle costing (LCC). The paper discusses Activity based life cycle assessment analysis method which has several major advantages and then states the steps of implementing the activity based life span model. Kaplan et al (2003) enclosed since the traditional ABC model had many limitations, time driven activity based costing model was proposed which is simple and accurate. Time driven ABC is easy and fast to implement.

METHODOLOGY

This research work is a mixed-method case study of Ugolab productions Nigeria limited. The company engages in the manufacture and marketing of pharmaceuticals and animal health products. It operates through the Pharmaceuticals Product Group and Animal Health Product Group segments. The primary data used was a recorded interview and transcribed verbatim with key personnel including: Production manager, Accountant, Quality control manager, and Process manager conducted on-site at the company's premises. The secondary data used is the company's document, report and academic literature on ABC application. Purposive sampling of key personnel with expertise in ABC application was employed. The data was analyzed using ABC calculation to determine the cost per unit of the drugs considered for production using ABC method.

RESULTS AND DISCUSSION

This section of the paper present the data analysis result.

Respondents by office designation	**Academic qualification/professional affiliation**
Production Manager	B. Pharm
Accountant	B.Sc. Accountancy/ICAN
Quality Assurance Manager	B.Sc. Microbiology
Process Manager	B.Sc. Biochemistry

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Respondent	Questions	Response to oral Interview of the key personnel
Production Manager	**Describe how ABC has improved the production process for pharm. Products?** **Challenge and limitation?**	"ABC has helped to identify the most cost effective production method for pharmaceutical products. By assigning costs to specific activities, we can see where we can optimize our process and reduce waste. Such as streamlining our equipment setup process, we could reduce production time and costs." "One challenge we faced was getting employees to track their time accurately and continuous training to ensure accurate data."
Accountant	**How does ABC help you evaluate the cost effectiveness of products?** **What method did you use to assign cost to activities?**	"ABC provides a detail picture of the costs associated with each activity in the production process. This allows us to accurately calculate the cost of goods sold and make informed decisions about product pricing." "We identify cost drivers and use time-driven ABC to assign costs to activities. We track employee time spent on each activity and multiple it by the rate."
Quality Assurance Manager	**How does ABC Impact quality control processes for pharm.products?**	"ABC helps us identify areas where quality control processes can be improved. We found out that by improving our testing processes on the products for consideration, we could reduce the number of defective products and save costs."
Process Manager	**Can you describe how ABC is used to test new products in the pharmaceutical company?**	"We use ABC to evaluate the cost effectiveness of different production methods for new & competitive products. It allows us compare the cost of different production methods and choose the most cost effective one. We also use ABC to identify areas for process improvement and optimize production time."

Based on the information obtained from the interview of key personnel in Ugolab productions Nigeria Limited, ABC is used to identify cost-effective production methods, reduce cost and optimize processes. ABC helped identify areas for quality control improvement and reducing defective product. In overall, ABC in the pharmaceutical company has led to significant improvement in the production process, cost reduction and quality control. This finding is consistent with Effiong & Akpan (2019) who examined how ABC affects industrial productivity. The findings show that the ABC technique makes the manufacturing process more efficient.

The Pharmaceutical Company is currently conducting assessment on the two analgesic drugs that are being worked on by the company. The first product is Acetaminophen while the second product is Mefenamic acid; both are used for the production of pain relievers. The detailed production costs obtained by the researchers are presented in the table 4.1.

Table 4.1 Activity cost using ABC method and product per-unit cost

product A (10,000 tablets)				
Batch (5,000 tablets) 500mg				
Activity	**Rates**	**Cost drivers**	**Activity cost**	**Activity cost/unit ₦**
	₦		₦	
Compound engineering	8,000	1 hour per formulation of 10,000 tablets	8,000	0.8
Chemical synthesis	5,000	2 hour per batch –reaction time	20,000	2

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Homogeneity	3,000	Testing per batch	6,000	0.6
Setup	10,000	1 setup per production run of 10,000 tablets	10,000	1
Tablet pressing	4,000	2 hours per batch	16,000	1.6
Coating	4,000	2 hours per batch	16,000	1.6
Quality control	7,000	1 hour of inspection per batch	14,000	1.4
Packaging	6,000	1 hour per batch	12,000	1.2
Activity cost			**102,000**	**10.2**
product B (10,000 tablets)				
Batch (5,000 tablets) 500mg				
Activity	**Rates per hour**	**Cost drivers**	**Activity cost**	**Activity cost/unit ₦**
	₦		₦	
Compound engineering	8,000	1 hour per formulation of 10,000 tablets	8,000	0.8
Chemical synthesis	5,000	2 hour per batch –reaction time	20,000	2
Homogeneity	3,000	Testing per batch	6,000	0.6
Setup	10,000	1 setup per production run of 10,000 tablets	10,000	1
Capsule filling	6,000	5 hours per batch	60,000	6
Quality control	7,000	1 hour per batch	14,000	1.4
Packaging	6,000	1 hour per batch	12,000	1.2
Activity cost			**130000**	**13**
Product per-unit cost				
	Product A	**Production unit (10,000)**	**Product B**	
	₦		₦	
Activity cost	102,000		130,000	
Direct material	150,000		320,000	
Direct labour	35,000		35,000	
Overhead cost	15,000		18,000	
Total cost	**302,000**		**503,000**	
Cost per-unit	**30.2**		**50.3**	

Based on the determination of product prices using activity based costing, the result shows that the cost of manufacturing a unit of product B is greater than that of product A. The cost per unit for product A is ₦30.2 while product B is ₦50.3.

A costing system in which more than one pool of factory overhead costs is allocated using a basis that incorporates one or more non-volume-related factors is required. Hence, ABC provide a detail picture of cost, enabling accurate calculation of the cost of goods sold because ABC focuses on the costs attached to products based on the activities carried out to produce, operate, and distribute or support the product in question.

Taking this into account, the production cost of product A varied with 20% from product B after calculations are carried out using the activity based costing method. This will help management to be able to make informed decision on the product.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Sequel to the results presented and discussion made, the following conclusions are reached. The application of ABC in the pharmaceutical company has led to significant improvement in the production process, cost reduction and quality control. ABC has enabled the company to identify cost effective production methods, optimize processes and make informed decisions about product pricing and either to choose the production of a product from the existing choices or not.

Recommendations

Based on the conclusion of this paper, the following are the recommendations made:

1. Pharmaceutical manufacturing companies should provide training and support to ensure that all employees understand the benefit and how to use the ABC system and accelerate its use in their company especially those that have advanced manufacturing technology and more than one product line.
2. Pharmaceutical manufacturing companies should establish Research and Development departments/units or collaborate with one or two higher educational institutions to provide R & D services to them (if that would be more cost effective), so that they continue to interrogate systems like ABC and others who ensure continuous improvement in the quality of their products (drugs and other pharmaceutical products).
3. Pharmaceutical manufacturing companies should implement a user-friendly and automated time-tracking system to facilitate accurate time tracking by employees.
4. The effectiveness of Activity –based costing is apparent. Further researchers should seek to investigate the factors that support the application of Activity-based system in the Nigerian pharmaceutical industry.

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