# TITLE PAGE

# AN ASSESSMENT OF QUALITY CONTROL TECHNIQUES AS A TOOL FOR ENHANCING ORGANIZATIONAL EFFICIENCY OF OLAM CROWN FLOUR MILLS NIGERIA LIMITED, KADUNA

**BY**

**GBADAMOSI OLUFEMI ISIAQ**
**KPT/CBMS/18/50657**

**BEING A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF MANAGEMENT STUDIES, COLLEGE OF BUSINESS AND MANAGEMENT STUDIES**

**IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF HIGHER NATIONAL DIPLOMA (HND) IN PRODUCTION AND OPERATIONS MANAGEMENT,**

**KADUNA POLYTECHNIC, KADUNA.**

**AUGUST, 2022**

## DECLARATION

I hereby declare that this research project has been conducted solely by me under the supervision of **Mal. Mohammed Nurudeen Ahmed**, of the Department of Management studies, Kaduna polytechnic, and I have neither copied someone's work nor has someone else done it for me. Authors whose works have been referred to in this project have been duly acknowledged. Finally, I wish to state that all errors made in this research work is mainly my responsibility.

_____ _____

**GBADAMOSI OLUFEMI ISIAQ** Date
KPT/CBMS/18/50657

## APPROVAL PAGE

This is to certify that this research project is undertaken by **GBADAMOSI OLUFEMI ISIAQ,** KPT/CBMS/18/50657 under the supervision of **Mal. Mohammed Nurudeen Ahmed** and has been prepared in accordance with the regulations governing the preparation and presentation of projects in Kaduna Polytechnic.

_____ _____

**Mal. Mohammed Nurudeen Ahmed** Date
(Project Supervisor)

_____ _____

**Mallama Sa'adiya Aliyu** Date
(Project Coordinator)

_____ _____

**Mal. Bala Dzukogi** Date
(Head of Department)

_____ _____

External Examiner Date

## DEDICATION

This project is dedicated to the Almighty God for His infinite mercy and guidance over me throughout the course of my programme.

## ACKNOWLEDGEMENTS

First and foremost, my appreciation goes to Almighty God for His mercy and guidance over me throughout the course of my programme.

My appreciation goes to my indefatigable supervisor, Mal. Mohammed Nurudeen Ahmed for taking his time in going through my manuscript and made necessary correction where required, in order for this research work to be worthy of acceptance and recognition. May Almighty God bless you and your family abundantly (Amen).

My profound gratitude goes to the H.O.D., Mal. Bala Dzukogi and the entire lecturers in the Department of Management Studies for their intellectual supports.

My sincere appreciation goes to my late parents: Alhaji and Alhaja Tijjani Gbadamosi, my beloved wife Zainab Gbadamosi, my supportive uncle Alhaji Yisau Gbadamosi, brothers, sisters and the entire family for their love, care, prayers, supports and encouragement.

Finally, my sincere appreciation goes to my friends and colleagues, for their encouragements and advices.

## ABSTRACT

*This study examined an assessment of quality control techniques as a tool for enhancing organizational efficiency in Olam Crown Flour Mills Nigeria Limited, Kaduna. The study determined the extent to which poor product design affects production; to verified the impact of machines and tools in quality of a product; to ascertained the extent to which un-conducive environment affect quality of a product; and to verified the extent to which technique used in quality control process and category of personnel affect the quality of a product in Olam Crown Flour Mills Nigeria Limited, Kaduna. Opinion of various authors and scholars were reviewed on the subject matter. Survey research design was adopted and the study was made up of 120 which comprised of management and staff of Olam Crown Flour Mills Nigeria Limited, Kaduna and the sample size was ninety-two (92). Based on the findings, it is clear that the management do not deem it necessary to specify the need for higher quality and do not train and coach employees to analyze work processes so that they can make improvements in them and that a focus is not giving to continuous improvement which the employees stop learning and striving to do better. Finally, it was concluded that it is necessary not only to specify the need for higher quality, but also to train and coach employees to analyze work processes so that they can make improvements in them, the primary cause of quality problems can be traced to variances in process or outcomes; and that machine component part should be design such that operation produces less heat and noise so as to facilitate a conductive environment for worker and thus enhance productivity.*

.

## TABLE OF CONTENTS

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background to the Study

The success of many manufacturing and service firms has been linked directed or indirectly to the quality of the products and services provided. The life span of any product could be short lived or its consumption is harmful if the quality is not controlled. Thus, we cart say that quality control in manufacturing organization can be seen as an important tool for efficient performance (Schroeder and Sakakibara, 2014). Quality controls have attracted the attention of many industrialists during the last few decades. A widely quoted example is the development of Japanese product during the last twenty years. It was at one time being branded as a nation that produces cheap and unlawfully product, but that image has rapidly been change to its present highly claimed status of an industrialized nation noted for its high quality products (Juran, Deming, and Feigenbaum (2017).

The success story lies in the manufacturing of quality products and more importantly through strict quality control of the product that are manufactured at Fairless cost than its competitors. Different people may have different views on what quality is.; according to Buffer (2016) quality to a consumer connotes a high degree of performance goodness and

excellence. To him quality simply implies the degree to which a product is able to satisfy his needs. Thus, different categories of consumers may have different levels of satisfaction. The different level of satisfaction will mean different cost to meet the specification. Therefore, manufacturer should be concerned with the consistence in meeting these specifications. To the manufacturer, quality in this sense means conformity to a prescribed standard or specification that is the degree to terms of pleasant visual appearance once dimension chemical composition of raw materials, hardness strength surface finish etc. (Ahire, 2016).

Summarizing from above, quality is defined by' the customer's expectation are not always static with technological developments, competitors and new designs customers constantly expect as improvement in quality. Quality control is an integrated management view-point that aims assiduously improving the quality of processes and products to ensure client satisfaction (Ahire, 2016). Firms that establish a strategy for quality management emphasize on attaining and maintaining outputs of high quality by applying management practices (inputs) and quality performance (outputs) (Schroeder and Sakakibara, 2014). Quality control practices are defined as those important areas which a firm must achieve in order to attain its mission through categorization and examination of their impacts (Oakland, 2015).

Lee, Ooi, Tan and Chong (2010) defined quality control practices as those vital processes aimed at ensuring that a product manufactured or rendered service conforms to a specified set of criteria of quality and/or meets the desires of the customer.

The pioneers in quality management including Juran, Deming, and Feigenbaum (2017), emphasized the significance of the philosophy of quality as a crucial competitive tool in the transformation of an organization. Quality control refers to the process by which organizations evaluate the quality of all factors used in production and focus on fulfilling quality requirements (Lee, Ooi, Tan and Chong, 2016). Elements of quality in which organizations adhere to include well-defined controls, well-managed processes, integrity of operations, knowledge preservation and improvement, skills utilization and continuous improvement through experience.

Quality control in regards to the customer would be the unceasing process of making sure products, in their design and manufacture, are produced to attain and surpass the needs of customers (Kaynak, 2015). The drive of quality control is to ensure that specific processes conform to the organization's set standards. Effective quality control requires one to define measure, compare, evaluate, correct, and monitor. Statistical process control

attempts to remedy processes that are not in line with the preset limits and also to study the output standards to make sure they are up to specifications. Controls comprise product inspection, where each product is examined in great detail before it is released into the market. Inspectors are provided with descriptions and lists of unacceptable product defects for example, surface blemishes, loose fittings and poor workmanship with guidelines on how to handle them (Kaplan, 2013).

## 1.2 Statement of the Problem

The essence of quality control in the production system cannot be over emphasized. More so in a competitive environment such as Nigeria, it is imperative for the firms to emphasize quality control in other to enjoy competitive leverage.

It is observed that the product of some organization do not measure up to the quality standard set. However, the attitudes of Nigerian manufacturers towards quality control are less encouraged. The evidence is in the poor quality product that make available to the customer.

The researcher is focused in finding out the problem of quality control in a manufacturing firm and particularly in Olam Crown Flour Mills Nigeria Limited, Kaduna.

1. How does poor product design affect the quality of a product?
2. How does unstandardized machines and tools affect the quality of a product in a manufacturing firm?
3. How does unconducive environment affect the quality of a product?
4. How does the type of technique used in quality control process and the category of personnel involved affect the quality of a product?

## 1.3 Objective of the Study

The objective of this study is to examine the effect of quality control techniques as a tool for enhancing organizational efficiency, with particular reference to Olam Crown Flour Mills Nigeria Limited, Kaduna. Other objectives of the study are:

i. To determine the extent to which poor product design affects production in Olam Crown Flour Mills Nigeria Limited, Kaduna.
ii. Verify the impact of machines and tools in quality of a product in Olam Crown Flour Mills Nigeria Limited, Kaduna.
iii. To ascertain the extent to which un-conducive environment affect quality of a product in Olam Crown Flour Mills Nigeria Limited, Kaduna.
iv. To verify the extent to which technique used in quality control process and category of personnel affect the quality of a product in Olam Crown Flour Mills Nigeria Limited, Kaduna.

## 1.4 Statement of Hypothesis

The following hypothesis is put forward:

$H_0$: Quality control technique has no significant impact on organizational efficiency of Olam Crown Flour Mills Nigeria Limited, Kaduna.

$H_1$: Quality control technique has significant impact on organizational efficiency of Olam Crown Flour Mills Nigeria Limited, Kaduna.

## 1.5 Significances of the Study

The researcher strongly believes that the outcome of this study, will be beneficial to both management and employees of any manufacturing firm in the country an above all it will be useful to other industries and services rendering organization at large.

Another major significance of this study is for the partial fulfillment of the requirement of the award of Higher Diploma (HND) in the Productions and Operations Management.

To expand the understanding of the writer's knowledge regarding the research study. The research is also intended to serve as a reference for the further research work for study.

## 1.6 Scope of Study

This study is to investigate the effect of quality control technique as a tool for enhancing organizational efficiency of a manufacturing firm using Olam Crown Flour Mills Nigeria Limited, Kaduna as a case study.

## 1.7 Limitation of the Study

Lack of disclosure of some vital document to the research has actually hampered the smoothness of the study in no small measure; this is due to the fact that the company considers some information about itself as confidential.

Owing to service of security checks at the: gate of the case study, feedback as regards questionnaires were hard to get on time. It has always been a normal practice by most firms to praise itself and its capabilities and operation as a form of promoting itself and as such some response and feedback were not completely trusted and confirmed with the situation of the economy financial constraint is also a major limitation owing to the high cost of material and labour for the work.

## 1.8 Historical Background of Olam Crown Flour Mills Limited

Crown Flour Mill has been in the wheat milling business in Nigeria for over four decades. Incorporated in May 1971; it commenced milling operation in

1981 with only one product- Flour. In 2010, Olam International (a Global Good and Agri-products focused multinational based in Singapore) acquired Crown Flour Mill. Crown Flour Mill at that time had 2 operating factories in Lagos and Warri with only 2 products Flour and Semolina. Today, Crown Flour Mill has become one of the top 10 millers in the world.

This acquisition brought about a significant turnaround in the business. Olam International brought its Agro-technical and Supply Chain capabilities into the business. The business multiplied multifold. It was still in the flour and semolina business only. The entry into the pasta business started with the acquisition of the BUA pasta and flour milling units in 2016. The Technological, Sales and Supply Chain skills of Olam helped Crown Flour Mill become a large pasta player. In 2019, Crown Flour Mill took a giant step and acquired one of the key players in the industry, Dangote Flour Mill. This greatly increased Crown Flour Mill production and distribution capacities. Crown Flour Mill is now a key player in the Nigerian flour milling industry.

These acquisitions have allowed Crown Flour Mill to have a wide portfolio in Wheat Milling to help cater to the needs and yearnings of the consumers for more nutritious and affordable options. The wide portfolio now ranges from a Consumer Portfolio (different ranges of Pasta and Semolina) to a

Business to Business (B to B) Portfolio of various types of Flour (Bread, Noodles and Confectionary flour). Crown Flour Mill has plants located in strategic positions across Nigeria – Apapa, Tincan Island, Beachland, Ikorodu, Ilorin, Warri, Calabar, Port Harcourt and Kano. Top of the line Agro-Technology is at the heart of our success in the Flour Milling business. All our factories have the best state of the art facilities with required certifications – Food Safety System Certification 22000(FSSC 22000); International Standard Organization certification (ISO 9001:2015).

**Ethics and Compliance**

Conducting business in an ethical, socially responsible and environmentally sustainable manner must be embedded in every aspect of Olam's business.

We recognize that how and what we do to achieve our success, is just as important as success itself. Upholding high standards of behaviour is fundamental to the values and culture of Olam, and it is central to earning and maintaining the trust of our investors, customers, suppliers, employees, communities and other stakeholders.

To strengthen our ethical and compliance standards, we have established the Olam Ethical Business Programme (EBP). This sets out the standards and behaviours firmly expected, which are detailed in the Olam Code of Conduct, as well as our specific policies.

## 1.9 Definition of Terms

**Quality:** The degree to which something is good or bad.

**Control:** Constraining of event to follow plans

**Quality control:** The practice of checking goods or products, as they are produce to make sure they are of good quality.

**Assurance:** A feeling of calm confidence in something.

**Specification:** A detailed instruction about how something should be design or make.

**Material:** Component parts used for the production of a product.

**Product:** Something useful that is made in a factory.

**Standard:** A level of quality, skill, ability or achievement by which something is judge as acceptance.

**Inspection:** A careful examination of something to find out more about it. Monitoring: To carefully watch and check a situation in order to see how it progress over a period of time.

**Cost:** Something that one loses; give away, damage in order to achieve something.

**Reliability:** Something that can be trusted or depended on.

# CHAPTER TWO

# REVIEW OF RELATED LITERATURE

## 2.1 Conceptual Definitions

### 2.1.1 Quality

The issue involved in this chapter is the review of pervious literature on the subject matter, that quality control as a tool for organizational efficiency in a manufacturing firm. Paramount among an organizational goal is the production of goods and services for the satisfaction of consumer's at a considerable lesser cost and a good profit level. The amount of satisfaction a consumer derived from the product should be reflected in the quality of that product (Wolfgang, 2016). In this wise, quality could be regarded as one of the fundamental ingredient that could make a consumer to go for more of such product without diminishing effect of the utility, that is to say the principles or the theory of marginal utility put forward by economist could be minimize if not totally eliminated with the high quality product.

Quality here can be seen to connote a high degree of performance, goodness and excellence. It simply implies the degree to which a product is able to satisfy a need that is a product ability to meet satisfactions. For a firm to achieve this, at a less possible cost there must be a form of control (Dale and Tidd, 2018). Control is a function that involves constraining of events to

follow plans. It operates in general principle by comparing actual achievement with the plans and by feedback information concerning variance to those who are in position to take corrective action. It is on this note we come about “quality control” in a manufacturing firm as a task of ensuring that what as produce meets the required standard.

### 2.1.2 **Quality Control**

Quality control is of vital importance to industries as competition is intense and consumers became more discriminating in their consumption pattern. Juran (2014) define quality control as a regulating process through which we measure actual quality performance compared with standard and act on the differences.

Caplen (2016) defined quality control as a function or collection of duty, which must be performed throughout an organization in order to achieve its quality objectives. He further states that quality control objectives include the following:

a. To maintain design standard
b. To meet customers’ specifications
c. To defect and correct defective product.
d. To minimize the cost of production.

From the above it could be summarized that the aim of quality control is to increase sales and productivity at a possible cost, which invariability will prove organizations efficiency. Thus he defined quality products as those that:

a. Satisfy customers' expectation.

b. Meet a well-defined need, use of purpose

c. Comply with applicable standards and specifications

d. Comply with stator and other requirement of society

e. Are available at a cost, which will yield profit.

He states that, the key pointing quality control is therefore the faithful conformance of the production specification or standard and that product defects or deviation from specification can result from any or combination of some of the following:

a. Poor product design.

b. Defective raw material.

c. Inadequate or inappropriate machines and tools.

d. Inappropriate environment.

e. Human errors.

Therefore, quality management/control should be designed and instituted to cover all their areas.

Kathryn and David (2017) share the same view that through quality control can be defined in many ways. The America Society for Quality (2014) offer this standard definition “quality is the totality of features and characteristics of a product or services that bear on its ability to satisfy stated or implied needs.

They view quality control as a integral part of an organization strategy and is aimed at continually improving product and services quality so as to achieve high levels of consumer satisfaction and build strong customer loyalty. This definition recognizes that quality control involves every aspect of a product or service, that quality affects the ability of a product or services to satisfy needs and that customer needs for quality may not always be explicitly stated (Servaes, 2019).

## 2.2 **Need for Quality Control**

According to Juran (2014) he said deflects are eliminated or minimize through quality control, the cost of production will decrease. It is simply common sense that when products which deviate from the intended standard are made, they must either be repaired or discarded and this would obviously incur extra cost. It is possible to turn out goods that will fulfill the standard, naturally cost will decrease. In addition to improved customer’s satisfaction,

it is therefore improved customers satisfaction. It is therefore appropriate to state here that the need for quality control is a strategic way of manufacturing firm to completely effectively and efficiency while bearing the customer's needs at heart.

According to a quality expert David (2014) from a strategic point of view, there are eight dimension of quality that are very important, they include:

**Performance:** This involves a product's primary operating characteristic. For example automobile, performance world include acceleration, braking, handling and fuel usage.

**Features:** These are supplements to the basic functioning characteristics of the product or services. Examples include complementary newspapers for hotel quest or stereo player in automobiles.

**Reliability:** This address the probability of a product's not working properly or breaking down altogether within a specific period. Since a significant amount of usage is typically involved in accessing reliability, these quality dimensions does not apply as readily to product and services that are use immediately.

**Conformance:** It refers to the degree to which a product design or operating characteristics conform to pre-established standards.

**Durability:** This is a measure of how much a person get from a product it deteriorates or breaks down to such a point that replacement makes more sense that continual repairs.

**Serviceability:** This refers to the promptness, courtesy, proficiency and ease of repair.

**Aesthetics:** It refer to how a product works feels sound, tastes or smell all subjective issues highly dependent on personal judgment and preference.

**Perceived Quality:** It refers to individuals' subjective assessments of product or services quality such as assessments may be based on incomplete information but often it is a perception that counts with customers.

## 2.3 Quality Control and Assurance

According to Stevenson (2017), the terms "quality control and quality assurance" are widely used in production management literature today as synonyms. To some authors however, the term "quality assurance" is a much broader term than "quality control".

This is the view of Benjamin (2018) he states that the term "quality assurance" has been introduced to correct the wrong impression given by the term "quality control" that the task of ensuring that what is produced meets customer's requirements starts only after the final design specifications have

been drawn. In other words, quality assurance has been introduced to emphasize the fact that control of quality starts right from the initial design stages of a. product and continues with the actual production process up to the time the product reaches the final consumers (Sarvaes, 2019).

In this text, the overall quality control function is referred to as “quality management” within this quality control and quality assurance. Quality control includes areas that the management can undertake to increase the quality. These areas include the quality product design in process inspection, training programmes, and quality circles employees’ recruitment, training and award programmes. On the other hand, quality assurance encourages higher quality production in areas outside management control (Stevenson, 2017). These include the inspection of incoming (purchases) good and finished products. These two types of inspection do not control the operation of producing the goods directly. They just “assure” that the goods conform to the prescribed specifications and are independent of the processes producing them.

Conclusively, the scope of quality assurance cover all activities staffing from defining the specifications and tolerance limit, formulating the in specifying the types of measurements and variables that required inspection. Quality

assurance is the only quality control function traditionally concluded by many manufacturing firms. This function is carried out by quality inspectors and they are totally independent of the workers on the production floor (Benjamin, 2018).

## 2.4 Quality Control Process/System

The task of quality control involves monitoring and inspecting the quality as explicit as possible; a set of in specification for a given product or services, an organization must then procure goods and services in accordance with those specifications. Example of these factors of production will be suitable equipment, which must the properly employed and assigned to man the various stages of production process. This must be preceded by a determination of the skills needed to perform a given task satisfactorily (Feigenbaum, 2016).

To continue, the procured equipment, building materials and! labour should be backed up by a programme for maintenance. In addition, operation personnel must be supervised and provided with the necessary instructions regarding what must be done, how it is to be done and when it should be done. Finally, unless all of the forgoing is supplemented by a conscious effort on the parts of the organization employee to produce a satisfactory

products or service, established quality standard are not likely to be met. This call for deliberate efforts to install quality consciousness in the personnel team (Vladimir, 2019).

In summary, an effective quality control effort required that:

1. The organization goods or services are properly designed.
2. A specific set of specification as possible is developed.
3. A qualified labour force, be maintained.
4. The employees are provided with proper equipment buildings materials, supervision and instruments.
5. The workforce is motivated to produce in accordance with established specification.
6. Disciplinary action is taken against those who negligence results into defective output.

Hence, control process requires the involvement of production personnel, as the inspection or checking will be conducted right next to the worker operating a machine or performing a certain task (Ong'ayo, 2017). Generally, a quality assurance/control system, like any other control system, comprises the following:

i. Setting quality standards inform of product/production specification.

ii. Communicating the standards to all concerned.

iii. Measuring actual performance (inspection) at specified production stages or given point in time.

iv. Comparing actual performance against the set standards.

v. Reporting deviation from standard (if any)

vi. Taking corrective measures either by:

    a. Modifying the standards set or

    b. Corrective operational deficiencies.

A comprehensive quality control system should compare the following subsystems:

i. The design sub-system: This involves the vital planning for the products and all its components.

ii. The input sub-system: This has machines labour, and methods as the major components.

iii. The output sub-system: This includes the final output of the products.

**Quality Control System**

These sub-systems are sometimes classified into two major classes, which then constitute the basis for two types of controls in a quality control process, that is, control of future output and control of past output.

a. **Control of future output:** This involves monitoring the production process including the output resources, and processing activities to make sure that no defective units are produced. Defects are defected and remove out of the production line.

b. **Control of past output:** This is a situation where the final products are inspected before shipments to make sure that no defective units are passed to the customers. This often takes the form of finished goods inspection.

## 2.5 Quality Inspection in an Organization

According to Juran (2014) quality assurance system like the one outlined above does not guarantee complete perfection. Some of the output may continue to be unsatisfactory. Variations may arise from a collection of factors inherent in the production process, none of them large in themselves, but their combined effort will give variation in the measured quality. For instance error in design cannot be completely avoided some specifications can be expressed in explicit terms faults may develop in the production facilities example variations in machines, a shipment of in perfection materials may be received occasionally an unqualified. Or negligent employee will sometimes be assigned to a task and so on consequently; it is become necessary to extend the quality assurance process to include inspection.

Stevenson (2017) says, inspection in the production process can occur at three points, before production, during production and after production. Generally, inspection is an integral part of quality assurance, which is designed to ascertain the quality of production input, the work in process, and final output. It is the act of the manufacturing system with the view to identifying those input and output items that do not fail within acceptable limits and therefore required separating them from good items.

A typical organization may subject many things to inspection. Among these will be the incoming production facilities that will be used to produce its goods or service, example the testing of a new machine that has just been installed. Similarly, purchases materials, part and supplies will be inspected. All these are someone else past output, and they are inspected all these to ensure that their quality is such that the organization can utilize them to produce satisfactory goods or services. The inspection involved here is referred to as receiving inspection. The organization will also inspect it work-in-progress to make sure that conversion of inputs into output is restaurant will examine a meal at various stage of its production. This is work-in-process inspection (Sarvaes, 2019).

### 2.5.1 Inspection Method/Types

Inspection methods vary from one organization to another depending on what is to be inspected and what i being produced base on the proportion of the output to be inspected;

a. 100% inspection of screening: The examination of every item in a batch of raw materials or finished goods.

b. Sampling inspection: The examination of n items of a batch comprising N items which is usually more than one-tenth of N.

**100% Inspection**

In this category of inspection, one simply inspects every piece (raw materials, components or finished goods) and selects only those that meet the quality requirement. Once you have separated all those that not met the quality standard you can be assured that the rest will be accepted by your customer, this form of inspection is going to be very costly as inspection itself is time and manpower consuming. It might also be worthwhile to note that 100% inspection cannot guarantee the elimination of all defective item because of human error resulting from fatigue experienced by the inspectors.

**Sampling Inspection**

This is based on statistical sampling plans. It should be note that some inspection methods entail destructive testing that is the item is destroyed in

the course of being inspection. For example, whether a candle will burn satisfactorily can be determined only by burning it and whether a beverage has the right favour can be determined only by drinking it. Obviously, not every unit of output can be inspected under such circumstance nothing could remain for shipment to the organization customers.

However, an alternative upon which inspection will be carried out is called "sample inspection". It gives information, which is derived from a relatively small random sample for a decision to be made on whether the whole batch is to be accepted or rejected. It is often used when:

a. The product 100% inspection is far too high.

b. The cost of 100% inspection is far too high.

There are two subset of sampling inspection that is:

1. Controlling sampling.

2. Acceptance sampling

**Control Sampling:** It is used to obtain data for the purpose of in process control, machine or operator.

**Acceptance sampling:** It is an inspection to distinguish between the acceptance from the non-acceptable lots. It is used for

(a) Incoming and vendor Inspection: Where raw materials or finished products are inspected before the purchaser uses them.

(b) Process inspection: Where the component or parts are inspected before sending from one production department to another for further processing. In this instance, it is acceptance sampling between two departments of the same company as compared to that between two companies (a)

(c) Final inspection: Where the finished products are inspection before leaving the factory.

There are basically three (3) method of acceptance sampling. They include:

**Acceptance Sampling by Attributes**

This is the most common method of acceptance sampling under this method, each item in the sample is inspected and classified as being either defective or non-defective. This is to say that the attributes or characteristics, or items are examined to determine specification i.e. whether they are good or bad, acceptable or unacceptable, working or not working, pass or fail etc.

**Acceptance Sampling of Duration**

This involve the actual measurement of the output with the aid of some equipment based on some criteria e.g. length, weigh, duration, strength etc. Sampling Errors (Producers Risk and Consumers Risk). Naturally, there are

some inherent risks in acceptance sampling of whatever form because of the ever-present possibility of sampling errors.

Two kinds of errors can arise from sampling; as supply of good quality materials or a production batch can be mistakenly rejected if a large number of defective unit from supply or batch are selected into the sample. This probability of rejecting what could have actually been accepted is called producer's risk.

On the other hand, if a large number of good units are selected into a sample, a supply of substandard product or a bad batch of output will be mistakenly accepted. The probability that materials or products of defective of unacceptable quality level will be accepted is called the consumers risks.

Hence, a good sampling plan should clearly discriminate between good and bad lots or batches. As it were the discriminating power of a sampling plan depends largely on the size or the sample. Thus, the large the example, the higher the discrimination power, that is the higher the probability the costs of lower percentages of defective will be accepted.

## 2.6 **Quality Control Programme**

According to Stevenson (2017) a remarkable degree of our lives are increasingly dependent on the quality on serious human inconveniences, economic waste and sometimes even lost the loss of life. Quality is

something that we are familiar with, yet it seems to have a vague meaning that is hard to put into practice. An essential requirement of any product is that it must meet the need of the users. This concept of fitness for use in universal, and perhaps it is the best definition for quality. The user consumer is the final judge in deciding whether or not a, product meets the need or performance requirement.

The decision on design quality is not just design and production choice. It is fundamental corporate strategy that should involve the active participation and commitment of the entire department in an organization. The major functions are:

i. Market research, which should identify the quality, needs of the user.

ii. Product development, which must create design responsive to identify quality needs.

iii. Production planning must devises process capable of executing the product designs and regulates these processes to achieve the desire quality.

iv. Purchasing must obtain adequate materials of the right quality.

v. Inspection testing must prove the adequacy of the product of the proper application.

vi. Customer services must channel feedbacks from the users to assist in reducing quality failures and report on opportunities for improvement.

Alternatively, quality can be defined as zero defeats in the products on services provided by the firm, it is about doing things right the first time, which adds nothing to the cost of a product. Doing things wrong is what cost money. It therefore requires quality management, which can be described, as a systematic way of guaranteeing that all activities within an organization can be executed as planned it is an all pervasive approach concerned the attitude and controls that make prevention possible. It is also focuses on the continuous improvement in productivity and efficiency in order to achieve long-term success.

### 2.6.1 **Element of Quality Control Programme**

Quality control programmes should include all the major component of total quality control (TQC). This will encompass all activities that relate to preventing, detecting the correcting quality problems. The elements are as follows:

a. Policy, planning and administration.

b. Production quality control.

c. Control of purchase material.

d. Production quality control.

e. User contract and field performance.

f. Corrective action.

g. Employee section, training and instruction.

The emphasis will be quality at the sources it means that errors, if any exist should be detected and corrected at the work place.

This is in contract of the wide spread practice of inspection after a batch of product has been produced. In total quality control, worker and supervisors have the primary responsibilities for quality with quality control at the resource, there is immediate feedback concerning defects, which will result in fewer rejects, less reward and less material wastage.

By pacing responsibilities for quality directly in the hands of the workers and supervisors, total quality control will implement a commitment to the presentation of defectives. The following are the critical ingredient into quality control programme:

(a) Process control: A statistical quality concept of checking quality as the process continues and stopping process if it goes out of control should be implemented at each work station.

(b) Self-correction of error is the responsibility of each worker who must re-work bad items, usually after regular working hours.

(c) Lien stopping authority in the hands of the workers to implement the insistence on compliance. In capital-intensive process, senor devices detect poor quality and stop the process automatically.

(d) Self-correction of error is the responsibility of each worker who must re-work bad items, usually after regular working hours.

(e) Expose problems and get them solved, for example, by deliberately removing better inventories.

(f) 100% inspection, especially for finished goods under this concept of total quality control, the duty of a quality control department becomes to monitor the production process to see chat standard procedure are followed, to assist in eliminating the cause of defect and to assist in the quality audit of supplier plants in order to maintain standards. Since the responsibility of quality resets with the production personnel, it is then logical to train the worker in quality control techniques.

### 2.6.2 **Quality Control Cost**

Quality and quality control decision when viewed broadly can be regarded as an economic decision involving cost on one hand and revenue or income

on the other hand any quality level has some cost implications to the producer. Therefore, to the producer the task of quality planning and control (quality assurance) involves essentially the determination of those quality level at which consumer expectations are high than cost involved. In other words the producer is concerned with minimizing the cost associated with quality of the costs associated with quality and quality control.

**An Analysis of Quality Control Cost**

High conference quality seems to be costly. Usually firms only consider the direct cost of quality, such as inspection or high cost of materials. However, the true cost of quality includes quality controls, cost and failure cost. Control cost comprises, two major component that is, prevention costs and appraisal costs.

**Types of Quality Cost**

Prevention cost are those are expenses involved in establishing the initial quality and carrying out preventive action during creation. These preventive actions would include performing marketing research to determine customers quality needs, establishing product specifications, training workers, performing process capability studies and planning concluding vendor evaluation and selection, implementing quality audit instituting preventive maintenance.

Appraisal costs are those incurred in determining whether the product or services conforms to the prescribed quality requirement. They include expenses associate with inspection and testing of incoming materials work-in-process control, finished goods monitoring and the establishing of procedures for carrying out inspection (example, training, manuals and laboratories). The costs that are so often over looked are the failure.

**Cost:** Failure cost are the costs incurred to rectify or replace poor quality products, scrap, rework, re-design down time, reduced yield, and down grading a product to sell at lower price, losing credibility with customers are all examples of hidden costs or poor quality, these cost are reflected not only in the obvious direct labour costs but also in the indirect effects of reduced productivity. All these give rise to quality costs incurred in quality failures. The important point to note is that cost of poor quality often exceeds the cost -of good quality.

To have a successful quality control programme, it is essential that a firm measure all aspects of the cost of quality. It is important to remember that expenditures fire prevention and appraisal may easily affects the failure costs. While control costs are increasing percentage of the cost of quality total cost decrease up to a point because of the significant reduction in failure costs.

## 2.7 Management Involvement in Quality Control Programmes

The success of any quality control system has in the hands of management their commitment towards quality will be the pace setter towards a formal quality of the product must be constantly improved to remain.

In the year 1960s some US firms developed the zero defects programmes to motivate workers to be more quality conscious. While they were sometimes successful, they often failed to have any lasting impact. Perhaps, that was because, as a programme, the effort has a beginning date and an ending date, today the concept of zero defects has been reviewed and instead of being a one-short programme, the idea has become an on-going process of quality consciousness. It is not the carelessness or lack of capability on the part of workers that is the primary cause of poor quality. Infact of all controllable errors, 80% are management controllable that is error in process design and equipment selection, maintenance programme, operator training and similar task that are management.

An American quality management expert Edward W. Deming (1994) developed ideas on methods of improving quality. He developed 14 managers, especially on the upper levels, he believes managers, especially on the upper levels, must do to produce high quality product.

Deming's 14 points on how to improve quality are as follows:

1. Create constancy of purpose towards improvement of products and services, with the aim of become competitive and to stay in business and to provide jobs.
2. Adopt the new philosophy: We are in a new economic age, western management must awaken to the challenge must learn their responsibilities and must take on leadership for change.
3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into product in the first place.
4. End the practice of awarding business on the basis of price tag, instead, minimizes total cost.
5. Improve constantly and forever the system of production and services, to improve quality and productivity and thus constantly decrease cost.
6. Institute training on the job.
7. Institute leadership: The aim of supervision should be help people and machines gadgets to do a better job.
8. Drive out fear so that everyone can work effectively for the company.
9. Break down barriers between department, people in research design sales and production must work as a team to foresee problem of production.

10. Eliminate slogans, exhortation and target for the workforce asking for zero defects a new level of productivity as bulk of the causes of low quality and low productivity belong to the system and this lie beyond the power of work force.
11. Eliminate quotas on the factory floor and management by number, substitute with leadership.
12. Remove barriers that rob the hourly workers, people in management and in engineering of the right pride workshop.
13. Institute a vigorous programme of education and self-improvement.
14. Put everybody in the company to work to accomplish a transformation: The transformation is everybody's job. The appropriate focus for improving quality and reducing its cost is for top management to be committed to prevention by instilling the concept that quality must be a new of life not just a programme to ideal with temporary problem quality control can be effective in any organization small or big. The success of the programme however, will not be possible without the initiative and sustained interest of the top management.

## 2.8 **Statistical Process of Quality Control**

According to Bartol (2018) years ago, before statistical quality controls no one knew much risk was involved. Sometimes Larger samples than

necessary were inspected. At other items more risks was taken of bad work getting through, than anyone realized with statistical quality control. Inspection is more reliable with statistical quality control. Inspection is more reliable and less costly.

Hence statistical quality control aims at maximizing quality while minimizing inspection cost.

a. To control the quality of work done on individual factory operations while the work is being.
b. To decide whether to accept or reject lots of products already produced (whether bought or made in the company).
c. To furnish top the management a quality audit of the component's products. In achieving the above state uses, statistical quality control combines the use of control charts and acceptance sampling tools.

**Control charts**

In the 1920's the control of chart was developed at western electric. The control used inspection conducted on in-process goods during production to identify any change in quality and to help to assign a cause to that change. Although many type of chart have since been developed, they remain a widely used tool throughout the industry for controlling quality.

**Acceptance sample**

This is the primary tool in quality assurance. Developed at all ball laboratories in the late 1920's the practice introduce the idea that decision could be made on the quality of batch of products from a given production process without inspecting every item, only a number on pieces (known as sample) selected randomly from the whole batch of product need to be inspected. This is based on assumption that if the selected test pieces meet the quality standard, then all other items, which came from the same batch of production, should also satisfy the requirements, this procedure is known as acceptance sampling. It is commonly used for raw material and finished goods inspections. It should be noted that much of the acceptance sampling techniques of quality control makes use of probability and distribution theories. That is, it makes a lot of use of various statistical control charts ranging from the sample normal distribution. A detailed discussion of such statistical concept is, however beyond the scope of this text. Therefore, it's suffices to note that a sampling plan should indicate a random sample of size 'n' drawn from a population of size 'N' and the acceptance number "C", that is the number of defective in the sample permitted before the entire lot from where sample was drawn is to be rejected statistically, a sampling plan is shown by means of operating characteristics cure X drawn to pass through the desired acceptance number that is, the acceptable quality level (AQL).

There are two types of data collected statistically, they are;

i) Attributes

ii) Variables

Attributes are data obtain by counting or separating the bad from the good ones. The' are obtained by company, a work piece of its specification to judge whether the pieces can or cannot be accepted. Various gadgets such as the "go no go" gauge are used for this purpose.

Attributes are usually summarized to provide information such as the number the defect in a unit or the percentage of defective items. In the case of variable, they are actual measurements that will be used to determine the amount of deviation from the specifications. The variable measured are used to determine the average (mean) and the extend of deviation from the average (standard deviation).

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Research Design

Research design is an important tool for the collection of reliable data for study. In order to achieve high reliability and validity in this research study, the survey research is considered appropriate for this study. Survey research is a scientific research method that is interested in generating current data and information on the varieties under investigation. This method has important advantage of providing reliable assessment of the sample population, in terms of its characteristics, problems and other variables being investigated.

## 3.2 Research Population

The research population for the study is 120, which consists of all management staff and lower level workers of Olam Crown Flour Mills Nigeria Limited, Kaduna.

## 3.3 Sample Size and Sampling Techniques

The sample size is selected based upon the statistical law of large number which say that the larger number will give more accurate result than small

one. However the sample size of the research is ninety-two (92) and it plays a significant part in determining the sample size.

In a situation where the population of the researcher is many the researchers have to sample to a reasonable size. Sampling is the act of reducing a population in to researchable order. However, the researcher decided to use Krejcie and Morgan (1970).

## 3.4 Method of Gathering Data

The researcher used the field survey method of gathering data employing the use of questionnaire and oral interview. Therefore the researcher personally administered the questionnaire and also conducted the interview herself, the questionnaires were delivered by hand and also collected by hand. Secondary methods of gathering data is also used e.g. textbook, journal, etc.

## 3.5 Justification for the Instrument Used

Questionnaire: Structured questionnaire is administered to elicit information from the respondent because it is fast and may be pre-coded for data analysis.

Interview: The interview method is considered for this study because it has advantage of allowing the investigation of invisible behaviour and experience.

## 3.6 Method of Data Analysis

The data will be analyzed using simple percentage, and the analysis will be presented in a tabular form which the hypothesis will he proven and tested using chi-square.

$$X^2 = \frac{\sum (O - E)^2}{E}$$

Where: $\sum$ = summation

O = observed frequency

E = expected frequency

## 3.7 Justification for the Method Used

This technique is more convenient and appropriate to enable the researcher to comprehend the findings of this study.

# CHAPTER FOUR

# DATA PRESENTATION AND ANALYSIS

The presentation of data would be based on the number of questionnaire given to the respondents and shall be in tabular from, while a sample percentage will be used to analysis response of each questions from the respondents A total number ninety-two (92) questionnaire carrying seventeen (17) questions each were given to the respondents, but only seventy (70) were duly filled and returned. These are as presented and analyzed below.

## 4.1 Presentation and Analysis of Data

**Table 4.1:** Sex of Respondents

| **Sex** | **Frequency** | **Percentage (%)** |
|---|---|---|
| Male | 60 | 85.7 |
| Female | 10 | 14.3 |
| **Total** | **70** | **100%** |

**Source:** Field Survey, 2022

From the data on the table 4.1 above 60 respondents which represent 85.7% of the respondents are male, while the remaining 10 respondents representing 14.3% are female. From the above analysis, it can be deduced that there is more male staff than female staff in the organization.

**Table 4.2:** Age of the Respondents

| Age | Frequency | Percentage (%) |
|---|---|---|
| 18 – 25 years | 16 | 22.9 |
| 26 – 35 years | 36 | 51.4 |
| 36 – 40 years | 8 | 11.4 |
| 41 years and above | 10 | 14.3 |
| **Total** | **70** | **100%** |

**Source:** Field Survey, 2022

From the data presented on the table 4.2 above, 19 respondents representing 22.9% are between the age bracket of 18 - 25years, 36 respondents which represent 51.4% of the total of the respondents fall on the category of 26 - 35 years, 8 respondents representing 11.4% are between the age bracket of 36 - 40 years, while 10 respondents representing 14.3% of the entire respondents are above 41 years and above. From the analysis therefore, it can be deduced that the respondents used for this study are young, dynamic and vibrant. This shows a bright future for the organization.

**Table 4.3:** Marital Status of Respondents

| Sex | Frequency | Percentage (%) |
|---|---|---|
| Married | 54 | 77.1 |
| Single | 16 | 22.9 |
| **Total** | **70** | **100%** |

**Source:** Field Survey, 2022

From the data on the table 4.3 above reveals that 54 respondents representing 77.1% of the respondents are married, while the remaining 16 respondents representing 22.9% are single.

**Table 4.4:** Educational Qualification

| **Educational Qualification** | **Frequency** | **Percentage (%)** |
|---|---|---|
| GCE/SSCE | 20 | 28.6 |
| Professional Course | 10 | 14.3 |
| ND/NCE | 30 | 42.8 |
| Degree/HND | 10 | 14.3 |
| **Total** | **70** | **100%** |

**Source:** Field Survey, 2022

From the data presented in table 4.4 above, it was revealed that 20 (28.6%) of the respondents are GCE/SSCE holders, 10 respondents (14.3%) of the respondents are professional course, 30 respondents representing 42.8% are ND/NCE holders while 10 respondents representing 14.3% of the respondents have Degree/HND certificates This shows that the organization has well learned and highly educated staff members. This implication mean that the organization would have to spend less on staff training but more on the other staff development mechanisms, and there would be continuous innovation and inventions in the organization to achieve organizational productivity.

**Table 4.5:** Rank Position of Respondents

| Age | Frequency | Percentage (%) |
|---|---|---|
| Senior | 6 | 8.6 |
| Middle | 20 | 28.6 |
| Junior | 44 | 62.8 |
| **Total** | **70** | **100%** |

**Source:** Field Survey, 2022

From the data presented on the table 4.5 above, 6 respondents representing 8.6% are senior office; 20 respondents representing 28.6% are middle office; and 44 respondents representing 62.8% are junior officer.

**Table 4.6:** What are the sources of raw material?

| Options | No of Respondents | Percentage (%) |
|---|---|---|
| Domestically | 12 | 17 |
| Internationally | 10 | 14 |
| Both | 48 | 69 |
| **Total** | **70** | **100** |

**Source**: Field Survey, 2022

The above table shows that 12 respondent out of 70 respondents, representing 17% agreed that raw material is source domestically. 10 respondents representing 14% states that raw material are produced in both domestically and internationally.

**Table 4.7:** What method of inspection those your organization adopts?

| Options | No of Respondents | Percentage (%) |
|---|---|---|
| Random inspection | 6 | 9 |
| Sample inspection | 8 | 11 |
| 100% inspection | 6 | 9 |
| All of the above | 50 | 71 |
| **Total** | **70** | **100** |

**Source**: Field Survey, 2022

The above total shows that 6 respondents representing 9% agrees that random inspection is the method of inspection adopted by the organization While, 8 respondents representing 11% states that sample inspection is what is adopted. 6 respondent also representing 9% states that 100% inspection is what is adopted while, 50 respondents representing 71% states that all the above state method of inspection were use. The above revealed that inspection is carried out on materials; work in progress and finished goods and using the three stated inspection method.

**Question 4.8:** What section is responsible for quality inspection?

| Options | No of Respondents | Percentage (%) |
|---|---|---|
| Quality control section | 42 | 60 |
| The inventory section | 16 | 23 |
| Production section | 12 | 17 |
| The issuing officer | 0 | 0 |
| **Total** | **70** | **100** |

**Source**: Field Survey, 2022

The above table show that 42 respondents representing 60% agrees that quality control section are responsible for quality of goods inspection, while 16 respondents representing 23% states that the inventory section are responsible representing 17% state that production section are responsible. for the inspection of good quality. The above revealed that quality control sections are responsible .for quality inspection of goods.

**Table 4.9:** What key factor do you use assessing your suppliers?

| Options | No of Respondents | Percentage (%) |
|---|---|---|
| Financial strength | 7 | 10 |
| Technical capability | 10 | 14 |
| Quality delivery goods | 16 | 23 |
| Delivery time | 37 | 53 |
| **Total** | **70** | **100** |

**Source**: Field Survey, 2022

The above table shows that 7 respondents representing 10% agree that financial strength is used to asses suppliers. 10 respondents representing 14% states that technical capability is used, while 16 respondents representing 23% state, that quality delivery goods are used and 37 respondents representing 53% states that delivery time is used in assessing suppliers. The above table shows that the ability to deliver goods on time is what is used to asses supplier.

**Table 4.10:** At what stage of production level does your organization carry out quality control activities?

| Options | No of Respondents | Percentage (%) |
|---|---|---|
| Input level | 0 | 0 |
| Processing level | 0 | 0 |
| Output level | 0 | 0 |
| All of the above | 70 | 100 |
| **Total** | **70** | **100** |

**Source**: Field Survey, 2022

Above the table shows that all stages of production that is, input stage, processing stage and output stage the organization carry out quality control activities as revealed by 70 respondents representing 100% as shown in the above table.

**Table 4.11:** Do you consider quality control activities as part of cost minimization strategy in your organization?

| Options | No of Respondents | Percentage (%) |
|---|---|---|
| Strongly agree | 28 | 40 |
| Agree | 33 | 47 |
| Disagree | 9 | 13 |
| **Total** | **70** | **100** |

**Source**: Field Survey, 2022

The above table shows that 28 respondents representing 40% strongly agrees that quality control activities are part of the organization cost minimizations strategy, while 33 respondents representing 47% agrees and 9 representing 13% disagree. This reveals that quality controls activities are partly a cost minimization strategy adopted by the organization.

**Table 4.12:** Is the organization well equipped with materials necessary for the protection for quality materials in the store?

| Options | No of Respondents | Percentage (%) |
|---|---|---|
| Yes | 38 | 54 |
| No | 32 | 46 |
| **Total** | **70** | **100** |

**Source**: Field Survey, 2022

The above reveals that 38 respondents representing 54% states that the organization is well equipped with protection materials in the store and 32 respondents representing 46% states that the company is not well equipped. with quality protection materials. Above reveals that the company has adequate materials for the protection of quality of goods in the store.

**Table 4.13:** Does your organization have a training programme for your quality control staff to ensure maximum benefit of a concept?

| Options | No of Respondents | Percentage (%) |
|---|---|---|
| Yes | 58 | 83 |
| No | 12 | 17 |
| **Total** | **70** | **100** |

**Source**: Field Survey, 2022

The above table shows that 58 respondents representing 83% states that the organization has training programme for quality control staffs. While, 12 organization has no training programme for its quality control staffs. Above revealed that the organization have a training programme for quality control staff to ensure maximum benefit of the concept.

**Table 4.14:** Would you agree that quality assurance is the reason for your organization survival despite the prevailing economic hardship situation?

| Options | No of Respondents | Percentage (%) |
|---|---|---|
| Strongly agree | 39 | 56 |
| Agree | 23 | 33 |
| Disagree | 8 | 11 |
| **Total** | **70** | **100** |

**Source**: Field Survey, 2022

The above table revealed that 39 respondents representing 56% strongly agrees that quality assurance is the reason for the survival of the organization, while 23 respondents representing 33% simply agrees, 8 respondents representing 11% disagree.

Above revealed that the quality assurance is the reason for the survival of the organization despite the prevailing economic hard situation.

**Table 4.15:** What has been the response of your customers as regard the quality of the product they buy from you?

| Options | No of Respondents | Percentage (%) |
|---|---|---|
| Satisfactory | 36 | 51 |
| Unsatisfactory | 0 | 0 |
| Fair | 34 | 49 |
| **Total** | **70** | **100** |

**Source**: Field Survey, 2022

From the above table 36 respondents representing 51% states customers' response as regard the product quality is satisfactory and 34 respondents

representing 49% states that customer's response is fair. Above revealed that customers or consumers of these products are satisfied with the level of quality in the products.

**Table 4.16:** Do you consider quality control as an important tool in manufacturing organization like your company?

| Options | No of Respondents | Percentage (%) |
|---|---|---|
| Strongly agree | 46 | 66 |
| Agree | 21 | 30 |
| Disagree | 3 | 4 |
| **Total** | **70** | **100** |

**Source**: Field Survey, 2022

The above reveals that 46 respondents representing 56% strongly agrees that quality control is an important tool in manufacturing organization while 21 respondents representing 30% agree and 3 respondents representing 4% disagree. This shows that quality control is a very tool for manufacturing.

**Table 4.17:** In what way can you suggest to the organization to improve on the quality control activities?

This is an open-ended question, in which most of the respondents emphasized the need for provision of adequate storage facilities and also the improvement staff training to ensure that only qualified personnel are saddled with the responsibility for quality control function.

## 4.2 Test of Hypothesis

The stated hypothesis shall tested through the use of chi-square test ($X^2$). Using question 7, 10 and 12 in deriving the table, the procedures are as follows:

| Question | Strongly Agree | Agree | Disagree | Total |
|---|---|---|---|---|
| Do you consider quality control activities as part of cost minimization strategy in your organization? | (37.67)28 | (25.67)33 | (6.67)9 | 70 |
| Would you agree that quality assurance is the reason for your organization survival? | (37.67)39 | (25.67)23 | (6.67)8 | 70 |
| Do you consider quality control as an important tool in manufacturing organization like your company? | (37.67)46 | (25.67)21 | (6.67)3 | 70 |
| **Total** | **113** | **77** | **20** | **210** |

$H_0$ – Quality control has no significant impact on organization efficiency.

$H_1$ – Quality control has a significant impact on organization efficiency.

Significant level – 0.05

Degree of Freedom - (r-1)(c-1) = (3-1)(3-1) = 2 x 2 = 4

Testing Statistics - $X^2 = \sum \frac{(O-E)^2}{E}$

Decision Rule - Accept $H_0$ if $X^2 < 9.49$.

**Computation**

| O | E | O-E | $(O-E)^2$ | $\frac{(O-E)^2}{E}$ |
|---|---|---|---|---|
| 28 | 37.67 | -9.67 | 93.61 | 2.48 |
| 39 | 37.67 | 1.33 | 1.77 | 0.05 |
| 46 | 37.67 | 8.33 | 69.39 | 1.84 |
| 33 | 25.67 | 7.33 | 53.73 | 2.09 |
| 23 | 25.67 | -2.67 | 7.13 | 0.28 |
| 21 | 25.67 | -4.67 | 212.81 | 0.85 |
| 9 | 6.67 | 2.33 | 5.43 | 0.81 |
| 8 | 6.67 | 1.33 | 1.77 | 0.27 |
| 3 | 6.67 | -3.67 | 13.47 | 2.02 |
| | | | | **$X^2 = 10.69$** |

**Decision**

Reject $H_0$ because $X^2$ is > 9.49 and accept $H_1$, which states that quality control technique has significant impact on organizational efficiency of Olam Crown Flour Mills Nigeria Limited, Kaduna.

# CHAPTER FIVE

# SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

## 5.1 Summary of Findings

The following summary of findings was raised:

i) It was discovered that the management do not deem it necessary to specify the need for higher quality and do not train and coach employees to analyze work processes so that they can make improvements in them.

ii) It was realized that the management do not find the root causes for unwanted variability in product or services, and the employees do not take steps to make improvement that will lead to better quality.

iii) It showed that a focus is not giving to continuous improvement which the employees stop learning and striving to do better.

iv) it was also discovered that machine component part are not design such that operation produces less heat and noise so as to facilitate a conductive environment for worker and thus enhance productivity.

## 5.2 Conclusion

The importance of quality control cannot be over emphasized in actuality, in production of product, the materials and parts may not always be of uniform quality. The non-uniformity of quality of materials and parts, if not detected

early and separated, will result in the non-uniformity of the quality of the product therefore, the rule that must be observed is to established firm control over the condition that causes variability and keep the range of inconsistency within very narrow limit. Another important factor to be considered is the defection of the sources of defects, and. the degrees to which they affect the quality of the product.

The above is, of course, easier said than done. Many factors break up on conditions in the work place and to make them all consistently conform to certain standard is no easy task. It therefore, calls for the effective implementation of a total quality control system in a manufacturing environment.

## 5.3 **Recommendations**

Having observed some of the problem affecting the organization as regard the quality of product produced the following are hereby recommended:

i) Focus on work process. The quality of product and services ultimately travels back to the process that produces them. Therefore, it is necessary not only to specify the need for higher quality, but also to train and coach employees to analyze work processes so that they can make improvements in them.

ii) Analyze, and understand variability. The primary cause of quality problems can be traced to variances in process or outcomes. Only when the root causes for unwanted variability in product or services have been identified, can employees take steps to make improvement leading to better quality.

iii) Emphasize continuous learning and improvement. The idea here is that it is always possible to improve on the organization. A focus on continuous improvement here is to ensure that employees never stop learning and striving to do better.

iv) Conducive operative environment. Machine component part should be design such that operation produces less heat and noise so as to facilitate a conductive environment for worker and thus enhance productivity.

## REFERENCES


Anene, E.C. (2015). *"Production Planning and Control in a Small-Scale Garment Industry";* An Unpublished Research Paper Presented to the Faculty of Administration, Obafemi Awolowo University, Ile-Ife, in Partial Fulfillment of the Requirement for the Award of the Postgraduate Diploma in Management Studies.

Banjoko, S.A. (2015). *Production and Operations Management*. Lagos: Saban Publishers.

Bonavia, T. & Marin, J.A. (2014). An Empirical Study of Lean Production in the Ceramic Tile Industry in Spain. *International Journal of Operations & Production Management*, 26(5), 505-531.

Business Dictionary (2012). *Concept of Production Planning and Control*. Retrieved from: www.businessdictionary.com.

Cole, G.A. (2013). *Production Planning & Control*: London: Thomson Publishers.

Imaga, E.U.L. (2013). *Theory and Practice of Production Management*. Enugu: Gostak Printing and Publishing Co. Ltd Nigeria.

Jain, K.C. & Aggarwal, L.N. (2014). *Production Planning Control & Industrial Management,* (6th ed.). Delhi: Khana Publishers.

Magee, S. (2016). Lean Production and the Internet. *International Journal of Production Economics*, 89(3), 247-260.

Mayer, R.R. (2014). *Production & Operations Management.* Tokyo: McGraw Hill Inc.

McKay, C., Kenneth, K. & Vincent, M. (2016). Integrated Production Planning and Scheduling on Automobile Assembly Lines. *International Journal of Production Economics* 35(8), 711-725.

Mula, J., Poler, R. & Garcia, J.P. (2012). MRP with Flexible Constraints: A Fuzzy Mathematical Programming Approach. *Fuzzy Sets and Systems*, vol. 157, 74-97.

Pounds, K. (2014). *"Deterministic Lot-Sizing Models for Production Planning",* Netherlands: PhD Thesis, Erasmus Universiteit Rotterdam.

Rago, D., Huisman, W. & Wagelmanss, S. (2013). Lean Indicators and Manufacturing Strategies. *International Journal of Operations & Production Management*, 21(11), 1433-1452.

Silver, G., Pyke, C. & Peterson, A. (2016). *Production /Operations Management: Contemporary Policy for Managing Operating Systems.* Cambridge: Harvard University Press.

Stewart, M. (2011). *Modern Production Management*. New York: John Wiley & Sons Inc.

Vollman, T.E., William, L., & Clay, D (2012) *"Manufacturing Planning and Control Systems"*, (3rd ed), New York: Irwin.

Winston, A. (2014). *Production & Operations Management: Statistical Analysis for Decision*. New York: Richard P. Irwin Inc.

## APPENDIX I: LETTER OF INTRODUCTION

Department of Management Studies,
College of Business and Management,
Kaduna Polytechnic,
Kaduna.
20th May, 2022.

Dear Sir,

## LETTER OF INTRODUCTION

I am a student of the Department of Management Studies, Kaduna Polytechnic carrying out a research: "An Assessment of Quality Control Techniques As A Tool for Enhancing Organizational Efficiency in Olam Crown Flour Mills Nigeria Limited, Kaduna".

Kindly answer the following questions by ticking the appropriate box. The data collected will be used purely for research work as a partial fulfillment for the award of higher national diploma in production and operation management.

I promise that any information released to me will be treated as confidential and used for academic purpose only.

Yours faithfully,

**GBADAMOSI OLUFEMI ISIAQ**
KPT/CBMS/18/50657

## APPENDIX II: QUESTIONNAIRE

**SECTION A:** PERSONAL DATA

1. Sex of the respondent.

   Male ( ) Female ( )

2. Age of respondent

   18 -25 ( ) 26-35 ( ) 36-40 ( ) 41 above ( )

3. Marital status.

   Married ( ) Single ( )

4. Educational background.

   GCE/SSCE ( )

   Professional course ( )

   OND/NCE ( )

   Degree/HND ( )

5. Rank position of respondents

   Senior ( )

   Middle ( )

   Junior ( )

**SECTION B:** GENERAL INTRODUCTION

6. Where do you procure all your raw materials from?

   Domestically ( )

   Internationally ( )

   Both ( )

7. What method of inspection does your organization adopt?

   Random inspection ( )

   Sample inspection ( )

   100% inspection ( )

   All of the above ( )

8. What section is responsible for quality inspection?

   Quality control section ( )

   The inventory section ( )

   Production section ( )

   The issuing officer ( )

9. What key factor do you use in assessing your suppliers?

   Financial strength ( )

   Technical capability ( )

   Quality delivery goods ( )

   Delivery time ( )

10. At what stage of production level does your organization carryout quality control activities?

    Input level ( )

    Processing level ( )

    Output level ( )

    All of the above ( )

11. Do you consider quality control activities as part of cost minimization strategy in your organization?

    Strongly agreed ( )

    Agreed ( )

    Disagreed ( )

12. Is the organization well equipped with materials necessary for the protection of quality of material in the store?

    (a) Yes ( ) (b) No ( )

13. Does your organization have a training programme for your quality control staff to ensure maximum benefit of a concept?

    (a) Yes ( ) (b) No ( )

14. Would you agree that quality assurance is the reason for your organization's survival despite the prevailing economic hardship situation?
    Strongly agreed ( )
    Agreed ( )
    Disagreed ( )
15. What have been the responses of your customers as regards the quality of the products they buy from you?
    Satisfactory ( )
    Unsatisfactory ( )
    Fair ( )
16. Do you consider quality control as an important tool in a manufacturing organization like yours?
    Strongly agreed ( )
    Agreed ( )
    Disagreed ( )
17. In what way can you suggest to the organization to improve on the quality control activities?

    _____

    _____

    _____