

# Implementation of Quality Management System in the Central Laboratory for Technical Services and Calibration

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**Publishing Date: May 19, 2018**

## Abstract

The study carried out showed the effectiveness of application of quality management system 9001-2008 in the central laboratory for technical services, and calibration (CLTSC). It's also explained the implementation steps and the practical evidence of the system requirements such as increasing of customers, samples, the profits, the customers satisfaction and the customers retention-ship. The results indicated that, the most important motivations were the company image and the client satisfaction, as well as better the company image and better relations and communications with clients are the most important perceived benefits. There were positive relationships between QMS certification and organizational performance motivations and benefits.

**Keywords:** *Quality Management System, Technical Services, Clients Complains.*

## 1. Introduction

The ISO 9001 family of standards has been developed to assist any organization in all sectors, regardless of size, type, activity to implement and operate effective quality management. The application of international standards, benefits manufacturers, service providers, users, consumers and regulators, as well as supports sustainable development. Certification based on international standards gives confidence and facilitates access to world markets, and its popularity continues today.

## 1.1 Quality Management System

To respond to the increase on global competition, a considerable number of organizations have implemented ISO 9001 Quality Management Systems, aiming to respond to external stakeholder pressures or to internal motivations and achieve increased performance.

## 1.2. ISO 9001 Requirement

Customer focused organizations depend on their customers, and they should be understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations. Leadership leaders establish unity of purpose and direction. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives.

Involvement of people at all levels is the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit. Process approach a desired result is achieved more efficiently when activities and related resources are managed as a process. System approach to management Identifying, understanding and managing a system of interrelated processes as a system contributes to the organization's

effectiveness and efficiency in achieving its objectives. Continual improvement of the organization's overall performance should be a permanent objective of the organization, and factual approach to decision making. Effective decisions are based on analyze data and information mutually beneficial supplier relationships. An organization and its suppliers are interdependent and a mutually beneficial relationship enhances the ability of both to create value. The scope of the standard specifies the requirements of quality management systems, where an organization needs to demonstrate its ability to provide the consistent product, meets customer's services, applicable statutory, regulatory requirements, and aims to enhance customer satisfaction through the effective application of the system. This includes processes for continual improvement, assurance of conformity to a customer, and applicable regulatory requirements.

### **1.3 Effective Implementation of Quality Management Systems**

The effectiveness of the ISO 9001 QMS should be examined taking into consideration the company's approach to the critical success factors. In other words, there is a need to move beyond simply justifying quality practices and focus on a clear understanding of the influential factors.

Consider effective quality management system as a system which brings doubt economic or the social effects. Quality management system QMS efficiency extent to which planned activities within the quality management system are realized and planned results are achieved. Briefly, an efficient quality management system must be in rational operation.

### **1.4. Advantage of using ISO 9001-2008**

The advantages of quality management in small manufacturing enterprises: accessible management to the work place, train to staff members for communicating to other, hire the talented staff for making quick and accurate decisions. Similarly, the results of this case study revealed; reduced delivery time to the site, reduction in the quantity of goods damaged in transit and construction, reduced construction duration, increased productivity and improvement in customer perceptions of the company, better control of processes

resulting in consistency from design through to delivery and decreased fallout of chemicals.

Organizations will enjoy significant benefits, either external or internal in nature. Internal benefits are related to the achievement of organizational internal improvements, while those of external nature are related to the achievement of improvements in marketing, promotional aspects, company image.

## **2. Methodology**

### **2.1 Increasing of Customers**

The customer's data and related information were recorded such as client name, address, ID, telephone, fax, contact person , the client company activities in brief, comparing the increasing of clients monthly, and it is recording yearly to achieve the quality objective.

### **2.2 Increasing of Samples**

The incoming samples were inspected and ensured the suitability of the testing and availability of material and personal.

The numbers of samples were calculated monthly and were compared against the samples expected target.

### **2.3 Increasing of Amount of Income**

The incoming amount of earning which collected from analyzed tests and others activities were calculated to know losses and profits and comparing it against expected target.

### **2.4 After Services Feedback (Customers Questionnaire)**

The data about the services and laboratory practice were collected by monthly customer questionnaire, which used telephone, fax and letter, email, or directly for answered this questionnaire.

The feedback of customer's questionnaire were analyzed monthly and compared with specified criteria for acceptance of the feedback. The laboratory should achieve a measure not less than 90 % for customer satisfaction.

### 2.5 Clients Complains

The laboratory is receiving the client's comments, complaints and appeals by any available media such as telephone, E-mail, Fax

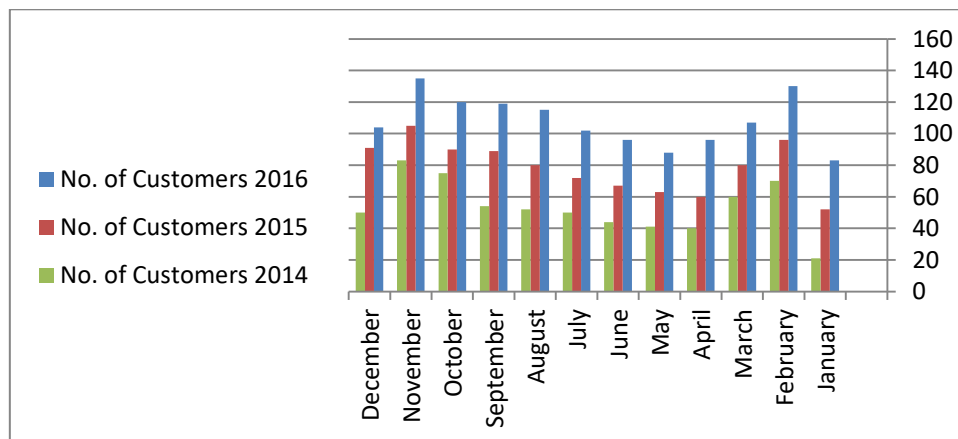
or through the client's attendance and meeting. The complaint is investigating and correcting. After closed the customer's complaint or comments the customers were informed with the response.

## 3. Results & Discussions

### 3.1 Customers Compared

**Table 3.1: Customers Comparison 2014 to 2016**

Month	No. of Customers 2014	No. of Customers 2015	No. of Customers 2016
January	21	52	83
February	70	96	130
March	60	80	107
April	40	60	96
May	41	63	88
June	44	67	96
July	50	72	102
August	52	80	115
September	54	89	119
October	75	90	120
November	83	105	135
December	50	91	104
<b>Total</b>	<b>640</b>	<b>945</b>	<b>1295</b>



**Figure 3.1: Increasing of Customers (2014 to 2016)**

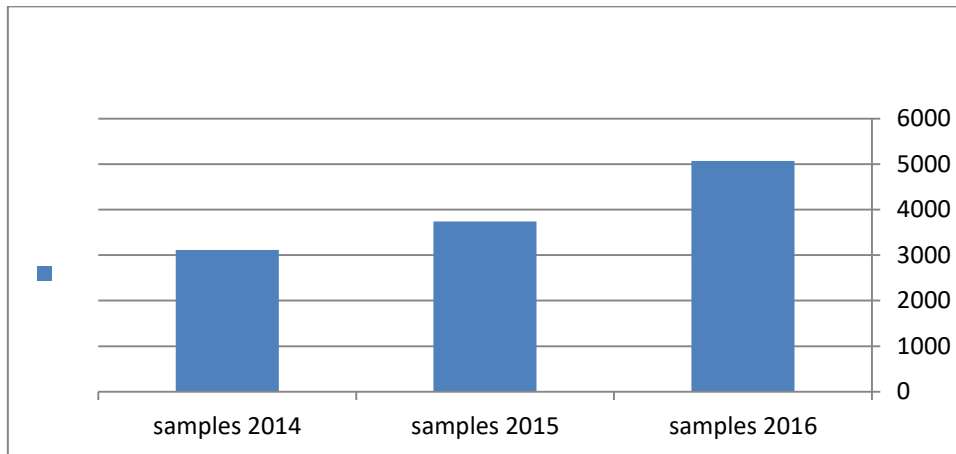
Table 3.1 was shown the increased growth of customers by 67% in 2015 and 73% in (2016). The laboratory's objectives to increasing customers are 25% yearly.

### 3.2 Samples Compared

#### 3.2.1 Numbers of samples compared 2014 to 2016

**Table 3.2: Samples Comparison (2014 to 2016)**

Sample 2014	Sample 2015	Sample 2016
3115	3743	5072



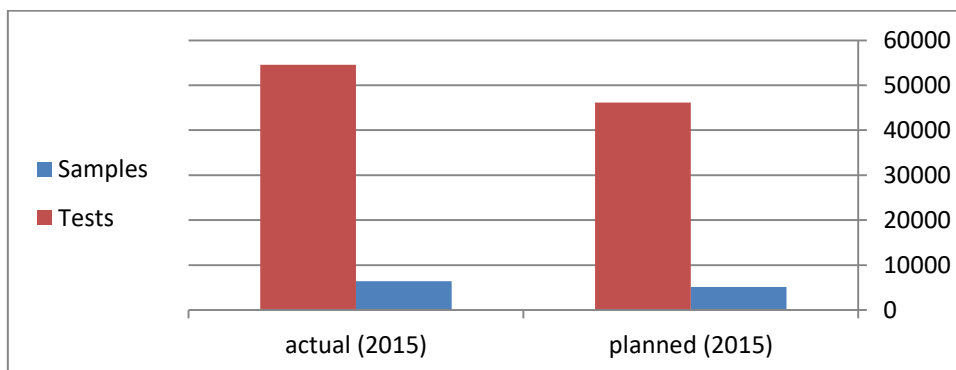
**Figure 3.2.1: Samples Compare 2014 to 2016**

The results in table 3.2.1 show the number of sample was increased due to apply ISO 9001 in 2015 more than 2014 and 2016 more than 2015.

#### 3.2.2 Compared between the Expected Target of Samples and Tests which Achieved in 2015

**Table 3.2.1: Planned and Actual of Samples and Tests**

Number	Planned (2015)	Actual (2015)
Samples	5092	6380
Tests	46120	54520



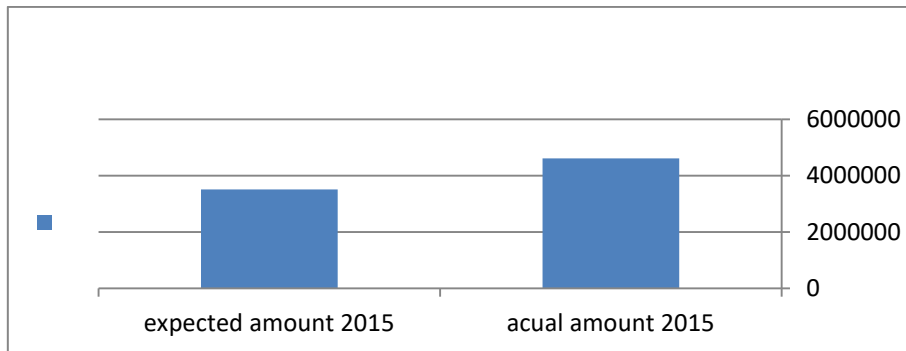
**Figure 3.2.2: Actual and Planned for Sample and Tests (2015)**

As it is clear from table 3.2.2, the CLTSC was achieved the expected target samples and tests.

### 3.3 Actual and Expected Amount 2015

**Table 3.3 the Actual and Expected Amount of 2015**

Actual Amount 2015/SDG	Expected Amount 2015/SDG	Exceed %
4604383	3509168.4	31



**Fig 3.3: The Actual and Expected Amount of 2015**

Table 3.3 showed the CLTCS target to achieve 25% increasing of the amount target yearly and the results was shown the amount were increased about 131%.

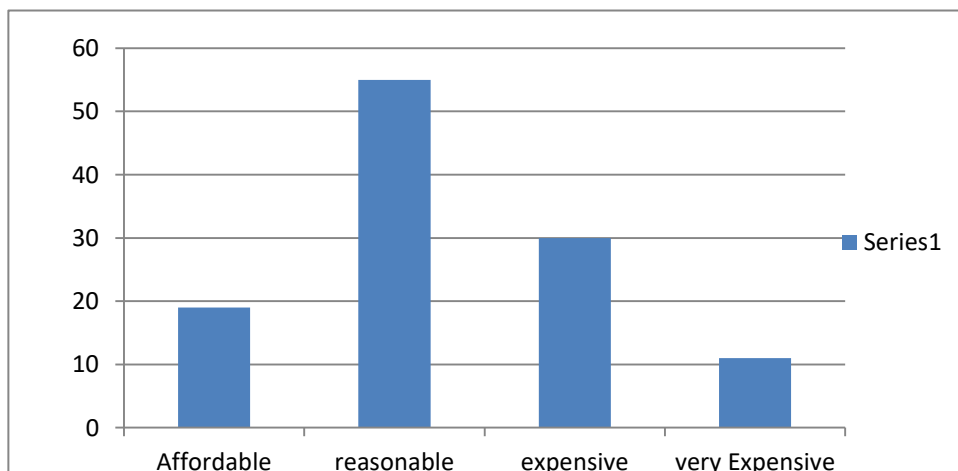
The CLTSC's incoming amount of earning which collected from analyzed tests and others activities were calculated to know losses, and profits, and comparing it against expected target.

### 3.4. After Services Feed Back (Customers Questionnaire) 2015

The laboratory has specified criteria for customer's acceptance to services which done in the laboratory, where the laboratory should achieve a measure not less than 90 % customer satisfaction.

**Table 3.4.1: Price**

answer	Affordable%	Reasonable%	Expensive%	Very Expensive%
No of customer	16	50	26	8

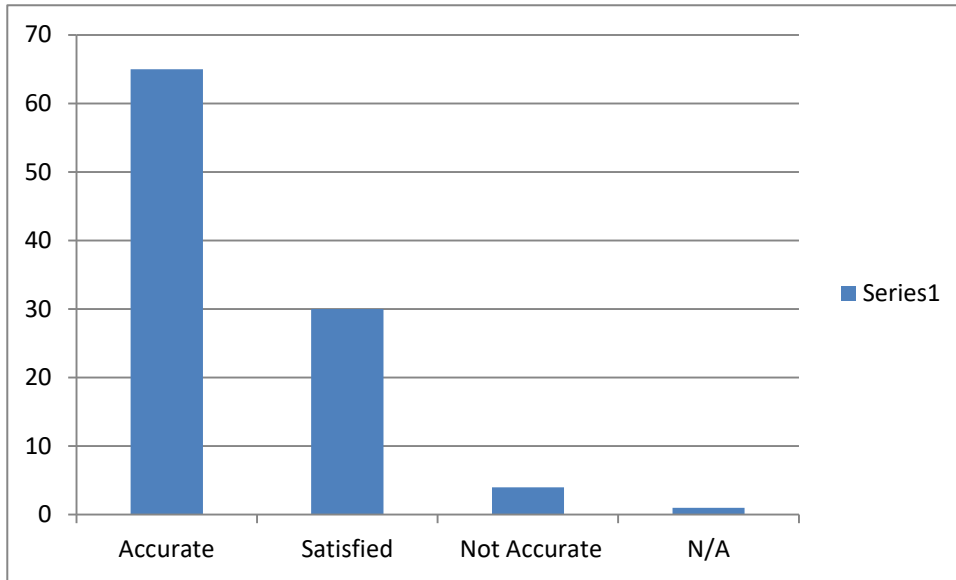


**Figure 3.4.1: Tests Prices**

Satisfaction of prices was 65%.

**Table 3.4.2: Result Accuracy**

Accurate%	Satisfied%	Not Accurate%	N/A%
65	30	4	1



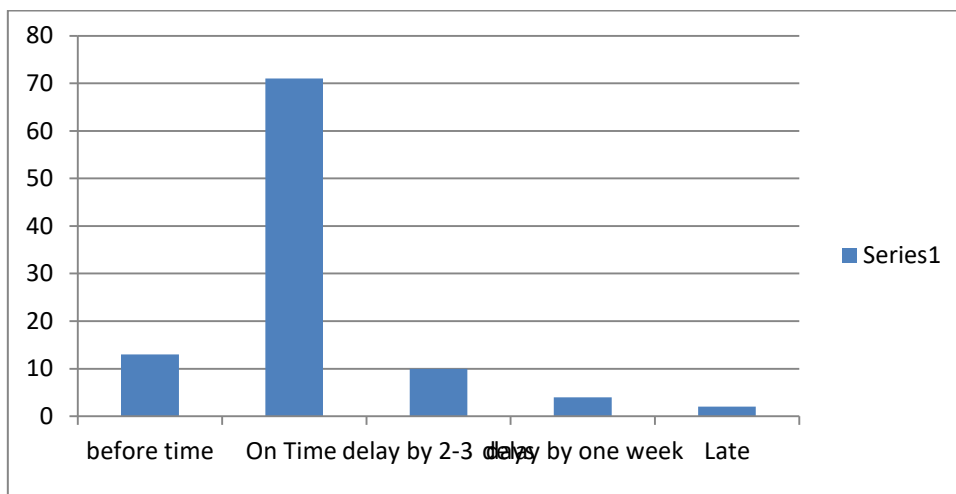
**Figure 3.4.2: Results Accuracy**

Satisfaction of accuracy was 95%

**3.4.3. Time Delivery:**

**Table 3.4.3 Results Time Delivery**

Before Time%	On Time%	Delay by 2-3 Days%	Delay by One Week%	Late%
13	71	10	4	2



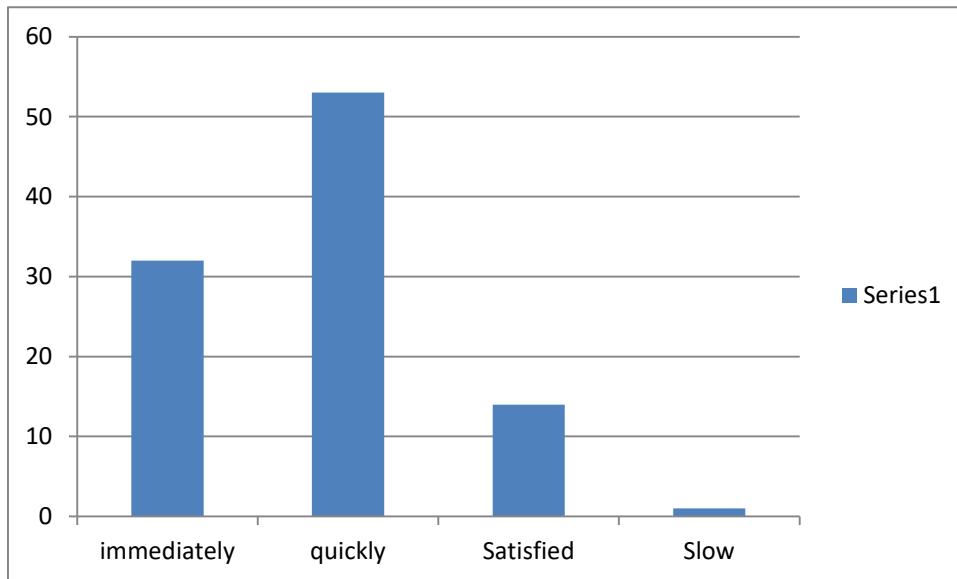
**Figure 3.4.3: Results Delivery Time**

Satisfaction of results time was 84%

#### 3.4.4 Response to Suggestions and Complaints

**Table 3.4.4: Response to Suggestions and Complaints**

Immediately%	Quickly%	Satisfied%	Slow%
32	53	14	1



**Figure 3.4.4: Response to Suggestions and Complains**

Satisfaction of complaints and comments was 99%

#### 3.4.5. Aspect of our Service most Satisfied for You

**Table 3.4.5: Aspect of our Service most Satisfied for You**

Result Accuracy%	Price%	Time Delivery%	Customer Service%	Response to Complaint%
50	29	44	72	17



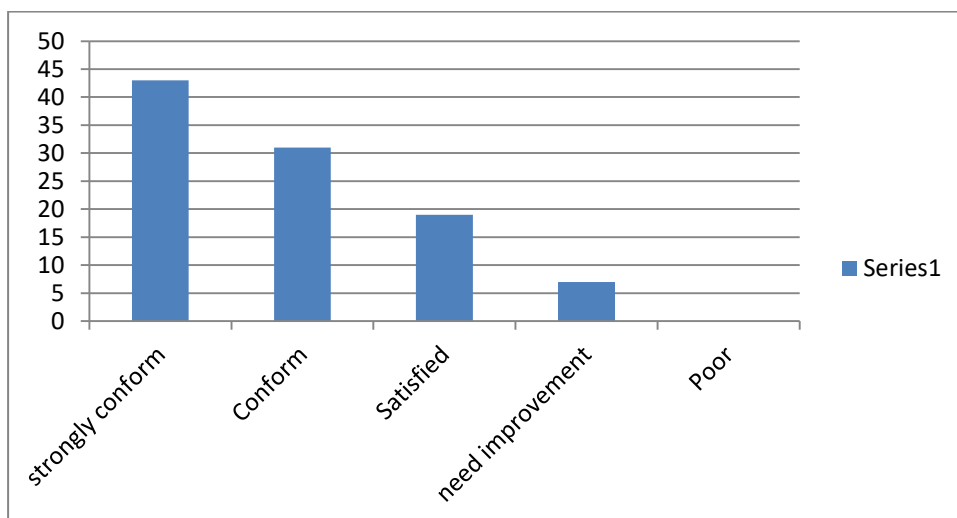
**Figure 3.4.5: The most Satisfactions Services**

The result shown in table 3.4.5 indicates that the most customers' satisfaction service is customer services, which get 72%.

### 3.4.6. Conformity to Customer Requirements

**Table 3.4.6: Result Conformity to customer requirements:**

Answer	Strongly Conform%	Conform%	Satisfied%	Need Improvement %	Poor%
No of the costumers	43	31	19	7	0



**Figure 3.4.6: Conformity of Requirements**

Satisfactions 93%



### 3.5 Customers Feedback (2016)

No.	Question
1	Communication and contacts with laboratory
2	Test Prices and Cost
3	Punctuality
4	Samples Receiving and inspection
5	Results ,and reporting procedures
6	Values, and quality of our reports
7	Response to complaints and Comments
8	Confirmation with the customer's requirements

**Table 3.5.1: Analyzed of Customers Feedback (2016)**

Month	Contacts %	Prices %	Report time %	Samples Receiving %	Results procedure%	Report quality %	Complaints %	Satisfaction %
<b>January</b>	94.00	78.50	95.00	100.00	100.00	88.00	94.00	<b>90.90</b>
<b>February</b>	90.00	84.50	88.0	100.00	100.00	90.00	95.00	<b>93.90</b>
<b>March</b>	92.00	78.00	96.0	100.00	100.00	94.00	97.60	<b>95.1</b>
<b>April</b>	90.00	79.00	94.5	100.00	100.00	88.00	91.00	<b>94.40</b>
<b>May</b>	94.50	65.60	88.0	92.50	87.00	86.00	100.00	<b>88.10</b>
<b>June</b>	85.00	65.00	82.0	96.00	91.00	80.50	83.00	<b>83.25</b>
<b>July</b>	96.00	78.00	89.0	93.00	98.00	94.00	90.00	<b>91.00</b>
<b>August</b>	90.50	80.50	96.0	90.00	92.00	82.50	100.00	<b>90.30</b>
<b>September</b>	94.00	68.90	89.0	100.00	100.00	93.90	93.30	<b>90.90</b>
<b>October</b>	96.00	79.00	87.3	98.00	97.80	90.50	81.10	<b>90.20</b>
<b>November</b>	100.00	87.00	95.6	100.00	100.00	100.00	100.00	<b>97.80</b>
<b>December</b>	85.00	79.40	92.5	92.50	95.00	92.50	95.00	<b>90.10</b>
<b>Average</b>	<b>92.00</b>	<b>77.00</b>	<b>91.10</b>	<b>96.80</b>	<b>96.70</b>	<b>90.00</b>	<b>93.30</b>	<b>91.30</b>

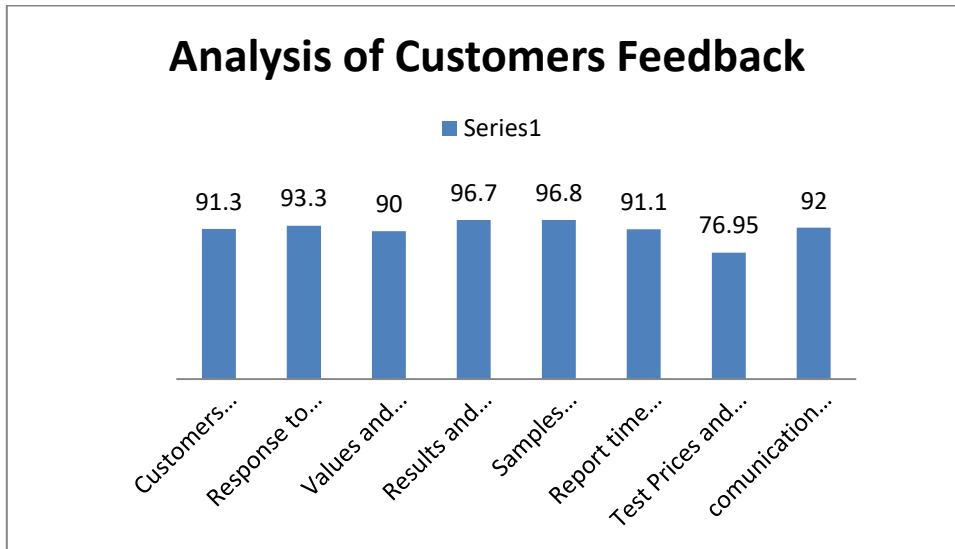


Figure 3.5.1: Analysis of Customers Feedback



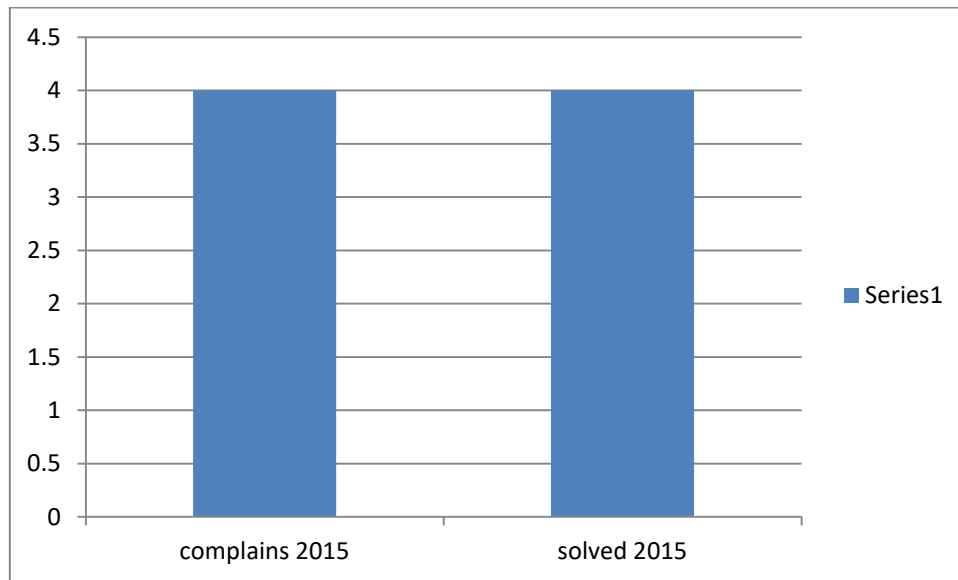
Figure 3.5.2: Customers Satisfaction Target

As shown in the table 3.5.1 the analysis of the questionnaire was shown that the customers were satisfactory for the laboratory services, and they were achieved their requirements, there were a few customers unsatisfied and they investigated to satisfied them. The lab was achieved satisfied target 90%.

### 3.6 Customers Complains

Table 3.6: Customers Complains

No. of Customers Complains 2015	No. of Solved Customers Complains 2015
4	4



**Figure 3.6: Customers Complains**

The Table 3.6 was shown the numbers of customers complains it was received, only 4 customer negative notices and treated as complain, investigated, solved and responds to the customers.

#### 4. Conclusion

The study was shown that CLTSC achieved the customer's satisfaction, the customer's needs, and achieved satisfaction target yearly for quality management system, and this due to the effectiveness of applied quality management system. The customers number, and of samples number were increased yearly during this three years (2014, 2015, 2016). After service feedback explained the customer satisfaction for all services and the laboratory was achieved the acceptable target and improved their services. All complaints from clients should be formally followed up. Used quality management system can be an invaluable tool in your decision-making, risk management, the customer's satisfaction and increased market share.

#### 5. Summary

Implementation of ISO 9001-2008 provides a system for continuous improvement of daily laboratory practices. Direct benefits include faster identification and resolution of issues, improved customer satisfaction, meeting of

quality requirements of specialized customers, and an overall increase in the laboratory business.

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