

Target Costing as a Critical Factor for Efficiency of Manufacturing Business in Plateau State, Nigeria

Sani Alfred Ilemona, Ph.D

Department of Accounting, Federal University, Kashere
Email: saniilemona@gmail.com

Nwite Sunday

Department of Business Management, Ebonyi State University, Abakaliki

ABSTRACT

The study examined the impact of target costing (TC) On the efficiency of manufacturing enterprises in Plateau State, Nigeria. Using primary sources, data for the study were obtained from responses to the questionnaire designed to reflect five (5) point Likert scale incorporating indicators of efficiency (dependent variable, PQ) and TC (explanatory variables: QoM, PrD, ProcD, and VCO) in the construct. The questionnaire was administered on 235 staff of seven (7) sampled manufacturing businesses in Jos, Plateau state with 153 of the questionnaires returned representing approximately 65% response rate. The data obtained were analyzed using ordinary least square (OLS) regression. The results indicate that all the explanatory variables combined have positive significant effect on product quality ($r^2 = 41.2\%$). However, quantity of material, product design, process design, and value chain orientation individually has positive but insignificant effect on product quality of manufacturing businesses. The study recommends that manufacturing businesses in Plateau state should implement TC with the government supporting the efforts of entrepreneurs by embarking on economic policies to tackle issues of inflation and devalued currency.

KEYWORDS: Target Costing, Operational Efficiency, Manufacturing Business, Product Quality, Product Design.

I. Introduction

In a competitive global economy, businesses in manufacturing have no choice but to produce goods that are readily acceptable to consumers anywhere in the world. Within the business of production, the quality and cost to produce (cost of inputs) and the output are key to efficiency on which the survival of any manufacturing business rotates (Gysum & Sungbum, 2018). Production efficiency is achieved when a product is created at its lowest average total cost (Bryan & Cashin, 2017). The lowest average

total cost means that a business is producing as much as possible without wasting its scarce resources (Denhall & Sporter, 2016). Efficiency is all about creating as much as a manufacturing business can with its resources while reducing the time, materials and energy put into production. It is in a bid to achieve efficiency in business that many manufacturing firms especially those in advanced economies such as China, the U.S.A, U.K. and Japan modernize their business processes, invest in

modern equipment, examine their workflow and invest heavily in preventative machines (Armington & Zeelan, 2018) manufacturing firms in these countries rely on the efficiency of their manufacturing processes to create quality products that consumers can afford. The more expensive and inefficient a manufacturing process is, the higher the cost of production with the ultimate burden borne by consumers. The result of inefficient manufacturing process whether due to outdated machines/ tools broken machines, unmotivated employees or a dysfunctional system creates problems such as higher prices and fewer sales (Currie & Cooplan, 2015). Target Costing (TC) is a managerial approach to ensure efficiency in manufacturing businesses. the essence of the approach is to determine products life cycle cost which should be sufficient to develop specified functionality and quality (Eden & Ebaiai, 2017). In the process of lifecycle determination, the target costs of a product are decomposed from product to component level. Through the decomposition, TC spreads the competitive pressure faced by the enterprises to product designers and suppliers (Carlos & Migan, 2016). Therefore, TC technique is a strategic tool for efficiency involving all members of the value such as suppliers, distributors and final consumers. Thus, Leonard and Churchill (2017) viewed TC as an efficiency tool involving a long-term relationship of mutual benefit to all members of the value chain with sharing of information on cost identification and elimination of all wastes for

efficiency.

In literature, the relationship between TC and efficiency of manufacturing enterprises has been established in developed countries such as the U.S, china, U.K and Japan. For instance, Gouilding, Colin and Goshel (2016), Dalmiski and Ashnol (2017), Mowen and Evans (2018) and Nourlu (2018) findings showed a positive and significant impact of TC on the efficiency of manufacturing businesses. However, in Plateau State, the veracity of findings has shown a mixture of the impact of TC on efficiency. For instance, while the findings of Rasheed and Olayinka (2018) indicated a significant impact of TC on the operational efficiency of manufacturing enterprises in Nigeria, particularly in Plateau State; Ollegako and Tuwen (2019) showed negative non-impact of TC on efficiency manufacturing business in the country. Based on the veracity of the findings of previous studies of the impact of TC on the efficiency of manufacturing business in Plateau State there is the need to investigate the impact of TC on the operational efficiency of manufacturing business in Nigeria.

The paper is divided into five sections as follows: Section one presents the introduction of the study section two is on literature review, section three explains the methodology used in this study, section four presents the results and section five is on the conclusion reached in this study.

2. Literature Review

In this section, relevant literature will be reviewed and synthesized.

2.1 Conceptual Review

Quality (Q) refers to conformance to specifications and standards (Harrison & Slizer, 2017). For a manufacturing business, specifications and standards are always set by management monitored by quality controllers and regulatory agencies to which a particular firm belongs. Thus, Thormri and Halttee (2017) defined q as conformance with laying down the standard for production without compromising the required quantity and quality of material needed for the desired output or product quality. Product quality (PQ) is the satisfaction derived by consumers inherent in a product (Singer & Iyed, 2016). Process Design (ProcD): It is the act of transforming an organization's vision goals and available resources into discernible and measurable means of achieving organizations to improve efficiency across business processes and maximize resources so as keep costs at a minimum. ProcD is steps that are followed by the product team for design solutions (Farah & Marrah, 2016).

Product Design (PrD): PrD is a systematic process that involves an idea, concept generation, concept development and evaluation (Scot & Tockle, 2016). The cardinal objective of PrD is to create goods with excellent functional utility at a reasonable list and delivery them to customers. For a utility to consumers' satisfaction, the product should be high quality at low cost and methods (Norman & Axena, 2017).

Value Chain Orientation (VCO): VCO is the process in which a business receives raw materials and adds value to them for quality output (Richard & Young, 2015).

The purpose of the orientation is to increase efficiency so that a company can deliver maximum value at the least possible cost. However, as significant as TC is in the operational efficiency of firms, there is a veracity of reports as to the impact of the managerial technique on the efficiency of manufacturing enterprises in Nigeria.

2.2 Empirical Review

Implementation of TC has been adjudged as the most effective mechanism in achieving production efficiency (Hamber & Bell, 2016). Studies have documented the impact of TC on manufacturing business (Goulding, Colin And Goshel, 2016; Dalmiski & Ashnol, 2017; Mowen & Evans, 2018). Their findings suggest that TC has a significant impact on the efficiency of the manufacturing business and is beneficial to all involved in the value chain of the manufacturing process. The broad benefits of TC underscore the critical nature of the managerial tool that requires the attention of managers. Corroborating these findings and the importance of the managerial technique (TC) Ghassan and Boeli (2018) viewed that TC has helped many manufacturing organizations across the globe to review their activities for cost minimization, a key objective of TC. It is in view of the cost minimization that TC implementation has become a practice in companies in both developing

and developed ones (Bovee & Malcon, 2017). Therefore, TC implementation is not unique to manufacturing firms in developing nations with contradicting results. For instance, in the UK, Gouilding, Colin and Goshel (2016) examined the impact of TC on the efficiency of manufacturing enterprises. Data collected related to the year 2015. The result of the correlative-descriptive analysis designed by the researcher indicated that TC implementation is associated with efficiency. Dalmiski and Ashnol (2017) in their study on TC implementation and impact on the efficiency of manufacturing enterprises in the U.S.A. findings suggested a significant impact of TC on the efficiency of manufacturing businesses. The finding is consistent with Mowen and Evans (2018) were in a study of the impact of TC implementation and efficiency of manufacturing firms in China found that implementation of TC has impacted significantly on the operational efficiency of the firms. However, Nourlu (2019) provided additional and specific evidence of the impact of product design on product quality as an indication of efficiency. The study examined the impact of product design on product quality. Data for the study were obtained from purposively sampled 470 manufacturing firms in Japan. Findings from analysis of the characteristic for quality design and quality output using the OLS and IV estimation model indicated a significant impact of product design (TC implementation) on output quality (A proxy for efficiency).

In a study by Rasheed and Olayinka (2018) on TC and efficiency of manufacturing firms in south-western Nigeria, the results of data obtained primarily from 10 manufacturing firms in Lagos and Ogun states descriptively analyzed found evidence of the positive impact of TC implementation on the efficiency of the firms. Ollegako and Tuwen (2019) provided a result that differs from the findings of Rasheed and Olayinka (2018). This study sought to establish a relationship between TC implementation and operational efficiency. Data for the study were obtained from randomly selected thirty (30) listed on the Nigerian stock exchange (NSE). Efficiency and TC implementation were proxied by product quality (PQ) and process design (ProcD) respectively. Self-constructed product quality (PQ) and process design (ProcD) index of the firm's Standard Organization of Nigeria (SON) mechanisms, were used for analysis. The result of panel regression analysis indicated a negative relationship between TC implementation and the efficiency of the firms. The result suggests that TC implementation has no impact on the efficiency of firms.

Apart from product design (PrD), product quality (PQ) also depends on other variables such as quality of materials (Qom) input, process design (ProcD) and value chain orientation (VCO) which are all processes of TC implantation that impact manufacturing efficiency (Singer & Iyed, 2016).

3. Methodology

The section describes the method used in carrying out the study and the procedure adopted in data collection.

Out of a population of 16 manufacturing enterprises in Jos-Plateau state, a sample of seven (7) manufacturing companies namely Nasco Packs Ltd., Ralmo Foods, Elco Tiles Ltd., Dutshe Packs Ltd., ITLM Plastics, Papco Tiles Ltd., and Becco Furnitures -was purposively selected for the study. Data for the study were obtained from primary source. Copies of questionnaire were distributed to 235 staff of the selected companies out of which 153 were returned representing 65% response rate.

The data used were primarily collected from two hundred and twenty-five (235) staff out of a population of four hundred and ten (410) staff of the selected companies. Out of 235 copies of the questionnaire administered, 153 of them were returned representing a response rate of 65%. Items on the research questionnaire were tailored in line with the assumptions of the research with respect to each of the variables selected for the study. Respondents were thus asked to respond on the extent to which they agree or disagree with each item on the survey questionnaire prepared on a five (5) point Likert scale.

The study employed Ordinary Least Square (OLS) regression to analyze the responses obtained with the questionnaire. Reliability of the data was established using Cronbach's alpha with each construct on efficiency indicators and explanatory variables of the study having a coefficient greater than 0.6. alpha coefficient greater than 0.6 is considered acceptable for the reliability of items of questionnaire construct (Nunnally, 1994 cited in Othman & Mamman, 2019).

The apriori expectation of the study was are inferred reasoning that values of explanatory variables will be greater than zero.

The model used in the study was adopted from the work of Ramdhan and Arlmer (2018), Erman and Taylor (2010), Kane and Leurd (2012) and Sawyer & Darmer (2013) that include QoM, PrD, ProcD and VCO as variables that can impact on PQ (efficiency indicator).

Therefore, the econometric equation representing the model of the study is stated as follows:

$$PQ = a + \beta_1 QoM + \beta_2 PrD + \beta_3 ProcD + \beta_4 VCO + \epsilon$$

Where:

PQ = Product Quality. QoM = Quantity Of Material

PrD = Product Design ProcD = Process Design

VCO = Value Chain Orientation

ϵ = Error Term

4. Results

In the sections, results of the study are presented and discussed as follows:

Table 1: Multiple Ordinary Least Square (OLS) Regression

Variable	Coefficient	Std. Error	T-Statistic	Prob.
C	2.038429	2.792213	0.730041	0.4839
QOM	1.000879	0.421633	0.256963	0.3215
PRD	0.125184	0.351156	0.356492	0.7297
PROCD	0.506419	0.536468	0.343988	0.3698
VCO	0.176907	0.289661	0.410738	0.5565
R-Squared	0.432415	Mean Dependent Var		18.92857
Adjusted R-Squared	0.412104	S.D. Dependent Var		20.36764
S.E. Of Regression	6.944133	Akaike Info Criterion		6.986124
Sum Squared Resid	433.9889	Schwarz Criterion		5.114359
Log-Likelihood	-43.90287	Hannan-Quinn Criteria.		6.964997
F-Statistic	25.70945	Durbin-Watson Stat		2.110463
Prob(F-Statistic)	0.000012			

Source: Computations Using E-Views Version 10

Quality of material (QoM, 1.000), product design (PrD, 0.125), process design (ProcD, 0.506) and value chain orientation (VCO, 0.176) all individually relates positively with product quality (PQ). This implies that 1% increase in QoM, PrD, ProcD and VCO will contribute up to 100%, 12.5%, 50.6% and 17.6% increase in PQ respectively. However, this effect is not significant at 5% level of significance. However, the results of the OLS regression show that the coefficient of determination (r^2) has a value of approximately 43%. This implies therefore that about

43% of variations or likely changes in PQ are jointly explained by the explanatory variables of this study. Similarly, the adjusted r^2 value of approximately 41% indicates that 41% of changes in PQ are jointly explained in the model after all necessary adjustments are taken care of. This complements the moderate explanatory power of r^2 . The value of r^2 (0.43) is an indication that the independent variables jointly contributes and have a statistically significant impact of 43% on PQ. This is evidence by the F-statistics probability (0.00) which is clearly below the 0.05

significant boundary. This implies that the result is useable for prediction. The result is consistent with the findings of studies such as Gouiding, Colin & Goshel, 2016; Dalmiski & Ashnol, 2017; Mowen & Evans, 2018; Rasheed & Olayinka, 2018; and Nourlu, 2019 that found a positive and significant impact of TC on the efficiency of manufacturing business.

The result of this study further suggests that while about 43% of the efficiency of manufacturing can be induced by an endogenous policy of TC implementation, a greater percentage of 57% of efficiency in manufacturing in the Nigerian environment is induced are explained by other factors such as inflation and purchasing power of the currency (exogenous factor). Quality of input for desired output is a function of the number of resources (financial resources) eroded by inflation and low value as the case in Nigeria (Elila & Wahab, 2018; Folu & Dickson, 2019). The statistical tool used to test the presence of autocorrelation (error) is Durbin Watson (DW) statistics. The value of 2.11 greater than the upper value of Durbin Watson (DW) at 1.883 shows the absence of autocorrelation error conforming to the adequacy/efficiency of the model as a good fit.

5. Conclusion

Implementation of the TC technique is a potent managerial tool that has enabled many manufacturing organizations around the world to attain efficiency. However, there is veracity in the finding of authors in studies conducted on the impact of the TC technique

on the efficiency of the TC technique on the efficiency of manufacturing business in Nigeria. This study investigated the impact of TC on the operational efficiency of manufacturing businesses in Nigeria. data obtained through the primary source from seven (7) purposively selected on a stratified random basis out of 16 manufacturing businesses in Jos – Plateau state was analyzed using OLS regression analysis.

The results of the analysis indicated a positive r^2 value of 43%. This suggests an impact of TC on the efficiency of the manufacturing business. the study recommends the need for manufacturing businesses in Plateau state to implement TC for efficiency in operation. In addition to this, endogenous policy of management, the government should embark on micro and macroeconomic policies that will tackle issues of inflation and the low purchasing power of Nigerian currency

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