

## Interaction Effect of Total Quality Management and Performance Management on Competitive Advantage of Manufacturing Industries in Nigeria: Evidence from Quoted Companies in Nigeria.

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### Abstract

*a firm's competitive advantage is defined as the way in which it creates value for its customers which allows it to establish and sustain a defensive position in its product market. The specific objectives are to examine whether there is a positive influence of product quality on goal, feedback and profit growth of manufacturing industries in Nigeria. To examine whether process quality has an effect on goal, feedback and profit growth of manufacturing industries in Nigeria. Hypotheses were tested using SPSS version 23, among the findings were that process quality and product quality gives a significant effect on the competitive advantage of manufacturing industries in Nigeria. We recommend that emphasizes should be more on quality than on quantity.*

**Keywords:** *process quality, Product quality, competitive advantage, manufacturing industries.*

### Introduction

Prior research (Maiga 2008; Callahan and Lasry 2004, Dunk, 2007) have viewed total quality management and performance management as a means of achieving competitive advantage in manufacturing industries today. A critical factor reportedly behind product quality initiatives undertaken by many organizations has been the increasingly global nature of competition (Maiga, 2008, Callahan and Lasry 2004).the quality of goods and services is a powerful strategic tool to firm competitiveness and customer satisfaction. This has been of concern to management accounting literature. (Daniel et al. 1995, Flynn et al. 1995; Foster and Sjoblom 1996). Total quality management (TQM) perception by consumers is a determinant of a companies' performance featured ( Malmi et al. 2004; Foster and Sjoblom 1996, Shank and Govindarajan 1994; Anderson and Sedatole 1998 ). TQM is critical in creating a product or providing services that can meet or exceed consumers/customers expectation (Smith and Wright, 2004). Customer's specification and feedback should be taken into consideration in order to produce quality product. Incentives given to workers aid process quality that will transcend to management goal actualization and profit growth.(Flynn et al. 1994; Lynch 1999; Porter and van der Linde 1995; Nadia 2001; Wagner 2005). Azzone and Bertele (1994) indicated that process quality leads to product quality and these environmental attributes are a critical factor in the buying behavior of consumers. A firm's competitive advantage is defined as the way in which it creates value for its customers which allows it to establish and sustain a defensive position in its product market (Dunk,2007). In Nigeria, the emphasis is more on quantity than quality for some customers while others prefer quality as against quantity. The decline in economic condition in the country is assumed to be the reason behind customer's choice. This has led management to produce goods to suit the market, remain going concern and achieve profit growth. Employees on the other hand, are not motivated enough in the production process and are not given enough incentive to meet production target, increase inventory turnover and reach their goals. The production target set by management demotivates production staff in the stages of process quality. It is believed that industries only get feedback on product quality to maintain their existence in business as well as profit growth. As such, total quality management is not considered in high proportion. Few studies have been done on total quality management and performance management in Nigeria and most studies done in other countries were done in the 90s and few in the 20<sup>th</sup> century. It is in the light of these problems that the researchers seeks to empirically analyse the interaction effect of total quality management and performance management on the competitive advantage of manufacturing industries in Nigeria. The specific objectives are to examine whether there is a positive influence of product quality on goal, feedback and profit growth of manufacturing industries in Nigeria. To examine whether process quality has an effect on goal, feedback and profit growth of manufacturing industries in Nigeria. The following hypothesis will be tested; **H0<sub>1</sub>**: there is a positive influence of product

quality on goal, feedback and profit growth of manufacturing industries in Nigeria. **H<sub>0</sub><sub>2</sub>**: there is a positive effect of process quality on goal, feedback and profit growth of manufacturing industries in Nigeria.

## **2. Literature Review**

According to (Ahire and Dreyfus, 2000) Product quality Performance consists of an internal quality and external quality, the quality of the product/service depends on the variables that influence it. Process quality management has components that can affect the performance of the quality of products, among others, identifying the essential elements in the process. In this case it can be said that the process quality management is a series of processes in producing a quality product. According to Maiga (2008) the results of previous studies that claimed different results, the process quality management does not affect products quality performance, due to the lack of involvement of management accounting systems in the link between process quality management and product quality performance. Maiga research (2008) resulted in a conclusion that the management accounting system and process quality management signifies positive interaction effects on product quality performance, except for quality incentives does not affects the external quality. However, research related to management accounting system which addresses the relationship between process quality management with the quality of the product is still lacking. Management accounting system is often regarded as an important tool to provide information for decision makers, create and develop some kind of coaching in the company (Axelsson et al. 2002). This means that the management accounting system plays an important role in organizations and organizational behavior at large. Wruck and Jensen (1994) suggest to employees that will achieve quality performance products, such as management accounting system goals, feedback, and incentives should be used as a mechanism to motivate and influence behavior in getting the maximum welfare for both the organization and employees. Therefore, employees should know what they are doing (feedback for learning) and they should know what they should be doing (goal directing information), and they should get a prize/reward for what they have achieved (Baker, 1988). Thus, management accounting is a very valuable tool for decision making and control in general. So, it is clear that the interactive effect between process quality management and management accounting systems on the quality of the product can be justified. Maiga and Jacob (2005) stated that the control system will affect the direction and level of effort shown by individuals or groups. It is expected to improve the performance quality of the product. Management accounting system has three functions of management, including planner, coordinator, and controller. Maiga (2008) states that there are three components in the control of management accounting systems, namely quality of goals, quality of feedback, and quality-related incentives that are expected to create the conditions that can motivate employees to achieve outcomes

### **Management Accounting System**

Anthony and Govindarajan (2009) as cited in Dunk,(2007) says that a system is a certain way to carry out an activity or series. The system used by management to control the activities of an organization called the management control system. Management control is the process in which a manager influences other members of the organization to implement the organization's strategy. Management control is facilitated by a formal system which is a repeated cycle of activity. Management Control System includes financial and nonfinancial performance measures. Atkinson et al. (2012) said "A Management Accounting and Control Systems (MACS) generates and uses information that helps decision makers assess whether an organization is achieving its objectives. The term control in management accounting and control refers to the set of procedures, tools, performance measures, systems, and incentives that organizations use to guide and motivate all employees to achieve organizational objectives. A system is in control if it is on the path to achieving its strategic objectives, and deemed out of control otherwise."

There are three components of the control of management accounting systems, namely  
1. quality goals,

2. quality of feedback, and

3. quality incentives (Maiga, 2008).

### **Process Quality Management and Product Quality Performance.**

Process quality management is the process of tracking and improve the quality of the production process (Ahire and Dreyfus, 2000). Two measurements of quality products used in this study are internal and external quality. Internal quality is the quality of the finished product is assessed before being shipped and according to the quality process/quality associated process (Reeves and Bednar, 1994; Ahire and Dreyfus, 2000). External quality is the quality of the finished product from the customer point of view (Ahire and Dreyfus, 2000).

### **Theory of Process Quality Management**

Ahire (1996) says that the process quality management is one of the functions of the Total Quality Management (TQM). Process quality management is also a series of processes to produce high quality products. Excess organizations that have implemented a process quality management is able to develop the concept of quality with a comprehensive approach (holistic). In the concept of Total Quality Management, customers not just as a buyer but are intended as a further process that specify requirements and expects satisfaction. TQM emphasizes the operational aspects and social behavior on quality improvement. In TQM, there are five main programs are interrelated , namely

- 1). Focus on the customer,
- 2). Continuous improvement,
- 3). The development of the system,
- 4). Full participation, and
- 5). Performance measurement

### **Theory of Product Quality Performance**

Hall (2007) said that two basic reasons why the quality is important for manufacturers worldwide. First, poor quality and very expensive for the company. Secondly, the quality is world-class manufacturer of basic competition. Quality is no longer a charge neutralizer. Customers want quality and are looking for quality products at the lowest price. One way companies can increase quality is to place control points along the production process for identifying operations that are "out of control" when the operation occurred. The alternative is the final quality

control procedures that traditional process. In this approach, the product will be studied after completion. Horngren (2012) stated that "Performance evaluation systems provide top management with a framework for maintaining control over the entire organization once it is decentralized. Such management systems should help promote goal congruence, provide a tool for communications, motivate unit managers, provide feedback, and allow for benchmarking". These measures should not revolve around just financial performance measures, however. Production efficiency (number of units produced per hour) and product quality (defect rate) also affect the price charged to the customer. To remain competitive, companies must be at least as good as the industry leader at those internal operations that are essential to their business. The balanced scorecard performance is one company may use a tool to not only measure how well the company is meeting its strategic goals, but also to identify areas where the company may improve overall performance. Continuous improvement is the goal. Each area in which the company makes improvements in efficiency and effectiveness, no matter how small. Often this translates into learner, more efficient and more profitable companies". Thus it can be said that quality

from the perspective of the consumer/customer (external quality) is a reference/standard availability, characteristic, maintainability, reliability, and performance can be measured.

**Empirical Studies**

Gamble et al. (1996) in their work Environmental Disclosures in Annual Reports: An International Perspective, reported that international action on environmental issues has influenced firms to consider the manufacture and marketing of products from an environmentally sensitive perspective. Christmann (2004) studied Multinational Companies and the Natural Environment: Determinants of Global Environmental Policy Standardization. Reported that as public concerns about environmental issues rise, customers increasingly consider environmental factors in their purchasing decisions. Vandermerwe and Oliff (1990) studied Customers Drive Corporations Green, their Research suggests that one significant factor in product development is identifying user needs and incorporating them into product design. Callahan and Lasry (2004) in their work, the Importance of Customer Input in the Development of Very New Products, reviewed that Customers expect products to be free of harmful materials, and evidence indicates that consumers are prepared to pay more for them. Thus, customers prefer quality to quantity.

**3. Methodology**

The structural framework of this study is based on survey design (Asika 2006). Questionnaires were administered to the respondents from Anino international Plc, Berger paints, BOC gases Nigeria Plc, Cutix Plc, Liz-Olofin and company Plc, Nigerian Enamelware company Plc, Nigeria bag manufacturing company Plc, Nigeria Lamp industrial Plc, Rokana industrial Plc, Vitafoam Nigeria Plc, and Vono products Plc. To ensure that all manufacturing industries quoted in the Nigerian stock exchange as at 2<sup>nd</sup> June, 2016 are covered, these companies were selected. A total number of 329 questionnaires calculated using the Taro Yamen formula for Sample size were distributed through Emails, DHL and personal contact. The research instrument contains 18 questions against which the respondents were asked to indicate their level of agreement upon a five point Likert scale (where 5 = strongly agree, 4 = agree, 3 = undecided, 2 = disagree and 1 = strongly disagree). The respondents of this questionnaire are the Production directors, head of production, production managers, production supervisors, capacity managers and production staff of the industries under study. Each question number is subsequently referred to as S1-S18. 294 questionnaires were responded to and returned. Selected questions in the questionnaires which are closely related to the purpose of the study are tabulated and analysed.

**Model specification:**

<b>Model</b>	<b>specification</b>
CAM = (PFG, GOL, FBK) -----	1
PCQ <sub>t</sub> = a <sub>0t</sub> + b <sub>1</sub> + PFG <sub>t</sub> , b <sub>2</sub> + GOL <sub>t</sub> , + b <sub>3</sub> + FBK <sub>t</sub> + ε <sub>t</sub> -----	2
PCQ! <sub>t</sub> = a <sub>0t</sub> + b <sub>1</sub> PFG <sub>t</sub> *GOL <sub>t</sub> + b <sub>2</sub> FBK <sub>t</sub> *PFG <sub>t</sub> + ε <sub>t</sub> -----	3
CAM = (PFG, GOL, FBK) -----	1
PDQ <sub>t</sub> = a <sub>0t</sub> + b <sub>1</sub> + PFG <sub>t</sub> , b <sub>2</sub> + GOL <sub>t</sub> , + b <sub>3</sub> + FBK <sub>t</sub> + ε <sub>t</sub> -----	2
PDQ! <sub>t</sub> = a <sub>0t</sub> + b <sub>1</sub> PFG <sub>t</sub> *GOL <sub>t</sub> + b <sub>2</sub> FBK <sub>t</sub> *PFG <sub>t</sub> + ε <sub>t</sub> -----	3

Where;

CAM: Competitive advantage of manufacturing companies in Nigeria is represented by; PFG<sub>t</sub>: Profit growth **í** in year **t**.

GOL<sub>t</sub>: Goal **í** in year **t**.

FBK<sub>t</sub>: Feedback **í** in year **t**.

PCQ<sub>t</sub>: Process quality **í** in year **t**.

PDQ<sub>t</sub>: Product quality **í** in year **t**.

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8 =$  coefficients  
 $\epsilon_i$  = error terms.

The model is expected to be  $\beta_0 > 0; \beta_1 > 0, \beta_2 > 0; \beta_3 > 0, \beta_4 > 0, \beta_5 > 0, \beta_6 > 0, \beta_7 > 0, \beta_8 > 0$ . Simple regression technique, ordinary least square (OLS) was used for data estimation and analysis. In the course of analysis, correlation coefficient analysis, pooled regression analysis and other diagnostic test were conducted. These were done with the aid of Statistical package for social sciences (SPSS) 23 software.

**TEST OF HYPOTHESIS ONE**

**REGRESSION**

```

/DESCRIPTIVES MEAN STDDEV CORR SIG N
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/STATISTICS COEFF OUTS R ANOVA
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT PCD
/METHOD=ENTER PFG GOL FBK
/RESIDUALS DURBIN
/CASEWISE PLOT(ZRESID) OUTLIERS(3).
    
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**Regression**

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**Descriptive Statistics**

	Mean	Std. Deviation	N
PCD	167.2000	130.49406	5
PFG	117.6000	77.64213	5
GOL	121.0000	108.27049	5
FBK	117.4000	92.24316	5

**Correlations**

		PCD	PFG	GOL	FBK
Pearson Correlation	PCD	1.000	.986	.991	.995
	PFG	.986	1.000	.995	.965
	GOL	.991	.995	1.000	.977
	FBK	.995	.965	.977	1.000
Sig. (1-tailed)	PCD	.	.001	.000	.000
	PFG	.001	.	.000	.004
	GOL	.000	.000	.	.002
	FBK	.000	.004	.002	.
N	PCD	5	5	5	5
	PFG	5	5	5	5
	GOL	5	5	5	5
	FBK	5	5	5	5

**Variables Entered/Removed<sup>a</sup>**

Model	Variables Entered	Variables Removed	Method
1	FBK, PFG, GOL <sup>b</sup>	.	Enter

a. Dependent Variable: PCD

b. All requested variables entered.

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate	Durbin-Watson
1	1.000 <sup>a</sup>	.999	.997		7.22629	1.426

a. Predictors: (Constant), FBK, PFG, GOL

b. Dependent Variable: PCD

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68062.581	3	22687.527	434.466	.035 <sup>b</sup>
	Residual	52.219	1	52.219		
	Total	68114.800	4			

a. Dependent Variable: PCD

b. Predictors: (Constant), FBK, PFG, GOL

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.061	16.747		-.601	.656
	PFG	.572	.470	.341	1.218	.438
	GOL	.051	.412	.042	.124	.922
	FBK	.884	.191	.625	4.635	.135

a. Dependent Variable: PCD

**Residuals Statistics<sup>a</sup>**

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	62.3549	359.0343	167.2000	130.44403	5
Residual	-5.32243	4.64508	.00000	3.61315	5
Std. Predicted Value	-.804	1.471	.000	1.000	5
Std. Residual	-.737	.643	.000	.500	5

a. Dependent Variable: PCD

The coefficient of determination at 1.000 and .999 shows that there is a perfect relationship between the variables.  $R^2$  at .999 indicates that the model is perfectly fitted, process quality (PCQ) being the independent variable and profit growth, goal and feedback being the dependent variable and Durbin Watson give a high figure at 1.43.

**TEST OF HYPOTHESIS TWO**

**REGRESSION**

```

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/STATISTICS COEFF OUTS R ANOVA
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/DEPENDENT PDQ
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**Regression**

**Notes**

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	Cases Used	Statistics are based on cases with no missing values for any variable used.
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**Descriptive Statistics**

	Mean	Std. Deviation	N
PDQ	112.8000	58.77670	5
PFG	117.6000	77.64213	5
GOL	121.0000	108.27049	5
FBK	117.4000	92.24316	5



**Correlations**

		PDQ	PFG	GOL	FBK
Pearson Correlation	PDQ	1.000	.996	.998	.967
	PFG	.996	1.000	.995	.965
	GOL	.998	.995	1.000	.977
	FBK	.967	.965	.977	1.000
Sig. (1-tailed)	PDQ	.	.000	.000	.004
	PFG	.000	.	.000	.004
	GOL	.000	.000	.	.002
	FBK	.004	.004	.002	.
N	PDQ	5	5	5	5
	PFG	5	5	5	5
	GOL	5	5	5	5
	FBK	5	5	5	5

**Variables Entered/Removed<sup>a</sup>**

Model	Variables Entered	Variables Removed	Method
1	FBK, PFG, GOL <sup>b</sup>	.	Enter

a. Dependent Variable: PDQ

b. All requested variables entered.

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.999 <sup>a</sup>	.998	.992	5.39899	1.426

a. Predictors: (Constant), FBK, PFG, GOL

b. Dependent Variable: PDQ

**ANOVA<sup>a</sup>**

Model		Sum Squares	df	Mean Square	F	Sig.
1	Regression	13789.651	3	4596.550	157.691	.058 <sup>b</sup>
	Residual	29.149	1	29.149		
	Total	13818.800	4			

a. Dependent Variable: PDQ

b. Predictors: (Constant), FBK, PFG, GOL

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	43.789	12.512		3.500	.177
	PFG	.159	.351	.211	.454	.729
	GOL	.505	.308	.929	1.640	.349
	FBK	-.092	.142	-.144	-.645	.635

a. Dependent Variable: PDQ

**Residuals Statistics<sup>a</sup>**

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	67.5295	207.2785	112.8000	58.71467	5
Residual	-3.97655	3.47049	.00000	2.69949	5
Std. Predicted Value	-.771	1.609	.000	1.000	5
Std. Residual	-.737	.643	.000	.500	5

a. Dependent Variable: PDQ

The coefficient of determination at 1.000 and .999 shows that there is a perfect relationship between the variables.  $R^2$  at .992 indicates that the model is perfectly fitted, process quality (PCQ) being the independent variable and profit growth, goal and feedback being the dependent variable and Durbin Watson give a high figure at 1.43.

**Conclusion**

This study examined the interaction effect of total quality management and performance management on the competitive advantage of manufacturing industries in Nigeria. Simultaneously, Product Quality and process quality give a pointer to total quality and performance quality, while profit growth, goal and feedback gives a pointer to competitive advantage. If management can improve process and product (before sending it out to customers), its competitive advantage will increase and the product will dominate the market. Hence emphasizes should be on quality not quantity.

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