

EFFECT OF QUALITY CONTROL (QC) MEASURES ON THE INCOME OF CASSAVA FLOUR BASED ENTERPRISES IN ABIA STATE NIGERIA

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Abstract

This study evaluated the level of progress in QC adoption of cassava flour based enterprises in Abia State. A random sampling technique was employed in the selection of 90 enterprises from the study area. Descriptive statistics and inferential (probit and Z-test) were used in analyzing the data collected through well structured questionnaires. About 82% of the cassava flour based enterprise' users adopted quality control measures in the manufacture of their products while 16% did not. The use of photographic aids, use of standard descriptions, system quality assurance and good manufacturing practices constituted 11%, 45%, 22% and 22% respectively of the quality control measures adopted by the enterprises. Level of education, qualified personnel and profit positively influenced the choice of quality control adoption at 1%, 10% and 5% significant levels respectively while cost of operation and government policies negatively influenced the choice of quality control adoption at 1% significant levels respectively. Result of the Z-test analysis reveals that there is a distinct difference between the mean incomes of cassava flour based enterprises who adopted quality control measures and those who did not. This study recommended that the Quality control regulatory bodies should be empowered to enforce the adoption of these measures among relevant enterprises; Government should support the growth of these enterprises by the supply of important machineries and equipment at subsidized rates; A synergy among firms on improving their level of QC utilization is recommended.

Key words: cassava, control, income, quality

INTRODUCTION

Cassava known as *Manihot esculenta* or *Manihot utilissima* was introduced into Central Africa from South America in the 16th century by the early Portuguese exporters [1]. It is estimated that 250 million people in Sub-Saharan Africa derive half of their daily calories from cassava being the second most important food staple and supplier of calories after maize [1]. Recently, production figures ranked Nigeria as the leading producer of cassava in the world [3;7] and puts ready money and food in the very vulnerable segments of society of the country. Nigeria is the largest producer of cassava in Africa. The tubers are mostly processed into cassava flour (lafun), gari and fufu in Nigeria. It can also be cooked or eaten, pounded and consumed in its raw form, most especially the sweet variety [5].

Cassava flour based enterprises are the

enterprises that use cassava flour as their major raw material. The cassava flour based enterprises may be involved in the farm production of cassava, processing of cassava flour and use of cassava products and by products for the manufacture of other products.

Owing to the policy focus of the transformation agenda to encourage the production of cassava and usage of cassava flour in Nigeria. This had led to the promotion of cassava flour exports and the birth of numerous cassava flour based enterprises mainly on a small scale basis. Cassava flour based enterprises are found in every nook and cranny in the urban and rural areas of Nigeria. The issue of quality control becomes imperative; because of most these enterprises are not registered with the government and therefore may not be controlled by government agencies.

The link between quality control and income

especially among small cassava flour enterprises makes this study exceptional. Quality is a situation where the customers are satisfied [4]. Control is the process employed to meet standards thereby, leading to a decision dependent on the observed to increase in performance [4]. Quality Control (QC) is the action taken throughout the production of a product to prevent and detect product deficiencies and product safety hazards [2;4]. Quality controls measures are adopted by the cassava flour enterprises to ensure the safety of the products, since majority of their products are mainly edible. Food safety is an increasingly important public health issues. Governments of all over the world are intensifying their efforts to improve food safety. Food safety and hygiene are very crucial for the food enterprises. This work is an attempt to determine the level of adoption of quality control by cassava flour based enterprises as well as the effect on the performance and income of the enterprises in Abia State. In line with the aim of this work, the following questions will be answered:

- a) What is the level of adoption/usage of quality control among the cassava flour based enterprises?
- b) What are the factors affecting the adoption of quality control measures among cassava flour based enterprises?
- c) Does quality control affect the performance/profitability of the enterprises?

MATERIALS AND METHODS

The study location is Abia State of Nigeria. Random sampling technique was adopted for this study in selecting a total of 90 respondents. Primary data were collected via the administration of well-structured questionnaires while secondary data were collected from journals and important literatures. Simple descriptive tools like tables, percentages and frequencies as well as other econometric tools like probit and Z-test models were used to analyze the data for this study.

Model Specification

The t-test is given as:

$$Z_{cal} = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{S_1^2 \frac{X_1}{n_1} + S_2^2 \frac{X_2}{n_2}}}$$

Where,

\bar{X}_1 = Mean net returns from cassava flour based enterprises Quality control users

\bar{X}_2 = Mean net returns from cassava flour based enterprises non Quality control users

$S_1^2 \bar{X}_1$ = Variance of net returns from cassava flour based enterprises Quality control users

$S_2^2 \bar{X}_2$ = Variance of net returns from cassava flour based enterprises non Quality control users

$$\text{Probit (Y*)} = X_i \beta + u$$

Where $\mu \sim N(0,1)$

$Y^* = 0$ or 1

Y = prob. (Quality control usage) = yes or no

Where yes=1 stands for adoption of quality control and no=0 stands for non-adoption of quality control

X_i = vector of the independent variables

X_1 = educational level of the enterprise owners (number of years spent in school)

X_2 = Availability of Qualified Personnel (Yes = 1, No = 0)

X_3 = Size of firm (Output in Kg)

X_4 = Perception of quality control (1 = Relevant, 0 = Irrelevant)

X_5 = Capital (₦)

X_6 = cost of operating quality control (₦)

X_7 = Profits/income from the enterprises (₦)

X_8 = Number of customers

X_9 = Government policies on quality control (Operational = 1, Otherwise = 0)

U = error terms.

RESULTS AND DISCUSSIONS

Level of Quality Control Adoption among Cassava flour based Enterprises

The extent to which the cassava flour-user enterprises adopt quality control measures is presented in the Table 1 below and discussed.

The distribution of the enterprises by level of quality control adoption shows that 82% of the cassava flour based enterprise' users adopted quality control measures in the manufacture of their products while 16% did not.

Table 1. Frequency Distribution of Quality Control Adoption by Cassava flour User Firms

Quality Control Adoption	Frequency	Percentage
Yes	74	82
No	16	16
Total	90	100

Source: Field Survey, 2015.

This implies that the entrepreneurs adopted one or more of the measures stated below.

Quality Control measures Adopted by the Cassava flour based Enterprises

The various quality control measures adopted by the cassava flour based enterprises are presented in Table 2 below.

Table 2. Frequency distribution of enterprises according to the adopted quality control measures during manufacture

QC measures	Frequency	Percentage
Use of photographic aids	10	11
Use of standard descriptions	40	45
System quality assurance	20	22
Good manufacturing practices	20	22
Total	90	100

Source: Field Survey, 2015.

The use of photographic aids, use of standard descriptions, system quality assurance and good manufacturing practices constituted 11%, 45%, 22% and 22% respectively. Majority (45%) adopted the use of standard descriptions. This is a major concern for regulatory agencies to avoid sub-standard products and maintain uniformity in manufacturing. System quality assurance and good manufacturing practices were relatively adopted signifying an improvement in the quality control practices of these enterprises.

Quality Standards and Labeling systems used by the Enterprises

The quality standards and labeling systems used by the cassava flour based enterprises in the study area is presented in table 3 below.

A multiple response system was employed in presenting the data.

Table 3. Frequency distribution of enterprises according to quality standards and labeling systems used

Labeling systems	*Frequency	Percentage
A best before date	30	33
The ingredients	70	78
The nutritional content	50	56
The manufacturers' name and address	90	100

Source: Field Survey, 2015.

*Multiple Responses

The distribution of the enterprises according to quality standards and labeling systems employed shows that 100% (all the enterprises) had the manufacturers' names and addresses on their labels. 78% of the enterprises had the ingredients' composition of their labels. 56% had the nutritional contents of the ingredients on their labels while 33% had a best before dates. This result indicates that the labeling system of the cassava flour-flour based enterprises was moderately efficient with lots of improvement.

Annual income distribution of the cassava flour-flour based enterprise owners

The distribution of the cassava flour-flour based enterprise owners' income is presented in Table 4 below.

Table 4. Distribution of the cassava flour-flour based enterprise owners' income

Annual income (₦)	Quality control users		Quality control non-users	
	Frequency	Percentage	Frequency	Percentage
1,000 – 300,000	10	14	5	31
301,000 – 500,000	14	19	8	50
501,000 – 700,000	30	40	3	19
701,000 – 1,000,000	20	27	0	0
Total	74	100	16	100

Source: Field survey, 2015.

The result shows that majority of the QC users and non-users earned a minimum of N 500,000 and 301,000 respectively. 27% of the QC users earned at least 701,000 while nobody of the non QC users earned up to this amount. It therefore shows that a great disparity existed between the income of QC users and non-users.

Factors affecting the adoption of quality control measures among cassava flour-flour based enterprises

The probit regression model was used to examine the effect of certain explanatory variables on the choice of adopting quality control measures among cassava flour-flour based enterprises in the study area. The result is presented in table 5.

The model Chi square value of 43.401 implies that the probit regression model is statistically fit at 1% level. Level of education, qualified personnel and profit positively influenced the choice of quality control adoption at 1%, 10% and 5% significant levels respectively while cost of operation and government policies negatively influenced the choice of quality control adoption at 1% significant levels respectively.

The level of education of the enterprise managers/owners positively affected their choice to adopt quality control measures in the manufacture of their products implying that as they advanced in education, they increased their chances of adopting QC measures.

Table 5. Probit Regression Result for Factors Affecting the Adoption of Quality Control measures among Cassava flour based Enterprises

Parameter	Estimate	Std. Error	Z
x_1 =Level of Education (Years)	1.264	0.334	3.780***
x_2 =Qualified Personnel (1=Available, 0=Otherwise)	1.328	0.801	1.658*
x_3 =Size of firm (Output)	0.0001	0.001	0.1
x_4 =Perception of QC (1=Effective, 0=Otherwise)	0.063	0.231	0.272
x_5 =Capital (₦)	0	0	-0.1
x_6 =Cost of operating QC (₦)	-0.056	0.014	-4.000***
x_7 =Profit (₦)	0.2651	0.089	2.652**
x_8 =Number of Customers	0.001	0.007	0.143
x_9 =Government Policies (1=Favourable, 0=Otherwise)	-0.122	0.021	-5.810***
Intercept	-2.606	0.521	-5.002
Chi	43.401***		

Source: Field Survey, 2015

*** = Significant at 1%, ** = Significant at 5%, * = Significant at 10%

The availability of qualified personnel to manage the QC section of the enterprises also positively influenced the decision to adopt

QC. This entails that enterprises will adopt QC measures provided they can employ or have employed qualified personnel.

The profit level of the enterprises also influenced their choice of adopting QC measures. Since some costs are incurred in this section, an enterprise with an unstable profit level will find it difficult to implement the QC measures.

Conversely, cost of operation and poor/unfavourable government policies negatively influenced the adoption of QC measures. This is because while operating cost added burden on the firms, unfavourable policies provided the firms with harsh environment to operate.

Z-Test Analysis of Mean Income Differences between Quality Control Users and Non-users among Cassava flour-based Enterprises

The Z-test result for differences in the mean income of adopters and non-adopters of cassava flour-flour based quality control enterprise' users is presented in table 6 below and discussed.

Table 6. Z-Test Result of Mean Income Differences between Quality Control Users and Non-users among Cassava flour-based Enterprises

	N	Mean	Std. Deviation	Std. Error Mean	z	df
NONUSERS of QC	16	335,711.1	32899.725	4904.401	7.281	15
USERS of QC	74	702,822.2	38407.674	5725.478	7.479	73

Source: Field Survey Data, 2015.

Result in Table 6 revealed that there is distinct difference between the mean income of cassava flour-flour based enterprises who adopted quality control measures and those who did not. A mean income of ₦335, 711.13 and ₦702, 822.24 for non-adopters and adopters of quality control measures was estimated. Z-calculated for users of quality control (7.479) was higher for the non-users of quality control (7.281). This difference was statistically significant.

CONCLUSIONS

The adoption of Quality Control (QC) measures among food based enterprises have become a major issue for discussion among service-sector economists and policy makers.

This gave rise to this study which tried to evaluate the level of progress in QC adoption among cassava flour-flour based enterprises in Abia State. A multi-stage sampling technique was employed in the selection of 90 enterprises from the study area. Descriptive (tables, frequencies and percentages) and inferential (probit and correlation models) were used in analyzing the data.

Quality control measures were well adopted by the cassava flour based enterprises though level of utilization was still below expectation. Adoption was influenced by such variables as level of education of the managers/owners of the enterprises, availability of qualified personnel, profit level, cost of operation and government policies. A distinct difference between the mean income of users and non-users of Quality Control practices was estimated and the result showing that the difference was statistically significant. It is therefore recommended that Quality control regulatory bodies should be empowered to enforce the adoption of these measures among relevant enterprises; a synergy among firms on improving their level of QC utilization is recommended. Such integration will reduce to a certain extent the costs incurred in managing the QC section of the firms; standards should also be enforced uniformly among the firms so as to avoid the undue exploitation of the ignorant and reduce sharp practices associated with standard discriminations; timely checks and monitoring of these recommendations will go a long in enforcing the adoption and continuity of QC measures among the firms concerned.

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