

1-1 INTRODUCTION

Managing the cost of quality was the first stage of awareness of business and the profitability is the stage of interest in inspection and testing, which was done using technical means. Since the emergency of a mass production were usually affect the quality during the production process itself. ,Therefore the focus on measuring the cost of quality along all the manufacturing process by means of screening process where they are excluded defective which was screening at random based on statistical estimates and limited responsibility of quality control in the quality manager and the process of inspection and examination for the purposes of quality only. Well, no interest in knowing and return of the causes of defects and track did not devoid products of defects at this stage and it was at that time the concept of cost quality revolves around conformity only where the processes are designed in accordance with the product wants and not according to the customer wants, and then the evolution of the concept of inspection in quality control and quality of processes and quality assurance.

Implementation of cost of quality is one of the tool which is managing the resources of the organization and satisfying the stakeholders needs and achieving the strategic goals for the organization.

The concept of measuring the cost while maintaining the quality, and in the context of compliance with the requirements of the community, and was excellence is the final stage of the evolution of the overall quality system. The managing of cost of quality as a key frames to help organization enhance their competitiveness and achieve excellence as one of the most important standards, and is also an important tool to assess the situation of the Professional staff within the organization and the extent of progress and the strength of This tool means of supporting organization in order to reach better balance priorities and more efficient in production and develop realistic action plan for the management.

Cost of quality has many components, always representing in :

- ✓ Managing the prevention cost.
- ✓ Managing the appraisal cost.
- ✓ Managing the internal failure cost.
- ✓ Managing the external failure cost.

2-1 PROBLEM STATEMENT

In Sudan many organizations start to implement quality management system to improve their performance and the product quality.

This research trying to investigate the impact of implementation of cost of Quality programme in pharmaceutical industries on the quality of process and products .

also the employees and customers satisfaction in local drug industry in sudan.

The concept of the research will be address through answering the following questions:

1\ What is the extent of the job satisfaction among the employees in PHARMALAND PHARMACEUTICAL?

2\ what is the extent of the customers satisfaction of PHARMALAND PHARMACEUTICAL?

3\ accordingly is it possible to implement cost of quality tools in all the pharmaceutical industries in Sudan?

1-3 AIM OF THE RESEARCH

The concept of cost of quality measurement is one of the TQM tool for Quality Management to help organizations to achieve their goals, by selecting path for those organizations towards achieving excellence , helping them to understand the gaps and then launch solutions. This study aimed to identify measurements that could help the application of COQ in Sudanese pharmaceutical factories, and how those organisation deal with this concept and how far is reflected on the production in terms of product quality and Employees- Customer satisfaction.

The application will be done by measuring the prevention and appraisal cost to control the failure cost either internal or external.

1-4 Objectives of the Research:-

1\ To identify the cost of quality , its principles , COQ in pharmaceutical industries , its requirements for implementation , the impact of implementing COQ in production, positive and negative attitudes of COQ and the prevention of the internal and the external failure.

2\ measuring the level of the customer's satisfaction of pharm land pharmaceutical company.

3\ Measuring the level of the employees satisfaction in pharm land pharmaceutical company.

4\ Drive a group of recommendations that could help all the pharmaceutical companies to reach to the level of reducing the failure cost & to reach to the satisfaction for their employees and their customers.

1-5 The Significance of the Research:-

There are many challenges facing cost controlling in pharmaceutical companies in Sudan such as:-

-The general deterioration of scale of measurement & standards in the pharmaceutical companies in Sudan.

-The increasing number of the products which are distributed in the market.

-In the meanwhile COQ, is widely being adopted these years and considered to be the working procedures for the quality management principles which change them to practical integrated tools that help organizations achieve their objectives.

-Hence there is a real need for checking and assessing the impact of implementing COQ in pharmaceutical industries.

All these challenges can only be faced by adopting and checking distinctive cost of quality programs that can be flexible and cope with the rapid changes in the international systems.

Hence, the research picks this topic and concentrates on measuring the impact of implementing COQ on both internal and external customer since, the system begins and ends with customer. It is built on the customer requirements and assessed according to its success in achieving customer satisfaction in terms of high quality products.

1-6 Research Hypothesis:-

To achieve the objectives of this research the following hypothesis are assumed:-

- 1\ There is a high level of job satisfaction among the employees in pharmaceutical industry implementing COQ.
- 2\ There is a high level of the customers satisfaction in pharmaceutical industry implementing COQ.
- 3\ There is no statistically significance difference between implementing COQ in these pharmaceutical industry and their employees job satisfaction.
- 4\ There is no statistically significant difference between implementing COQ in these pharmaceutical industry and the customers satisfaction.

1-7 Research Methodology:-

A simple random questionnaire survey of employees and customers of some of the GMP pharmaceuticals industry (PHARMALAND PHARMACEUTICAL) will be conducted where we would like to answer some of the questions concerning on the impact of implementing the COQ management systems.

The questionnaire will be distributed among 45 employees and 15 customers in 1 pharmaceutical company implementing COQ system.

The questionnaire is designed and concentrate on the product quality reflected mainly on employees and customers satisfaction .

In the two parts of questionnaire employees satisfaction and the customers satisfaction , the respondents will be asked to rank their agreement with the statement on a five –point Like scale .

1- for strongly disagree , 2- for disagree , 3- for I don't know , 4- for agree and 5- for strongly agree .

Data Collection Process :-

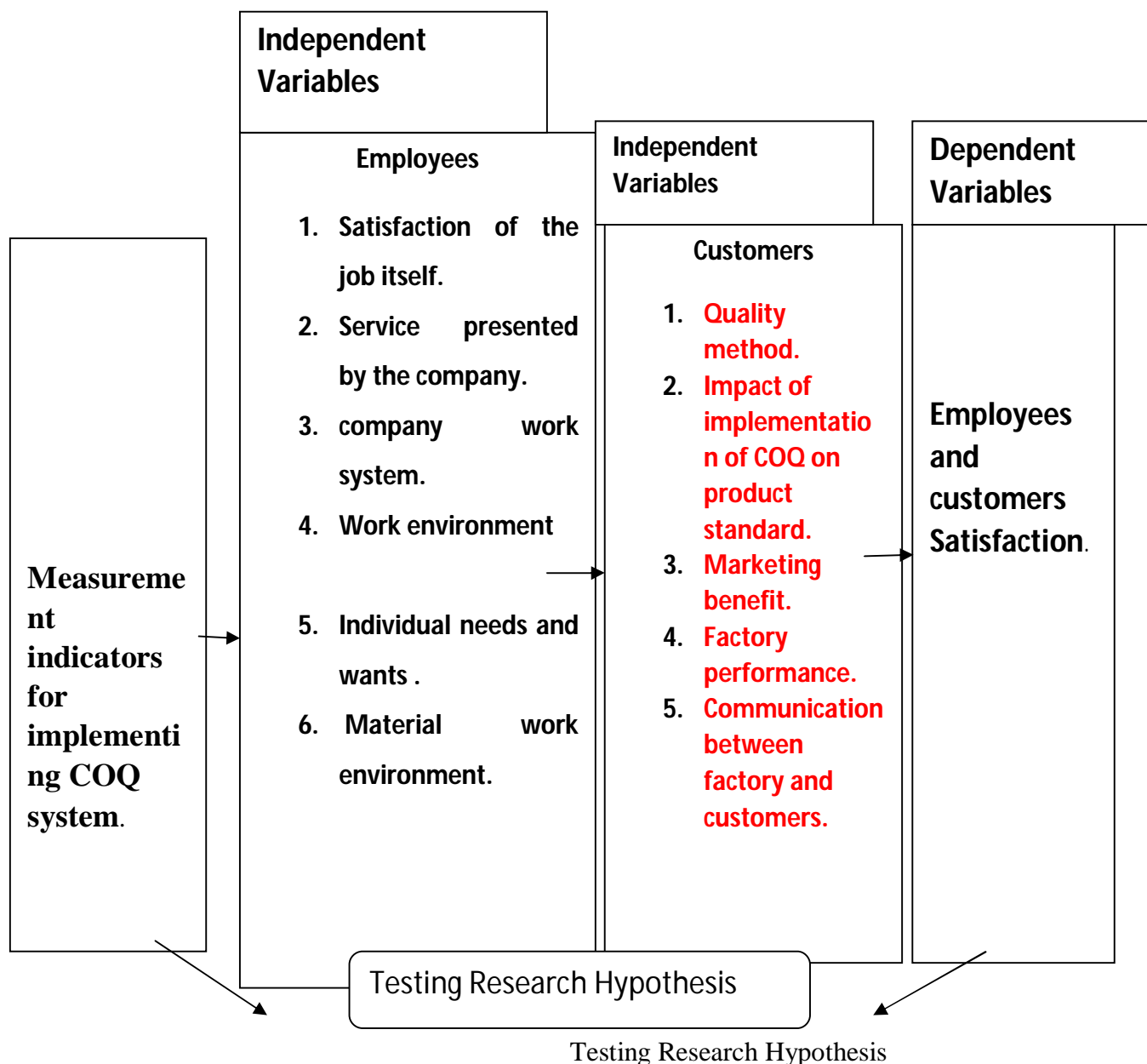
The questionnaire was distributed with the explanation of the survey purpose and guarantee of response confidentiality for the employees and the customer in the pharmaceuticals company moreover, interview with some customers & employees will be conducted to drive some recommendations to help implementing COQ in the pharmaceuticals companies in Sudanto reach to the optimum product quality and employees- customer satisfaction.

Research Model:

To study the relation between independent & dependent variables the researcher designed the following research model

figure (1)

Research Model:



CHAPTER TWO

Literature Review

2-1 cost of quality :

Cost of quality refers to the sum of costs incurred to prevent thenon-conformance from happening and the costs incurred whenthe non-conformance in productsand system occurs which is commonly known as cost of poor quality.

Cost of poor quality is actually the cost of doing things wrong, Cost of poor quality refers to the costs associated with providing poor quality product or service

In any organization implementing COQ is considered to be a strategic decision and this is because of its impact on the organizational level on investment and on the terms needed for implementation and the c impact of this in the reputation of the organization. Moreover, COQ is affected by the objectives of the organization, the product or services which is introducedby the types of its processes.

The critical point for the efficiency and effectiveness of this system is its ability to achieve internal and external customer satisfaction because it begins and ends with the customer. It is built according to the success of achieving customer satisfaction by providing aquality products. Armand Feigenbaum suggested that the Costs of Quality could be separated into distinct categories:

- The Cost of Internal Failure
- The Cost of External Failure
- The Cost of Appraisal (or Detection costs)
- The Cost of Prevention

INTERNAL FAILURE COSTS

Incurred when products fail to meet specified quality requirements, and failures are detected before delivery to the customer, e.g. scrap, waste, etc.

EXTERNAL FAILURE COSTS

Incurred when products fail to meet specified quality requirements, but failures are only detected after delivery to the customer, e.g. warranty claims, liability, etc.

APPRAISAL COSTS

Costs of ensuring that the product meets the specified quality requirements, and that any non-conforming product is detected before delivery to the customer, e.g. inspection, audits, etc.

☐ PREVENTION COSTS

Incurred to prevent defects from occurring by developing quality systems and quality programs e.g. quality planning, training, etc.

- Appraisal and prevention costs are the costs of controlling quality, whereas internal and external failure costs are the costs of failing to control quality.
- The cost of preventing mistakes is generally much less than the cost of correcting them, as revealed by inspection/assessment

Build quality in vs. Inspect quality in

- 2-2-1 Cost of Achieving Good Quality
 - Prevention costs
 - costs incurred during product design
 - Appraisal costs
 - costs of measuring, testing, and analyzing
- 2-2-2 Cost of Poor Quality
 - Internal failure costs
 - include scrap, rework, process failure, downtime, and price reductions
 - External failure costs
 - include complaints, returns, warranty claims, liability, and lost sales

PREVENTION COST:-

- Quality planning costs
 - costs of developing and implementing quality management program
- Product-design costs
 - costs of designing products with quality characteristics
- Process costs
 - costs expended to make sure productive process conforms to quality specifications

- Training costs
 - costs of developing and putting on quality training programs for employees and management
- Information costs
 - costs of acquiring and maintaining data related to quality, and development of reports on quality performance

APPRAISAL COST:-

- Inspection and testing
 - costs of testing and inspecting materials, parts, and product at various stages and at the end of a process
- Test equipment costs
 - costs of maintaining equipment used in testing quality characteristics of products
- Operator costs
 - costs of time spent by operators to gather data for testing product quality, to make equipment adjustments to maintain quality, and to stop work to assess quality

INTERNAL FAILURE COST:-

- *Scrap costs*
 - costs of poor-quality products that must be discarded, including labor, material, and indirect costs
- *Rework costs*
 - costs of fixing defective products to conform to quality specifications
- *Process failure costs*
 - costs of determining why production process is producing poor-quality products
- *Process downtime costs*
 - costs of shutting down productive process to fix problem
- *Price-downgrading costs*

- costs of discounting poor-quality products—that is, selling products as “seconds”

EXTERNAL FAILURE COST:-

- Customer complaint costs
 - costs of investigating and satisfactorily responding to a customer complaint resulting from a poor-quality product
- Product return costs
 - costs of handling and replacing poor-quality products returned by customer
- Warranty claims costs
 - costs of complying with product warranties
- Product liability costs
 - litigation costs resulting from product liability and customer injury
- Lost sales costs
 - costs incurred because customers are dissatisfied with poor quality products and do not make additional purchases

2-2 Measuring cost of quality:-

COQ data can be measured and presented in many different ways.

- % age of sales
- % age of profits
- % age of manufacturing cost.
- Cost per direct labor hour.
- Cost per unit of product.

2-3 Steps in implementing quality costs:-

The following sequence applies to most organizations

1. Review the literature on quality costs or consult others in similar industries who are using the same tool.
2. Select one organizational unit of the company to serve as a pilot site
3. Discuss the objectives of the study with the key people in the organization

4. Collect whatever cost data are conveniently available from the accounting system
5. Make a proposal to management for a full study
6. Publish a draft of the categories defining the cost of poor quality
7. Finalize the definitions and secure management approval
8. Secure agreement on responsibility for data collection and report preparation
9. Collect and summarize the data
10. Present the cost results to management along with the results of a demonstration quality improvement project .

2-4 Benefits of using quality costs:-

- Quantify the size of the quality problem
- Identify major opportunities for cost reductions
- It helps in Identification of opportunities for reducing customer dissatisfaction and associated threats to product salability
- Measures the results of quality improvement activities
- Align quality goals with organizational goals
- Set cost reduction targets.

The studies about job satisfaction differ in the ways that take it. It can be divided to three main groups.

1/ The first group takes job satisfaction as a variable which follows a group of other independent variables which concentrates on searching about the factors and determinants which cause the job satisfaction so it concentrates on choosing the relation between one or some of these determinants and the job satisfaction such as: the impact of the relations with the colleagues and the managers, impact of wages and salaries, demographic factors and incentives.

2/ The second group of the studies takes the job satisfaction as an independent variable which effect on the other variables following it such as the impact on commitment, on employee performance and the efficiency of the system of the organization.

3/ The third group concentrates on measuring the dimensions of the job satisfaction such as the impact on the feeling on the others, respect for the job, the importance of the job safety and quality, social position and satisfaction of individual needs.

Although there are many previous studies about job satisfaction none of them was about measuring the impact of implementing of cost of quality on the job satisfaction. This may be due to the fact that the cost of quality, is a recent system which its implementation is widely spread only in the recent years and the culture of quality control itself was not widely spread, and The awareness of this system which has been implemented in many countries all over the world comes late.

customers Satisfaction:-

Marketing and sales to be the external customer whom the QMS in pharmaceutical industry should satisfy, meet their needs and expectations and pool their efforts to exceed them. This is because marketing & sales department are those who decides to send products to the market, and also decides if these product is capable to be continues or not. This decision takes through his assessment to the quality of the products and services that is offered to them, beside their judgment for the quality of the management system that the pharmaceutical industry follows.

The studies about measuring the customers satisfaction are very important in the pharmaceutical industry. This may be due to the high concern of measuring customer satisfaction in the manufacturing organizations in general because it is easy to do this, for the tangible products as it is produced at the same time of its consumption.

Also the person who receives the pharmaceutical goods may participate in its production and this raises his awareness, when he expresses his requirements. This is beside the low automation in some services especially the pharmaceutical products which its quality depends mainly on the human factor such as quality procedures and people who work in the company and to the extent of the employees' response and concerns besides the extent of the awareness of the customers and follow up with the company and product quality standard responding and adopting to the pharmaceutical marketing needs also, the reputation of their products on the drug marketing that the company practices and invites the customers to attend and/ or participate.

CHAPTER THREE

METHODOLOGY

3-1 Research Method :-

3-2 Introduction :-

The methodology developed in this research is largely driven by the research objectives of the thesis and answers the following research questions:-

- 1- What is the extent of the job satisfaction among employees in PHARMALAND PHARMACEUTICAL COMPANY?
- 2- What is the extent of the Customers satisfaction in PHARMALAND PHARMACEUTICAL COMPANY?
- 3- Accordingly is it possible to implement cost of quality in all the pharmaceutical companies in Sudan?

3-3 Research Design:-

Kerlinger (1981) defines research design as the plan, structure and the strategy of the investigation aimed at answering the research questions . The research design must follow on from the research questions and provide the data that enable them to be answered.

It should define the mainlines of the strategy including sampling methods , data collection tools and procedure to be used to collect and analyze empirical data.

The total sample of the Employees and Customers for the tested Company PHARAMLAND PHARMACEUTICAL was taken , sample was cover most of operation department like production ,Quality control ,Quality Assurance ,maintenance and supply chain. On the other hands the Customer was present in the sales & marketing department.

The research design was conducted step by step to link the whole research together as the following flowchart.

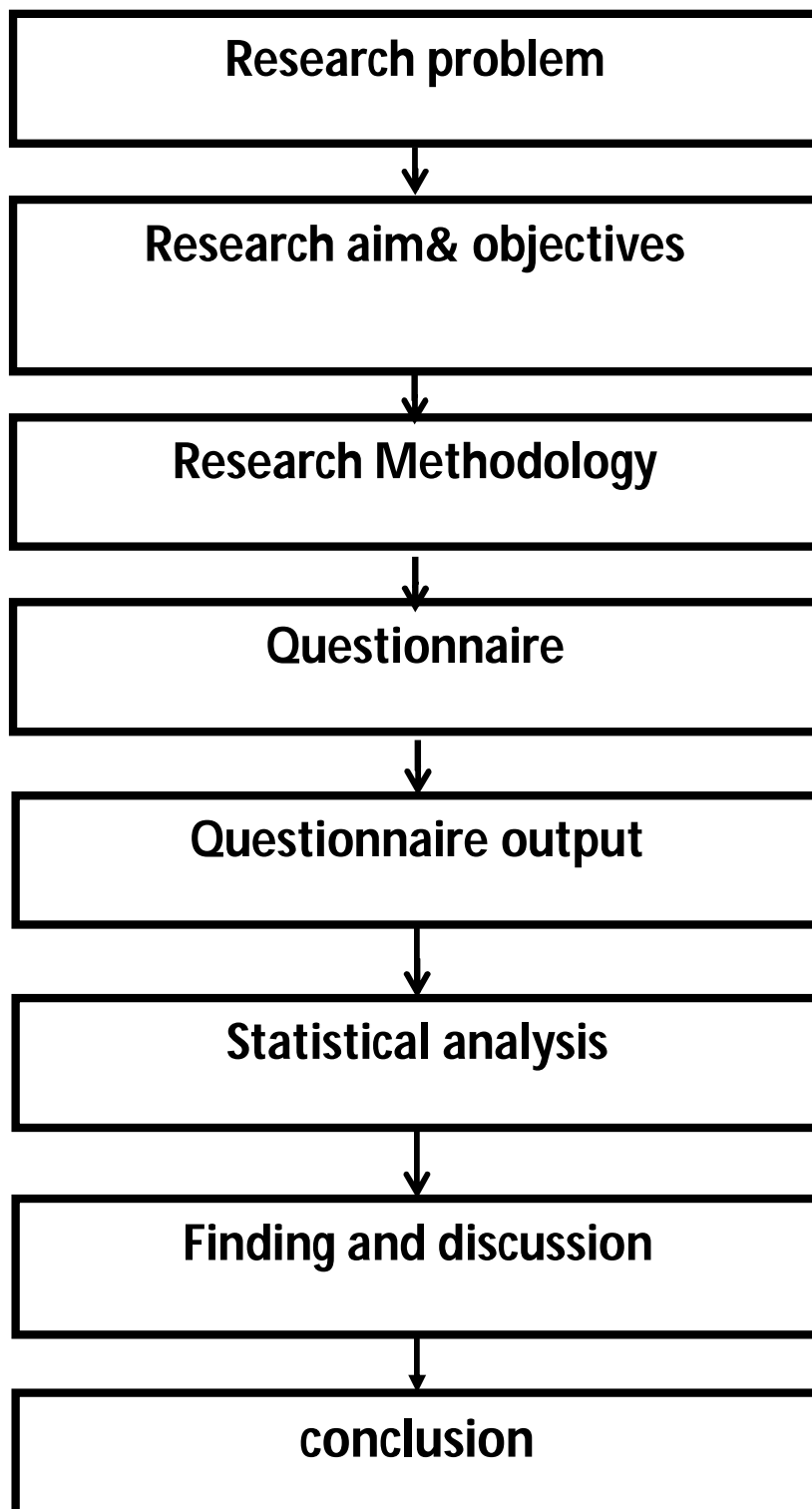


Figure No (2) Research Design Flowchart

3-4 Research Determinants:-

This research is conducted according to the following determinants:-

- The study is only conducted in the pharmaceutical company.
- The researcher used the expressions employees' satisfaction and job satisfactions as synonymous.
- It follows the random sampling method because of the limited resources and time.

3-5 Methods of Study:-

The researcher decided to follow both the qualitative techniques such as interviews with line managers in operation and sales departments, and the quantitative methods such as observations from the factory field and surveys which involve an inquiry into a desired problem, with the aim of producing data in the form of numbers, the data is then analyzed using statistical techniques, Also it is suitable for the study purpose and objectives and depending on literature review, this was judged to be the best way to boot realizable data and to be able to investigate the impact of implementing cost of quality management in employees and customers satisfaction in the pharmaceutical company.

3-6 Population and Sampling:-

The population in the collection of units within which the survey will be conducted while sampling is the process of selecting units e.g employees , managers , customers , organizations ... etc from a population of interest.

The research is conducted in the pharmaceutical industry in Sudan (PLP) . The researcher restricted the sample in the only two sectors in the company, the operation sector and the marketing & sales sectors in pharmland pharmaceutical,

The Study Was Conducted In The Following :-

- The whole seller (pharmaxir& savanna)-khartoum
- The operation site pharmland,-Albageer.

Therefore, the research depends on the number of the employees and the number of customers in both company sectors. The table below shows the number of the employees whose satisfaction was measured in the operation site of pharmland pharmaceutical. .

Table No (1) the name of the company and the number of the employees

The names of the school	The number of employees
Pharmaland pharmaceutical manufacturing site	45
Total	45

In this sample top management and head departments were randomly selected in the company,

For the customers, researcher depends on measuring the satisfaction of those who could assess the cost of quality in the company. So he chose those who keep in touch with the products. Therefore, the researcher chose the members of the customers assembly who had direct activities on products distribution in the market and close relationship with consumers to have the proper after sales feedback., and the table below shows the number of the customers whose satisfaction was measured whole seller company.

Both the samples are classified by the age, gender and occupations.

Table No (2) The number of the PLP's Customers

The name of the company	The number of customers
Pharm land pharmaceutical sales&marketing sector	15
Total	15

3-7 Data Collection Method :-

There are two methods of data collection

3-7-1 Secondary Data :-

Secondary data is the data which were previously collected through available library study such as references , researchers , websites , files and records from the company in which the research was conducted .

3-7-2 Primary Data :-

Primary data is the data which collected first through the questionnaire which is related to measuring employees satisfaction for the company in which the study is conducted and so are for the customers with specific qualifications that we wanted to study .

3-7-3 Selecting the Data Collection Method

The researcher used the qualitative technique, one on one interview because we can get the reasons for behaviors, not just descriptions of behaviors or actions . The researcher used descriptive quantitative data too, so self-administered questionnaire was chosen as the most suitable method to fulfill the objectives of this research for a number of reasons such as :-

- 1- It can be well – designed
- 2- Involve large group and
- 3- Easily interpreted .

3-7-3-1 Questionnaire Design :-

The aim of the questionnaire design is to translate the research objectives into specific questions. The answers of these questions should provide data for answering all or some of the research questions.

The questionnaire consists of two parts. Part (1) is measuring the employees satisfaction and part (2) is measuring customers satisfaction.

3-7-3-1-1 Employee Satisfaction Index :-

The researcher depends on the jobs satisfaction index quotation which is commonly used in many previous studies in total quality management. And the researcher revised it with many education experts, head teachers, and quality managers in the company, where

the research was conducted and came to the following dimensions that are required to be measured and formed the questionnaire statements accordingly

3-7-3-1-2 Job Satisfaction Dimensions:-

1. Satisfaction of the job itself.
2. Service presented by the company.
3. Satisfaction of company work system.
4. Work environment satisfaction.
5. Individual needs and wants satisfaction.
6. Satisfaction of material work environment.

The table below shows the dimensions of job satisfaction and the number of the statements in the questionnaire.

Table No (3) Job Satisfaction Dimensions

Dimensions	Number of the statement in the questionnaire
1	1-4
2	5-6
3	7-13
4	14-15
5	16-17
6	18-20

3-7-3-1-3 Customers Satisfaction Questionnaire:-

The researcher visited the pharmaceutical company and contacted with many customers in the company, who are the members of customers assemblies, so as to come to the most important dimensions on which they concentrate for their wants and expectations from the supplier. Besides, the researcher met some head managers to revise with them the indicator to measure the customers satisfaction and came to the following dimensions and formed the questionnaire statements accordingly

Customers Satisfaction Dimensions

1. Quality method.
2. Impact of implementation of COQ on product standard.
3. Marketing benefit.
4. Factory performance.
5. Communication between factory and customers.

The table below shows the dimensions of measuring parental satisfaction and the number of statements in the questionnaire.

+Table NO (4) customers satisfaction dimensions

Parental satisfaction dimension	Number
1	1-6
2	7-9
3	10-12
4	13-15
5	16-20

3-7-3-1 -5Measurement Scale :-

The researcher used a five LIKERT scale (version 16) throughout the two parts in order to indicate the degree of agreement or disagreements with each statement included in the research .

1- Strongly disagree 2- disagree 3- I don't know 4- agree 5- Strongly agree

3-7-3-1-6 Translation Of The Research Statements :-

The first version of the research statements was in English and was validated through the feedback from professional colleagues in the academic organizations.

Because the participants' main language is Arabic , the English version was translated into Arabic by professionals DRs.

3-7-3-1-7 Questionnaire Pilot Test :-

Pilot test is a good means of obtaining feedback on the content , clarity and style of survey . The proposed questionnaire was showed to some professionals in the field of

quality management and teaching for their comments on the structure of the questionnaire and test the validity of the content. The Arabic version of the questionnaire was administered to a small sample of individuals (10 people) who were similar to the target population (employees and customers in DR.nabil pharmaceutical company) each participants in this pilot test completed the questionnaire and provided feed back to the researcher regarding the clarity of the questionnaire.

As a result of the pilot test and the feedback received from the debriefing session after the completion of the pilot test, experts opinion and reliability check , the questionnaire was redesigned and simplified because some expressions and words were still understood by the participants such as COQ system , etc.

3-7-3-1-8 Procedure Of Data Collection :-

The selected employees and customer were met individually for explaining the purpose of the study and were instructed how to respond to the scale survey instruments of COQ in pharmaceutical industry. Further clarifications were offered on the questions and doubts raised by them.

The researcher intended to distribute more questionnaire copies for both employees and the Customers 50 copies for Employees and 20 copies of Customers, so as to collect the intended number for both of them.

3-7 Data Analysis :-

The data from the questionnaire was collected in APRIL-2015. Various methods were applied to analyze the response to the survey data such as :-

- Frequency distribution
- Person correlation coefficient
- Spearman – Brown equation for calculating reliability and validity coefficient
- Non-parametric , -square test
- SPSS (statistical package for social sciences)

CHAPTER FOUR

Data Analysis , Hypotheses Testing and Results

4-1 Introduction:

In this section, data analysis for the study and test of its hypotheses will be done. To do that, firstly we consider the instruments of applied study, which contain the description of the population of the study and its sample, method of collection data, reliability and validity of the tool, and the statistical treatments for the methodology of the study will be shown here.

4-2 Population and Sampling of the Study

The original population for this study is all the employees and the customers in the targeted Pharmaland pharmaceutical company. The researcher used the simple random sampling to select the people whom their satisfaction measured. The following table shows the number of distributed questionnaire, the number of received questionnaire with full-required information and the responses percentage.

Table no.(4-1): Study sample size

No.	Name	Distributes questionnaire	Received questionnaire	% of received
1	Employees satisfaction	45	39	86.6
2	Customers satisfaction	15	14	93.3
	Total	60	53	88.3

Source: The researcher from applied study, 2015

4-3 Reliability and Validity of the Questionnaire

4-3-1 Apparent Reliability and Validity:

In order to check the apparent validity for the study questionnaire and validation of its statements according to the formulation and explanation, the researcher showed the questionnaire to the quality management system ISO auditors who are specialists in the study field. Some of the auditors make some suggestions, an others agreed that the questionnaire is suitable. In any way, the researcher studied all suggestions, and some

corrections on his questionnaire have been done. The following table is showing the auditors and their jobs and places of work.

Table (4-2): The questionnaire's referees and their jobs and places of work

No.	Name	Job	Title
1	Dr/ Abbas Ibrahim	ISO Auditor	Sudan University of Science and Technology
2	Dr. Afra	Vice Dean	Statistics college of science- Sudan university

Source: The researcher from applied study, 2015

4-3-2 Statistical Reliability and Validity:

It is meant by the reliability of any test, to obtain the same results if the same measurement is used more than one time under the same conditions. In addition, the reliability means when a certain test was applied on a number of individuals and the marks of every one were counted; then the same test applied another time on the same group and the same marks were obtained; then we can describe this test as reliable. In addition, reliability is defined as the degree of the accuracy of the data that the test measures. Here are some of the most used methods for calculating the reliability:

1. Split-half by using Spearman-Brown equation.
2. Alpha- Cronbach coefficient.
3. Test and Re-test method
4. Equivalent images method.
5. Guttman equation.

On the other hand, validity also is a measure used to identify the validity degree among the respondents according to their answers on certain criterion. The validity is counted by a number of methods, among them is the validity using the square root of the (reliability coefficient). The value of the reliability and the validity lies in the range between (0-1). The validity of the questionnaire is that the tool should measure the exact aim, which it has been designed for.

The researcher calculated the validity statistically using the following equation:

$$\text{Validity} = \sqrt{\text{Reliability}}$$

The researcher calculated the reliability coefficient for the measurement, which was used in the questionnaire using (split-half) method. This method stands on the principle of dividing the answers of the sample individuals into two parts, i.e. items of the odd numbers e.g. (1, 3, 5, ...) and answers of the even numbers e.g. (2,4,6 ...). Then Pearson correlation coefficient between the two parts is calculated. Finally, the (reliability coefficient) was calculated according to Spearman-Brown Equation as the following:

$$\text{Reliability Coefficient} = \frac{2 \times r}{1 + r}$$

r = Pearson correlation coefficient

For calculating the validity and the reliability of the questionnaire from the above equation, the researcher was distributed about (10) questionnaires to respondents. In addition, depending on the answers of the pre-test sample, the above Spearman-Brown equation was used to calculate the reliability coefficient using the split-half method; the results have been showed in the following table:

Table (4-3): The statistical reliability and validity of the pre-test sample about the study questionnaire

Questionnaire	Reliability	Validity
Employees satisfaction	0.877	0.936
Customers satisfaction	0.845	0.919

Source: The researcher from applied study, 2015

We note from the results of above table that all reliability and validity coefficients for pre-test sample for overall questionnaire, are greater than (50%), and some of them are nearest to one. This indicates to the high validity and reliability of the answers, so, the study questionnaire is valid and reliable, and that will give correct and acceptable statistical analysis.

4-4 Statistical Instruments

In order to satisfy the study objectives and to test its hypotheses, we use the following statistical instruments:

1. Frequency distribution.
2. Person correlation coefficient.
3. Spearman-Brown equation for calculating Reliability coefficient.
4. Median.

5. Non-parametric Chi-square test.

In order to obtain accurate results, Statistical Package for Social Sciences (SPSS) was used.

4-5 Application of the Research Tool:

After the step of checking questionnaire reliability and validity, the researcher had distributed the questionnaire on determined study sample (60) persons, and the researcher constructed the required tables for collected data. This step consists transformation of the qualitative (nominal) variables (strongly disagree, disagree, I don't know, agree, and strongly agree) to quantitative variables (1, 2, 3, 4, 5) respectively, also the graphical representation have done for this purpose.

4-5-1 Employees satisfaction questionnaire:

4-5-1-1 Satisfaction of the job itself:

Table (4-4): Frequency distribution for Satisfaction of the job itself and percentage.

No	Statements	Number &Percent				
		Strongly agree	Agree	I don't know	Disagree	Strongly disagree
1	I feel my job is important for achieving company objectives	29 74.4%	9 23.1%	1 2.6%	0 0.0%	0 0.0%
2	My job is giving me the opportunity for improvement and innovation	19 48.7%	11 28.2%	1 2.6%	3 7.7%	5 12.8%
3	I feel satisfied when I finish one of my job with the quality objectives.	33 84.6%	6 15.4%	0 0.0%	0 0.0%	0 0.0%
4	My job offers me a distinguishable status among others	9 23.1%	14 35.9%	3 7.7%	8 20.5%	5 12.8%

Source: The researcher from applied study, 2015

Table (4-5): Chi-square test results for respondents' answers about first hypothesis

No	Statement	Median	Degree of freedom	Chi-square value	Explanation
1	I feel my job is important for achieving company objectives	5	2	71.56	Strongly agree
2	My job is giving me the opportunity for improvement and innovation	5	4	20.40	Strongly agree
3	I feel satisfied when I finish one of my job with the quality objectives.	5	4	77.0	Strongly agree
4	My job offers me a distinguishable status among others	5	4	16.20	Strongly agree

According to the table, we can demonstrate the results as follows:

- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 1st question was (71.56) which is greater than the tabulated value of chi-square at the degree of freedom (2) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-5), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have strongly agree with that "I feel my job is important for achieving company objectives".
- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 2nd question was (20.40) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-5), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have strongly agree with that My job allows the opportunity for improvement and innovation".

- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 3rd question was (77.0) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-5), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have strongly agree with that "I feel satisfied when I finish one of my job with the quality objectives."
- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 4th question was (16.20) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-5), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have strongly agree with that "My job offers me a distinguishable status among others

4-5- 1-2 services presented by the company:

Table (4-6): Frequency distribution for services presented by the company:

No	Statements	Number &Percent				
		Strongly agree	Agree	I don't know	Disagree	Strongly disagree
1	the company provides a suitable health insurance for me.	20 51.3%	5 12.8%	4 10.3%	6 15.4%	4 10.3%
2	the company has policies and system about employees promotion	10 4.0%	11 4.0%	7 28.0%	5 18.0%	6 46.0%

Source: The researcher from applied study, 2015

Table (4-7): Chi-square test results for respondents' answers about services presented by the company

No	Statement	Median	Degree of freedom	Chi-square value	Explanation
1	the company provides a suitable health insurance for	1	4	27.10	Strongly agree

	me.				
2	the company has policies and system about employees promotion	1	4	30.20	Strongly disagree

Source: The researcher from applied study, 2015

According to the table, we can demonstrate the results as follows:

- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 1st question was (27.10) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-7), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have strongly agree with that "the company provides a suitable health insurance for me."

The calculated value of chi-square for the significance of the differences for the respondents' answers in the 2nd question was (30.20) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-7), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have strongly disagree with "services presented by the company the company has policies and system about employees promotion.

4-5-1- 3-the satisfaction of the company work system. :

Table (4-8): Frequency distribution for the satisfaction of the company work system.

No	Statements	Number & Percent				
		Strongly agree	Agree	I don't know	Disagree	Strongly disagree
1	the company objectives comply with employees objectives	8 20.5%	13 33.3%	4 10.3%	10 25.6%	4 10.3%
2	the company are applying laws and regulations guidelines.	13 33.3%	12 30.8%	3 7.7%	6 15.4%	5 12.8%
3	the company allows fair opportunities for	11	9	4	7	8

	promotion to all through a good performance	28.2%	23.1%	10.3%	17.9%	20.5%
4	the company provides good and suitable training opportunities for all	11 28.2%	7 17.9%	5 12.8%	8 20.5%	
5	the company adequately provides all my work needs	16 41.0%	8 20.5%	6 15.4%	5 12.8%	
6	the company is motivating employees on excellence work.	12 30.8%	9 23.1%	3 7.7%	7 17.9%	
7	the information easily passes through all	17 43.6%	14 35.9%	5 12.8%	1 2.6%	

Source: The researcher from applied study, 2015

Table (4-9): Chi-square test results for respondents' answers about the satisfaction of the company work system

No	Statement	Median	Degree of freedom	Chi-square value	Explanation
1	the company objectives comply with employees objectives	5	4	16.60	agree
2	the company are applying laws and regulations guidelines.	5	4	14.81	Strongly agree
3	the company allows fair opportunities for promotion to all through a good performance	4	3	13.80	Strongly agree
4	the company provides good and suitable training opportunities for all	4	4	17.90	Strongly agree
5	the company adequately provides all my work needs	3	4	24.10	Strongly agree
6	the company is motivating employees on excellence work.	3	4	27.80	Strongly agree
7	the information easily passes through all	3	4	18.60	Strongly agree

Source: The researcher from applied study, 2015

According to the table, we can demonstrate the results as follows:

- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 1st question was (16.60) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-9), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have Strongly agree with that “the company objectives comply with employees objectives”.
- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 2nd question was (14.81) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-9), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have strongly agree with that “the company are applying laws and regulations guidelines. ”.
- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 3rd question was (13.80) which is greater than the tabulated value of chi-square at the degree of freedom (3) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-9), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have agree with that “the company allows fair opportunities for promotion to all through a good performance”.
- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 4th question was (17.90) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-9), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who Strongly agree with that “the company provides good and suitable training opportunities for all”.
- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 5th question was (24.10) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value

level (1%) which was (12.63). According to what mentioned in table no.(4-9), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who strongly agree with that “the company adequately provides all my work needs ”.

- The calculated value of chi-square for the significance of the differences for the respondents’ answers in the 6th question was (27.80) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-9), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who strongly agree with that “the company is motivating employees on excellence work. ”.
- The calculated value of chi-square for the significance of the differences for the respondents’ answers in the 7th question was (18.60) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-9), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who strongly agree with that “the company is motivating employees on excellence work ”.

5-1-4 work environment satisfaction

Table (4-10): Frequency distribution for the work environment satisfaction.

No	Statements	Number &Percent				
		Strongly agree	Agree	I don't know	Disagree	Strongly disagreed
1	there is good cooperation between me and colleagues for conducting our work	25 64.1%	10 25.6%	2 5.1%	2 5.1%	0 0.0%
2	my manager consult with me in the work.	18 46.2%	13 33.3%	1 2.6%	4 10.3%	3 7.7%

Source: The researcher from applied study, 2015

Table (4-11): Chi-square test results for respondents’ answers about the satisfaction with the company work system.

No	Statement	Medi	Degree	Chi-	Explanatio
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		an	of freedom	square value	n
1	there is good cooperation between me and colleagues for conducting our work	1	4	67.60	Strongly agree
2	My manager consult with me in the work.	1	4	17.80	Strongly agree

Source: The researcher from applied study, 2015

According to the table, we can demonstrate the results as follows:

- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 1st question was (67.60) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-11), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have Strongly agree with that “there is good cooperation between me and colleagues for conducting our work ”.
- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 2nd question was (17.80) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-11), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have strongly agree with that “My manager consult with me in the work.”.
- 4-5-1-5 the extent of individual needs and wants satisfaction:
 - Table (4-12): Frequency distribution for the satisfaction of the extent of individual needs and wants satisfaction

No	Statements	Number &Percent				
		Strongly agree	Agree	I don't know	Disagree	Strongly disagree
1	if allowed to choose between pharmaceutical companies I would	18 46.2%	8 20.5%	5 12.8%	6 15.4%	2 5.1%

	select this company					
2	my job allows me to achieve my objectives (dreams through my competent job performance.	17 43.6%	15 38.6%	2 12.8%	5 5.1%	0 0.0%

▪ Table (4-13): Chi-square test results for respondents' answers about the extent of individual needs and wants satisfaction

No	Statement	Media n	Degree of freedom	Chi-square value	Explanati on
1	if allowed to choose between pharmaceutical companies I would select this company	1	4	21.00	Strongly agree
2	My job allows me to achieve my objectives (dreams through my competent job performance.	1	4	34.60	Strongly agree

Source: The researcher from applied study, 2015

According to the table, we can demonstrate the results as follows:

- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 1st question was (21.0) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-13), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have strongly agree with that "if allowed to choose between pharmaceutical companies I would select this company".
- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 2nd question was (34.60) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-13), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have strongly agree with that "My job allows me to achieve my objectives (dreams through my competent job performance.".

4-5-1-6 satisfaction of the material work environment

Table (4-14): Frequency distribution for the extent of the satisfaction of the individual needs and wants satisfaction of the material work environment.

No	Statements	Number & Percent				
		Strongly agree	Agree	I don't know	Disagree	Strongly disagree
1	the material environment of the company regarding to sanitation, ventilation, order, work instruments and tools is adequate	11 28.2%	15 38.5%	1 2.6%	8 20.5%	4 10.3%
2	no facing health hazard within work environment	10 25.6%	12 30.8%	1 2.6%	9 23.1%	7 17.9%
3	the company provide a safety quality procedure for the processes..	11 28.2%	15 38.5%	3 7.7%	5 12.8%	5 12.8%

Source: The researcher from applied study, 2015

Table (4-15): Chi-square test results for respondents' answers about the satisfaction of the material work environment.

No	Statement	Median	Degree of freedom	Chi-square value	Explanation
1	the material environment of the company regarding to sanitation, ventilation, order, work instruments and tools is adequate	1	4	56.90	agree
2	no facing health hazard within work environment	2	4	46.30	agree
3	the company provide a safety quality procedure for the processes..	2	4	51.27	agree

Source: The researcher from applied study, 2015

According to the table, we can demonstrate the results as follows:

- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 1st question was (56.90) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-15), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have agree with that “the material environment of the company regarding to sanitation, ventilation, order, work instruments and tools is adequate”.
- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 2nd question was (46.30) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-15), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have agree with that “I face no health hazard within work environment ”.
- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 2nd question was (51.27) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-15), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have agree with that “I face no health hazard within work environment ”.

4-6 Customer satisfaction questionnaire:

4-6-1 quality method in the factory:

Table (4-16): Frequency distribution quality method in the factory

No	Statements	Number & Percent				
		Strongly agree	Agree	I don't know	Disagree	Strongly disagree
1	products quality represent in an excellent way	1 7.1%	7 50.0%	2 14.3%	3 21.4%	1 7.1%
2	the products supply is achieving the customer needs	0 0.0%	6 42.6%	0 0.0%	5 35.7%	3 21.4%
3	the company have system for the goods delivery schedule.	1 7.1%	2 14.3%	4 28.6%	3 21.4%	4 28.6%
4	the employees benefit greatly from company policy.	0 0.0%	5 35.7%	0 0.0%	7 50.0%	2 6.0%
5	the quality method promotes commitment on goods supply.	2 14.3%	5 35.7%	1 7.1%	5 35.7%	1 7.1%
6	the quality method is minimizing the marketing negative feedback.	2 14.3%	4 28.6%	2 14.3%	4 28.6%	2 14.3%

Source: The researcher from applied study, 2015

Table (4-17): Chi-square test results for respondents' answers about quality method in the factory

No	Statement	Median	Degree of freedom	Chi-square value	Explanation
1	products quality represent in an excellent way	4	4	19.96	Agree
2	the products supply is achieving the customer needs	4	4	32.00	Agree

3	the company have system for the goods delivery schedule.	5	4	15.90	Strongly disagree
4	the employees benefit greatly from company policy.	4	4	26.60	Disagree
5	the quality method promotes commitment on goods supply.	4	4	22.40	Agree
6	the quality method is minimizing the marketing negative feedback.	5	4	21.60	Agree

Source: The researcher from applied study, 2015

According to the table, we can demonstrate the results as follows:

- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 1st question was (19.96) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-17), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have agree with that “products quality represent in an excellent way”.
- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 2nd question was (32.0) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-17), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have agree with that “the products supply is achieving the customer needs”.
- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 3rd question was (15.90) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-17), this indicates that, there are statistically significant differences at the level (1%) among the

answers of the respondents, which support the respondents who have strongly disagree with that “the company have system for the goods delivery schedule.”.

- The calculated value of chi-square for the significance of the differences for the respondents’ answers in the 4th question was (26.60) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-17), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who disagree with that “ the employees benefit greatly from company policy. ”.
- The calculated value of chi-square for the significance of the differences for the respondents’ answers in the 5th question was (22.40) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-17), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have agree with that “the quality method promotes commitment on goods supply”.
- The calculated value of chi-square for the significance of the differences for the respondents’ answers in the 6th question was (21.60) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-17), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have agree with that “the quality method is minimizing the marketing negative feedback”.

4-6-2 the impact of implementation of COQ on products standards:

Table (4-18): Frequency distribution for the impact of implementation of COQ on products standards

No	Statements	Number &Percent				
		Strongly agree	Agree	I don't know	Disagree	Strongly disagreed
1	The company products are reflecting a positive quality reputation.	1 7.1%	8 57.1%	0 .0.0%	0 0.0%	5 35.7%
2	the company is usually addresses the non-	1 7.1%	5 35.7	5 35.7	2 14.3%	1 7.1%

	conformity on their product quality.		%	%		
3	the company enhances and develop quality standards of their products	4 28.6%	4 28.6%	4 28.6%	1 7.1%	1 7.1%

Source: The researcher from applied study, 2015

Table (4-19): Chi-square test results for respondents' answers about the the impact of implementation of COQ on products standards

No	Statement	Median	Degree of freedom	Chi-square value	Explanation
1	The company products are reflecting a positive quality reputation.	5	4	38.00	agree
2	the company is usually addresses the non-conformity on their product quality.	4	4	22.40	agree
3	the company enhances and develop quality standards of their products	5	4	21.00	Strongly agree

Source: The researcher from applied study, 2015

According to the table, we can demonstrate the results as follows:

- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 1st question was (38.0) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-19), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have agree with that "The company products are reflecting a positive quality reputation".
- The calculated value of chi-square for the significance of the differences for the respondents' answers in the 2nd question was (22.40) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-19), this

indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have agree with that “the company is usually addresses the non- conformity on their product quality.”.

▪

The calculated value of chi-square for the significance of the differences for the respondents’ answers in the 3rd question was (21.00) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-19), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have strongly agree with that “the company enhances and develop quality standards of their products”.

4-6-3 marketing benefit

Table (4-20): Frequency distribution for the marketing benefit

No	Statements	Number & Percent				
		Strongly agree	Agree	I don't know	Disagree	Strongly disagreed
1	the marketing benefits from product quality..	4 28.6%	8 57.1%	1 7.1%	1 7.1%	0 0.0%
2	the marketing benefits from product availability.	6 42.9%	5 34.0%	0 0.0%	3 21.4%	0 0.0%
3	the marketing benefits from product regular supply.	4 28.6%	7 50%	1 7.1%	2 14.3%	0 0.0%

Source: The researcher from applied study, 2015

Table (4-21): Chi-square test results for respondents’ answers about the marketing benefit

No	Statement	Median	Degree of freedom	Chi-square value	Explanation
1	the marketing benefits from product quality..	5	4	16.10	agree
2	the marketing benefits from product availability.	4	4	15.80	Strongly agree
3	the marketing benefits from product regular supply.	5	4	17.40	agree

Source: The researcher from applied study, 2015

According to the table, we can demonstrate the results as follows:

The calculated value of chi-square for the significance of the differences for the respondents' answers in the 1st question was (16.10) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-21), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have agree with that "Students benefit from sport activities."

The calculated value of chi-square for the significance of the differences for the respondents' answers in the 2nd question was (15.80) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-21), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who strongly agree with that "Students benefit from cultural activities."

The calculated value of chi-square for the significance of the differences for the respondents' answers in the 3rd question was (17.40) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-21), this indicates that,

there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who agree with that “Students benefit from recreational activities”.

4-6-4- the factor performance

Table (4-22): Frequency distribution for the factory performance

No	Statements	Number &Percent				
		Strongly agree	Agree	I don't know	Disagree	Strongly disagree
1	the company management promptly responds to complaints	0 0.0%	6 42.9%	4 28.6%	2 14.36%	2 14.3%
2	the company management widely considers the customers suggestions.	0 0.0%	3 21.4%	5 35.7%	3 20.4%	3 21.4%
3	company management is committed towards goods delivery time	1 7.1%	6 42.9%	3 21.4%	3 21.4%	1 7.1%

Source: The researcher from applied study, 2015

Table (4-23): Chi-square test results for respondents’ answers about Factory performance

No	Statement	Median	Degree of freedom	Chi-square value	Explanation
1	the company	5	4	14.60	agree

	management promptly responds to complaints				
2	the company management widely considers the customers suggestions.	5	4	15.40	Don't Know
3	company management is committed towards goods delivery time	5	4	43.60	agree

Source: The researcher from applied study, 2015

According to the table, we can demonstrate the results as follows:

The calculated value of chi-square for the significance of the differences for the respondents' answers in the 1st question was (14.60) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-23), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have agree with that “the “company management promptly responds to complaints”

The calculated value of chi-square for the significance of the differences for the respondents' answers in the 2nd question was (15.40) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-23), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have I Don't Know with that “the company management widely considers the customers suggestions ”.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the 3rd question was (43.60) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-23), this indicates that, there are statistically significant differences at the level (1%) among the answers of the

respondents, which support the respondents who have strongly agree with that “company management is committed towards goods delivery time”.

4-6-5 communication between company and customer:

Table (4-24): Frequency distribution for communication between company and customer

No	Statements	Number & Percent				
		Strongly agree	Agree	I don't know	Disagree	Strongly disagree
1	the company allows customer to participate in products survey	1 7.1%	5 35.7%	4 28.6%	1 7.1%	3 21.4%
2	the company allows customer to participate in building of quality standards.	1 7.1%	2 14.3%	4 28.6%	5 35.7%	2 14.3%
3	the company has regular assessment of customers satisfaction	1 7.1%	3 21.4%	2 14.3%	4 28.6%	4 28.6%
4	the company-customer meeting is regularly conducted.	1 7.1%	2 14.3%	3 21.4%	3 21.4%	5 35.7%
5	the customers feedback is communicated to the management	1 7.1%	5 35.7%	1 7.1%	3 21.4%	4 28.6%

Source: The researcher from applied study, 2015

Table (4-25): Chi-square test results for respondents' answers about the for communication between company and customer

No	Statement	Median	Degree of freedom	Chi-square value	Explanation
1	the company allows customer to participate in products survey	5	3	17.92	Agree
2	the company allows customer to participate in building of quality standards.	1	4	14.60	disagree
3	the company has regular assessment of customers satisfaction	4	4	14.10	disagree
4	the company-customer meeting is regularly conducted.	5	3	16.12	Strongly disagree
5	the customers feedback is communicated to the management	1	4	16.60	Agree

Source: The researcher from applied study, 2015

According to the table, we can demonstrate the results as follows:

The calculated value of chi-square for the significance of the differences for the respondents' answers in the 1st question was (17.92) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-25), this indicates that, there are statistically significant differences at the level (1%) among the answers of the

respondents, which support the respondents who have agree with that “the company allows customer to participate in products survey”.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the 2nd question was (14.60) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-25), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have disagree with that “the company allows customer to participate in building of quality standards”.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the 3rd question was (14.10) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-25), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who disagree with that “the company has regular assessment of customers satisfaction”.

The calculated value of chi-square for the significance of the differences for the respondents' answers in the 4th question was (16.12) which is greater than the tabulated value of chi-square at the degree of freedom (3) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-25), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have strongly agree with that “the company-customer meeting is regularly conducted” .

The calculated value of chi-square for the significance of the differences for the respondents' answers in the 5 question was (16.60) which is greater than the tabulated value of chi-square at the degree of freedom (3) and the significant value level (1%) which was (12.63). According to what mentioned in table no.(4-25), this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have agree with that “the customers feedback is communicated to the management”

4-6-6 Table (4-26): Chi-square test results for respondents' answers about employees satisfaction in general

Statement	Degree of freedom	Chi-square value	Explanation
Allitems	4	169.81	Strongly agree

Source: The researcher from applied study, 2015

According to the table, we can demonstrate the results as follows:

The calculated value of chi-square for the significance of the difference for the respondents' answers in the in employees satisfaction was (169.81) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (13.28). this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have agree with that "implementing cost of quality method leads to employees satisfaction".

The P-value is <0.00001 , the result is significant ant $P<0.05$

4-6-7 Table (4-27): Chi-square test results for respondents' answers about Customers satisfaction in general

Statement	Median	Degree of freedom	Chi-square value	Explanation
Allitems	5	4	179.80	Agree

Source: The researcher from applied study, 2015

According to the table, we can demonstrate the results as follows:-

The calculated value of chi-square for the significance of the differences for the respondents' answers parental satisfaction in general was (179.80) which is greater than the tabulated value of chi-square at the degree of freedom (4) and the significant value level (1%) which was (13.28). this indicates that, there are statistically significant differences at the level (1%) among the answers of the respondents, which support the respondents who have strongly agree with that "implementing cost of quality method leads to customers satisfaction".

The P-value is <0.00001 , the result is significant ant $P<0.05$

4.7– Results:

- There is a high level of Employees satisfaction.
- There is no statistically difference between implementing CostofQuality and Employees satisfaction.
- There is no high level of Customers satisfaction.
- There are statistically difference between implementing CostofQuality and Customers satisfaction.

CHAPTER FIVE

Discussion ,Conclusion and Recommendations

5-1 Discussion:-

5-1-1 Employees Satisfaction Results:-

The impact of implementing Cost Of Quality Method in employees satisfaction in the Sudanese pharmaceutical company (PHARMALAND PHARMACEUTICAL) is very clear . According to the first hypotheses of this research.

There is a high level of job satisfaction among the employees in the pharmaceutical company implementing COQ of quality method.

we find that the employees are highly satisfied with the job as the calculated value of the chi-square is (167,40) which support the respondents' answers who agree with that implementing COQ leads to employee satisfaction .This is because, employees are highly satisfied with the job itself and this is because as the top management said , the school management keens to choose the employees who love their work and also does many interviews and tests before choosing and recruiting them . Moreover, they are well trained to develop their knowledge and skills so as to improve their performance which leads to the increase of the satisfaction of the job itself. Although employees said that there is no continuous follow up for the training outcomes.

Employees also see that their work environment allow them to work with high efficiency and optimum quality since, the company applying the law and regulation guidelines and providing suitable training, also all the information will communicated in easy way. finally, company are motivate the employees who have did an excellent job.

Moreover, employees are not highly satisfied with materials of work in the company , regarding to sanitation, ventilation, order, work instruments and tools is not adequate, the physical evidence as the researcher noticed the factory buildings are nice but not well equipped with adequate tools and instruments. Moreover , they are clean but not tidy and this leads to the fact that the employees may face health hazard within the material work environment.

Also , Employees are also highly satisfied about the extent of

individual needs and wants ,because my job allows me to achieve my objectives (dreams through my competent job performance), through a good financial compensation like year incentive and reward for achieving the noted plan.

On the other hand, Employees are not satisfied about the company policies and system about employees promotion, The top management returns this to the insufficient number of employee, also there are many job vacancies are freeze because the rehabilitation process which carried out at one section of the company parts which consider as 50% from the factory capacity.

According to the 3rd research hypotheses ,

There are no statistically significance differences between implementing Cost of quality method and employee satisfaction.

We find that there are statistically significant differences between implementing COQ and employees satisfaction as the calculated values of the chi square is (169.81) which indicates that there is statistically significant difference among the respondent's answers.

5-1-2 Customers satisfaction results :-

According to the second research hypotheses:-

There is no high level of Customers satisfaction in the pharmaceutical company implementing COQ method.

We find that the parents are satisfied as the calculated value of chi-square is (179.80) and this is because customers are satisfied with the products supply which is achieving the customer needs, also, they showing satisfaction upon the product quality which is present in excellent way

There is a satisfaction level from customer regarding to the impact of implementation of COQ on products standards ,showing that The company products are reflecting a positive quality reputation and the company is usually addresses the non-conformity on their product quality, to fix the problem and maintain the good quality standards.

They are highly satisfied with the company enhances and develop quality standards of their products and stimulation of the regular supply system and product availability whenever needed, to get the maximum marketing benefits.

however, customers are not highly satisfied with the customer-company relationship in terms of participation in the product survey,

Moreover, there is no high level of customer satisfaction with the communication between them and the company because also there is no effective communication regarding to the customer feedback from the market.

Finally, There is no satisfied level of customers with the participation in the customer-company regular meetings, and regular assessment of customers satisfaction

According to the 4th research hypotheses there are no statistically significant differences between implementing COQ\ in this pharmaceutical company and the customers satisfaction .

We find that there are statistically significant differences between implementing COQ in the pharmaceutical company and customers satisfaction as the calculated value of the chi square is (179,40) which indicates that there is statistically significant difference between implementing COQ and customer satisfaction.

In general customers are less satisfied than the employees so we can say that COQ has more positive impact on employees satisfaction (strongly agree) than on customers satisfaction (agree) .

5-2 Conclusion :-

In all fields especially pharmaceuticals, quality is an important matter and quality management method like measuring the cost of quality is an effective tool for improving performance and has a direct influence on the customer satisfaction . According to this study in which the researcher aimed to measure the impact of implementing COQ in employees and customer satisfaction in the pharmaceutical company, implementing COQ in these company leads to employees satisfaction and customer satisfaction and this leads to the recommendation for generalizing implementation of this method in all the pharmaceuticals companies in sudan.

Also, practicing the COQ method has direct impact on the the quality of product by appraisal and inspection the product along the processes ,which may decrease the defect in these product and minimizing the failure whether is internal or external.

The prevention cost method has a direct impact on the employee satisfaction because of the continuous improvement program andself development for the

employees leading to proper follow up with a knowledge , to maintain the stability in the processes.

5-3 Recommendations :-

In the summary of this study, and as a result of the interview with some managers ,employees and customers ,we recommend the following:

- Obviously before beginning the process the company management should explain the concepts of quality management and the quality management system to all employees and outlines the expected advantages of COQ implementation. It should organize awareness sessions covering COQ requirements, with the aim of the taking ownership of assessing the validity of these method.
- Use the COQ method to monitoring and measuring equipment and the daily output to increase the accuracy of process , productivity and other quality assessment tools and adopt new methods for assessing evaluation and measuring quality standard in the pharmaceutical company.
- Explain to the workforce that the system has a lot of benefit related to the people who maintained the system.
- Enhance and upgrade the material's work for employees so as to raise productivity and limited the processes time and motivate them because without motivated people , the system will eventually fail because people are the active force behind any system.
- Also, the importance of following up training outcomes and identifying strengths and weaknesses and use a training program to fill all the gabs when implementing the system and find the best way for employee promotion against the performance appraisal Moreover, do this usually.
- Develop a new system for Good delivery and availability with flexibility in marketing demand.
- The company polices should allied the customer benefit.
- The customer suggestion should be consider and the feedback should reflected on the good or services.
- The customer should involve in the strategic plan of the company by means of sharing the ideas which has definite impact on the market.

- Top management in Pharmaceutical company should support COQ practicing and cares for its continuous improvement because it is the stepping stone towards quality excellence.
- ISO 9001-2008 certificate should be target it, as a process of continues improvement , taking the company for the high level of quality standard.
- Moreover, it is necessary to transfer this experience to the Ministry of Health and the governmental industries so as to benefit from it in the national project for excellence in quality practice.
- The company which implemented the COQ should think about the stage after this and to implement total quality management and excellence , also getting certificate of c GMP.
- From all the results we came to, we can say that we should generalize the experience of the Pharmaland Pharmaceutical of implementing COQ to all the Pharmaceuticals companies in Khartoum & Bahri provinces as it leads to employees satisfaction and customer satisfaction.

5-4 Suggestions:-

The researcher suggests conducting more researchers and future studies in this field such as :-

- A research to investigate the impact of implementing COQ in customer satisfaction in the secondary level .
- A research to examine COQ adoption reduces waste and defects which would be reflected in the cost of the products presented in pharmaceutical company.
- A research to investigate the impact of implementing COQ in the term of qualitative ,measurement ,counting the cost of waste and the down time of the which effect the products also how to manage the internal and external failure.

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APPENDIX

SUDAN UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF POSTGRADUATES STUDIES

Customers satisfaction questionnaire

Dear participant

I am an MSc candidate currently conducting a research assessing the level of content of employees and customers of the pharmaceutical company that apply the quality management system (cost of quality) in the pharmaceutical company in Sudan taking PHARMALAND COMPANY as a model. The theme is to assess how feasible this system is.

Please respond to all the statements in the questionnaire regarding the quality method, the service level, the product quality, the company performance and the level of communication between the company and the customers.

I'd like very much to appreciate your participation and help since the success of this research depends on your response.

Please attempt to respond to every statement by taking (√) in front of what you see.

Sincerely yours

Khalid Elsobai

Please tick (√) in the box that best reflects your opinion (customers).

1= strongly disagree 2= disagree 3= I don't know 4= agree 5 = strongly agree

A\ quality method in the factory :-	1	2	3	4	5
1\ products quality represent in an excellent way					
2\ the products supply is achieving the customer needs					
3\ the company have system for the goods delivery schedule.					
4\ the employees benefit greatly from company policy.					
5\ the quality method promotes commitment on goods supply.					
6\the quality method is minimizing the marketing negative feedback.					
B\ the impact of implementation of COQ on products standards.					
7\ the company products are reflecting a positive quality reputation.					
8\ the company is usually addresses the non-conformity on their product quality.					
9\ the company enhances and develop quality standards of their products.					
C\ marketing benefit :-					
10\the marketing benefits from product quality.					
11\ the marketing benefits from product availability.					
12\ the marketing benefits from product regular supply.					
D\ factory performance :-					
13\ the company management promptly responds to complaints.					
14\ the company management widely considers the customers suggestions.					
15\ company management is committed towards goods delivery time .					

E\communication between company and customer:-					
16\ the company allows customer to participate in products survey.					
17\ the company allows customer to participate in building of quality standards.					
18\the company has regular assessment of customers content.					
19\ the company-customer meeting is regularly conducted.					
20\ the customers feedback is communicated to the management.					

Employees questionnaire

Dear participants :-

I am an MSc candidate currently conducting a research in the area of quality management system assessing the level of content of employees in the pharmaceutical company that adopts cost of quality in Sudanese pharmaceutical industry (PHARMALAND as a model).

The objective of this questionnaire is to help in sustainable improvement in the company work system .this would help in improving the individual performance of works . besides, the information and data acquired would be inclusively needed for sustainable promotional purposes and would be of great scientific and practical value.

I would like very much to appreciate your participation and help since the success of this research depends on your response.

This attempt to answer every question I am seeking your judgment and opinion only.

Sincerely yours

Khalid Elsobai

Please tick (√) in the box that best reflects your opinion (employees)

1= strongly disagree 2= disagree 3= I don't know 4= agree 5 = strongly agree

A\ satisfaction of the job itself :-	1	2	3	4	5
1\ I feel my job is important for achieving company objectives					
2\ my job is giving me the opportunity for improvement and innovation					
3\ I feel satisfied when I finish one of my job with the quality objectives.					
4\ my job offers me a distinguishable status among others .					
B\ services presented by the company					
5\ the company provides a suitable health insurance for me.					
6\the company has policies and system about employees promotion.					

C\ the satisfaction of the company work system.					
7\the company objectives comply with employees objectives					
8\ the company are applying laws and regulations guidelines.					
9\ the company allows fair opportunities for promotion to all through a good performance .					
10\ the company provides good and suitable training opportunities for all					
11\ the company adequately provides all my work needs .					
12\ the company is motivating employees on excellence work.					
13\ the information easily passes through all					
D\ work environment satisfaction					
14\ there is good cooperation between me and colleagues for conducting our work					
15\ my manager consult with me in the work affairs					
E\ the extent of individual needs and wants satisfaction					
16\ if allowed to choose between pharmaceutical companies I would select this company					
17\ my job allows me to achieve my objectives (dreams through my competent job performance)					
F\ satisfaction of the material work environment					
18\ the material environment of the company regarding to sanitation, ventilation, order, work instruments and tools is adequate.					
19\ no facing health hazard within work environment					
20/the company provide a quality procedure for the processes.					