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Target Costing and Performance of Manufacturing Industry in South-Western Nigeria

By Lawrence Imeokparia & Sanusi Adebisi
Redeemer's University, Nigeria

Abstract- This research work seeks to explore the extent of Target Costing system adoption and implementation by manufacturing industry in South-Western Nigeria and the impact on their performance. In the research work, performance was defined in terms of profitability, Return on Capital Employed and reduction in the cost of production. The study adopted the survey research method, using structured questionnaire to collect data from the sample data group which represents all manufacturing firms in South Western Nigeria listed on the Nigerian Stock Exchange as at 31st December 2013. A total of 282 firms were included in the study. Reliability test with Cronbach's Alpha of 0.88 was obtained using the ordinary least square and t-test methods. The results showed that the level of adoption and application of target costing by manufacturing industry in South Western Nigeria is low. However, the findings also showed that there is a strong positive relationship between adoption of Target costing and of improvement in Return on Investment and reduction of cost.

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Target Costing and Performance of Manufacturing Industry in South-Western Nigeria

Lawrence Imeokparia^α & Sanusi Adebisi^ο

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Keywords: target costing, competition, performance and profitability.

I. INTRODUCTION

The changes in the business environment in Nigeria occasioned by merger, acquisition and consolidation of many businesses within the manufacturing industry have brought about changes in the scope and size of many firms. Most large manufacturing firms in Nigeria benefit from economies of scale and therefore are able to charge lower prices. However, according to Ellram (2000), Lockamy & Smith (2000), and Shank & Fisher (1999), target costing may serve as a solution when developing new products, minimizing costs through optimal use of all resources along with entire supply chain. Ahmed, Cullen & Dunlop (1997) argue that the aim of target costing is to look at all possible ideas of cost reduction when designing a new product. In the same vein, Pierce (2002) states that the target costing process require a comprehensive information system and cross functional involvement.

II. OBJECTIVES OF THE STUDY

The objective of this research work is primarily to determine the level of the adoption and

Author α σ: Department of Financial Studies, Redeemer's University Km 46/48, Lagos-Ibadan Expressway Redemption City, Ogun State. e-mails: lmeolaw2@gmail.com, lmeokparial@run.edu.ng, sanusia@run.edu.ng

implementation of target costing by manufacturing industries in South-Western Nigeria. Therefore, the study will also determine the impact of target costing on the overall performance of the manufacturing industry in South-Western Nigeria in terms of Return on Capital Employed, Profitability and cost reduction.

III. DEVELOPMENT OF THE HYPOTHESIS

The following hypotheses will be tested:

Hypothesis 1:

Target costing systems have not been significantly adopted by manufacturing companies in South Western Nigeria.

Hypothesis 2:

There is no significant relationship between the adoption and application of target costing and cost reductions by manufacturing companies in South-Western Nigeria.

Hypothesis 3:

There is no significant association between the extent of the adoption of target costing and improvement of financial performance by manufacturing companies in South-Western Nigeria.

IV. REVIEW OF LITERATURE

This paper adds to the literature on what target costing is- theoretical definitions offer diverging views as to whether it is a tool, or somewhat a process. The eclectic review was also related to the reasons for, the process and the goals of target costing. The concepts of value engineering and management accounting were also given an analogous relation to the concept. Extant literatures were also reviewed.

Target costing is a cost management tool for minimizing the general cost of a product over its product life cycle (Jalaei, 2012). It is basically a product development process that manipulates equations and develops costs based on prices, and then works backward to design the product and then the production process (Fridh & Borgernas, 2003). A distinguishing factor between the above definitions is that the former defines target costing as a tool, while the latter harangued the concept as a process. Hamada & Monden (1991) saw it as a dual process of planning a product that meets the customer's needs which

establishes the target cost through the sales price and profit margin and also of achieving target cost by using value engineering and an assessment of such targeted costs with achieved costs; this is done by setting sets the target cost by subtracting the target profit margin from the target price and firm determines the target selling price at which a product can be sold in the marketplace (Kaur, 2014). Costs should be should conducted to a point in which the cost does not surpass the predetermined sales price and the lowest amount possible of expected profit (Sarokolaei & Rahimipoor, 2013).

This research defines Target costing as essentially a cost management technique which minimizes cost based on the difference between the selling price and target profit margin of a product in order to be in a better competitive position in the marketplace. The framework is based on the ever-sporadic and competitive Nigerian business environment; fundamentally, the manufacturing sector.

The Nigerian business environment is highly unpredictable, erratic and impulsive; this calls for a rational technique to be used by the management accountant. Target costing serves as one of the strategic cost management approaches better suited to brace a company's competitiveness in meeting the erratic nature of today's business and the challenges that follow (Bonzemba & Okano, 1998); it is one of the main tools to assisting manufacturers to be globally competitive (Kumar, 2014); this is because in this price-based target costing, a firm sets a target cost through comparison of various competitive products ((Helms, Ettkin, Baxter, & Gordon, 2005). Target costing is concerned with simultaneously achieving a target cost alongside the planning, development and detailed design of new products (Tani, 1995). It is for these reasons that the effects of target costing in a competitive business environment cannot be over-emphasized, as it combines the basic management accounting techniques with the functioning knowledge of management about the business environment.

Mathematically, target cost can be described as Target Price – Target Profit. Target costing starts with the examination of a target profit (Okano, 2005). Extant literatures, however, starts the process with determination of a competitive product (eg. Hamada & Monden, 199; Ax, Greeve & Nilsson, 2008). Other contemporaneous literatures envisage planning as the proper start of the process; Tani (1995) needs mentioning.

Extant literatures have however taken different manners to explicate the process of this costing method. Kaur (2014) opined target costing as consisting two major phases which he called the establishment phase and implementation phases. Jalae (2012) perceived the process as directed by the marketplace by first setting a selling price, then subtracting target

income and finally reaching a cost. Ax et al. (2008) further stated that the target cost is then decomposed in order to assign cost targets internally and to suppliers. The degree of influence over suppliers was seen as one of the major factors affecting the structure of target costing (Fridh & Borgernas, 2003); they were of the view that early involvement of such suppliers may result in reduction of time to the market.

There have been diverse goals of target costing highlighted in extant literatures. This literature encapsulates the major objective of target costing as to reduce the cost of production of a product which invariably enhances the profit of such product. Target costing exploits costing information and aims at on the best possible price up front and prevents wasted time on discussions concerning design and re-engineering of the product (Jalae, 2012). Kaur (2014) saw target costing as a major strategic tool on the face of intense competition in the marketplace. Kumar (2014) also viewed target costing as a strong weapon for competition. The goals aforementioned postulated for this literature also has its relevance in situating the business in the competitive market place; Ax et al. (2012) needs mentioning.

a) Empirical Framework

Fridh & Borgenas (2003) studied the use of target costing on Swedish manufacturing firms. 91 companies answered out of 250 selected companies through random sampling. Primary data was used consisting of the results from the survey. The survey was afterwards published on a website which comprised of 277 multiple choice questions, mostly multiple-choice. The total population of the study consisted of companies with 50 or more employees in the Swedish manufacturing industry, which resulted in 664 companies. The results after the analysis showed that 16.5 % of manufacturing firms in Sweden use target costs and such companies using it are larger companies having a differentiation strategy and which operates in highly competitive environments. This assertion goes in line with one of the goals listed above (eg. Ax et al, 2012; Kaur, 2014; Kumar, 2014).

In studying the obstacles of applying a target costing system in firms, Sarokolaei & Rahimipoor (2013) used the research survey method, while adopting T-Student technique in regression test and coefficient correlation to study the type of relationship between the variables with correlation coefficient used to identify the toughness of correlation and the identification coefficient to determine the volatility of the dependent variable. The findings indicated the obstacles of adopting target costing to include the impracticability to assign a competitive price, rareness of the costumers' satisfaction idea, lack of group work spirit, and the non-utilization of the target costing system and value engineering. It was then concluded that companies

would not have any tendencies to use target costing until when the country (Tehran) benefits from a monopoly market. It was also affirmed that such companies will use this system only in competitive conditions in which they can continue their survival.

The eclectic analysis of Wu, Huang & Brown (2013) investigated the role of strategic management accounting in target costing in real-estate investment industry. The didactic literature review made a proposition that in real-estate investment industry, target costing focuses on market orientation/price dynamics together with cost management while giving an encapsulated view of its goals, and general and business circumstance of its implementation. They used the case study method and the interview-based evidences from the research revealed that creating added value to increase prices was combined together with cost management in order to achieve expected profit margins and that the strategy of product price increase in this industry was not only at the level of a whole of construction batch, but also at diverse products caused by the features of products within a batch. It was concluded that value creation for increased product price and cost management to meet the customers' needs in a monopoly competition market might provide ways to support the competitive techniques adopted by companies.

V. METHODOLOGY

In this study, the research instrument used is the cross sectional survey and explanatory method. The cross sectional survey is considered because it allows for the collection of quantitative data which can be analysed quantitatively using descriptive and inferential statistics.

The population for this study consists of 958 manufacturing companies listed in the Stock Exchange Fact book 2011 and registered with Manufacturers' Association of Nigeria as at December 2011 located in South-Western Nigeria. The minimum population size was calculated using Yaro-Yamani Formula.

$$n = \frac{N}{1 + N (e)^2}$$

Where,

n = sample size

N = Population of the study

e = Tolerable error (5%).

The minimum sample size therefore is:

$$n = \frac{958}{1 + 958(0.05)^2}$$

$$= \frac{958}{1 + 2.395}$$

$$= \frac{958}{3.395}$$

$$= 282.2$$

282 companies

VI. TEST OF HYPOTHESIS

Hypothesis One:

Target costing systems have not been significantly adopted by manufacturing companies in South Western Nigeria.

Table 1 : Result of regression test from hypothesis one

Model Summary			
Model R	R Square	Adjusted R Square	Std. Error of the Estimate
.319a	.102	-.198	1.73043

a. Predictors: (Constant), Companies response

Table 2 : ANOVAb

Model R	Sum of Squares	Df	Mean Square	F	Sig.
Regression	1.017	1	1.017	.340	.601a
Residual 8.983		3	2.994		
Total	10.000	4			

b. Predictors: (Constant), Companies response

c. Dependent Variable: Levels of adoption

Table 3 : Coefficientsa

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
B	Std. Error	Beta			
1	(Constant)	3.614	1.308	2.764	.070
	Companies response	-.011 .018	-.319	-.583	.601

a. Dependent Variable: Level of adoption

Interpretation of Parameter Values

Test of Significance

Probability value is the most efficient test of significance. If probability value is greater than 0.05(p>0.05), then it is insignificant. The decision is to reject H1 and not to reject Ho. On the other hand if probability value is less than 0.05 (p<0.05), this shows significance. The decision is to reject Ho and not reject H1

From the result,TC adoption probability is 0.601 which is far greater than 0.05. The decision therefore is to accept Ho.

Coefficient of Correlation (R).

This is the measure of the goodness of fit of the regression estimate. The correlation coefficient, R, ranges from -1 to +1 It tells us if there is a relationship between the two variables in the first place. The father R is from zero, there is more probability that there is a relationship so the closer R is to -1 then there is more proof that the relationship is an inverse one and the closer to 1 implies a positive relationship between the variables. The result shows that the value of R is .319 therefore there is a low insignificant positive impact between organisational factors and the adoption and implementation by manufacturing companies in Ogun and Lagos states, Nigeria.

Coefficient of determination (R squared)

R squared is the coefficient of determination. The adjusted r squared is also a coefficient of

determination but it is a better value as it accounts for the degree of freedom and as such will be adopted for purpose of interpretation. The R-squared value of .102 shows that there is 10.2% level degree of adoption rate of target costing. The degree of determination is very low while the adjusted R-squared further buttressed the point with a negative value of about 19.8%

Hypothesis Two:

There is no significant relationship between the adoption and application of target costing and cost reductions by manufacturing companies in South-Western Nigeria.

The equation above establishes the linear relationship between the estimation commands as generated by spss. The estimation equation states that CR is linearly related to Adoption of target costing. C (1) is the constant that is the value of cost that can be reduced if target costing is not adopted or considered at all. C (2) is the slope, it gives the value of CR when target costing increases. The slope measures the rate of change in CR for a unit change in TC. Allowing for the influence of all other variables affecting CR in a stochastic variable u, the equation becomes $CR = C (1) + C (2)*TC + u$

Where u represents the random error term or simply the error term. Here u represents all those factors (asides Adoption of target costing) that affect CR (reduction in cost) but are not explicitly introduced in the model, as well as purely random forces.

Table 4 : Result of regression test from hypothesis two Model Summary

Model R	R Square	Adjusted R Square	Std. Error of the Estimate
.823a	.677	.675	.77743

a. Predictors: (Constant), TC

Table 5 : ANOVAb

Model	R	Sum of Squares	Df	Mean Square	F	Sig.
Regression		328.688	1	328.688		543.824.000a
Residual		157.144	260	.604		
Total		485.832	261			

a. Predictors: (Constant), TC

b. Dependent Variable: COST REDUCTION

Table 6 : Coefficientsa

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
	(Constant)	1.979	.085	23.240	.000	
	TC	.622	.027	23.320	.000	

a. Dependent Variable: COST REDUCTION

Table 7 : Result of Pearson correlation test from hypothesis two Correlations

	TC	COST REDUCTION	
TC	Pearson Correlation	1	.823**
	Sig. (2-tailed)		.000
	N	262	262
COST REDUCTION	Pearson Correlation	.823**	1
	Sig. (2-tailed)	.000	
	N	262	262

** Correlation is significant at the 0.01 level (2-tailed).

$$CR = F(TC) + u$$

$$CR = C(1) + C(2) * TC + u$$

$$CR = 1.979 + .622TC + u$$

$$R = 0.823 \quad R\text{-Square } (R^2) = 0.677 \quad \text{Adjusted } R\text{-Square } (R^2) = 0.675$$

$$SE = .085 \quad .027$$

$$T\text{- Statistics: } 23.240 \quad 23.320$$

$$Prob(T\text{- Statistics}): .000 \quad .000$$

Interpretation of Parameter Values

Test of Significance in t test and F Statistics

Probability value is the most efficient test of significance. If probability value is greater than 0.05 (p > 0.05), then it is insignificant. The decision is to reject H1 and not to reject Ho. On the other hand if probability value is less than 0.05 (p < 0.05), this shows significance. The decision is to reject Ho and not reject H1.

From the result, CR probability is 0.00 which is less than 0.05. The decision therefore is shows a strong evidence of H1.

Coefficient of Correlation (R).

This is the measure of the goodness of fit of the regression estimate. The correlation coefficient, R, ranges from -1 to +1 It tells us if there is a relationship between the two variables in the first place. The father R is from zero, there is more probability that there is a relationship so the closer R is to -1 then there is more proof that the relationship is an inverse one and the closer to 1 implies a positive relationship between the variables. The result shows that the value of R is 0.823 therefore there is a significant positive relationship between the adoption and application of target costing

system and reduction in the cost of manufactured products of manufacturing companies in Ogun and Lagos states Nigeria.

Coefficient of determination (R squared)

R squared is the coefficient of determination. The adjusted r squared is also a coefficient of determination but it is a better value as it accounts for the degree of freedom and as such will be adopted for purpose of interpretation. The R-squared value of 0.677 shows that there is a 68% level degree of relationship between the activities based costing adoption and reduction in cost of manufacturing company. The degree of determination is high while the Adjusted R-squared even shows it at the same percentage of about 68%. This means that a variation or change in the dependent variable (TC) in response to a positive change in the independent variable is to the tune of Sixty eight (68%) i.e. 0.675

Hypothesis Three:

There is no significant association between the extent of the adoption of target costing and improvement of financial performance by manufacturing companies in South-Western Nigeria.

$$IFP = F(TC)$$

The equation above establishes the linear relationship between the estimation commands (TC and IFP) as generated by SPSS. The estimation equation states that IFP is linearly related to Adoption of target costing. C (1) is the constant that is the value of cost improved financial Performance if target costing is not adopted or considered at all. C (2) is the slope; it gives the value of IFP when TC increases. The slope measures the rate of change in IFP for a unit change in TC. Allowing for the influence of all other variables

affecting IFP in a stochastic variable u, the equation becomes

$$IFP = C (1) + C (2)*TC + u$$

Where u represents the random error term or simply the error term. Here u represents all those factors (asides Adoption of target costing) that affect IFP (Improved Financial Performance) but are not explicitly introduced in the model, as well as purely random forces.

Table 8 : Result of regression test from hypothesis three Model Summary

Model R	R Square	Adjusted R Square	Std. Error of the Estimate
.917a	.841	.841	.76240

a. Predictors: (Constant), TC

Table 9 : ANOVAb

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	801.592	1	801.592	1379.079	.000a
Residual	151.125	260	.581		
Total	952.718	261			

a. Predictors: (Constant), TC

b. Dependent Variable: Financial Performance

Table 10 : Coefficientsa

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	-1.163		.083	-13.933	.000
TC	.971	.026	.917	37.136	.000

a. Dependent Variable: Financial Performance

Table 11 : Result of Pearson correlation test from hypothesis three Correlations

	TC	Financial Performance
TC	Pearson Correlation	1
	Sig. (2-tailed)	.000
	N	262
Financial Performance	Pearson Correlation	.917** 1
	Sig. (2-tailed)	.000
	N	262

** . Correlation is significant at the 0.01 level (2-tailed).

IFP =	F (TC) + u	SE =	.083	.026
IFP =	C (1) + C (2)*TC + u	T- Statistics:	(13.933)	37.136
IFP =	(1.163) + .971TC + u	Prob(T- Statistics):	.000	.000
R = 0.917	R-Square (R2) = 0.841	Adjusted R-Square (R2) = 0.841		

Interpretation of Parameter Values

Test of Significance in t test and F Statistics

Probability value is the most efficient test of significance. If probability value is greater than 0.05 ($p > 0.05$), then it is insignificant. The decision is to reject H1 and not to reject Ho. On the other hand if probability value is less than 0.05 ($p < 0.05$), this shows significance. The decision is to reject Ho and not reject H1.

From the result, CR probability is 0.00 which is less than 0.05. The decision therefore is shows a strong evidence of H1.

Coefficient of Correlation (R).

This is the measure of the goodness of fit of the regression estimate. The correlation coefficient, R, ranges from -1 to +1 It tells us if there is a relationship between the two variables in the first place. The father R is from zero, there is more probability that there is a relationship so the closer R is to -1 then there is more proof that the relationship is an inverse one and the closer to 1 implies a positive relationship between the variables. The result shows that the value of R is 0.917 therefore there is a significant positive relationship between the adoption and application of target costing system and relative improvement in financial performance of manufactured products of manufacturing companies in the south – western Nigeria.

Coefficient of determination (R squared)

R squared is the coefficient of determination. The adjusted r squared is also a coefficient of determination but it is a better value as it accounts for the degree of freedom and as such will be adopted for purpose of interpretation. The R-squared value of 0.841 shows that there is a 84% level degree of relationship between the target costing adoption and relative improvement in financial performance of manufacturing company. The degree of determination is high while the Adjusted R-squared even shows it at the same percentage of about 84%. This means that a variation or change in the dependent variable (TC) in response to a positive change in the independent variable is to the tune of Eighty four (84%) i.e. 0.841.

VII. CONCLUSION

The result of hypothesis 1 shows that there is a significant level of adoption of Target costing by manufacturing industry in Lagos and Ogun States; although the level of adoption appears to be less than that of the majority of the country surveyed in the developed countries but comparable to that of Japan and South Africa. The result of Hypothesis 2 shows that the r2 value of 0.677 and p value of 0.000 indicates a positive relationship between the adoption and

implementation of target costing systems and the reduction of cost of production by manufacturing companies in South Western Nigeria. The result of hypothesis 3 shows that there is a significant association between the extent of the adoption of target costing and improvement of financial performance by manufacturing companies in South-Western Nigeria with r2 value of 0.917 and p value 0.000

The barrier to the implementation of target costing in this part of the continent is an area which deserves further study.

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