ST. MARY UNIVERSITY
SCHOOL OF GRADUATE STUDIES
INSTITUTE OF QUALITY AND PRODUCTIVITY MANAGEMENT

FACTORS AFFECTING EFFECTIVENESS OF THE ETHIOPIAN NATIONAL QUALITY INFRASTRUCTURE

BY

FIKREAB MARKOS DOLEBO
(ID No:-SGS/0201/2008B)

JUN, 2018

ADDIS ABABA, EHTIOPIA

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A THESIS SUBMITTED TO THE INSTITUTE OF QUALITY AND PRODUCTIVITY MANAGEMENT IN PARTIAL FULFILLMENT FOR THE REQUIREMENTS OF THE DEGREE OF MASTERS OF SCIENCE IN QUALITY AND PRODUCTIVITY MANAGEMENT

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DECLARATION

I, the under signed, declare that this 'Thesis' entitled with **"FACTORS AFFECTING EFFECTIVENESS OF THE ETHIOPIAN NATIONAL QUALITY INFRASTRUCTURE"**, is my original work, prepared under the guidance of my Advisor Dr. Abdu Abagibe. All necessary sources of materials used for the preparation of this 'thesis' have been appropriately acknowledged. Moreover, I want to confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

_____   _____

   Name   Signature & Date

ENDORSEMENT

This is to certify that this Thesis paper work, entitled "FACTORS AFFECTING EFFECTIVENESS OF THE ETHIOPIAN NATIONAL QUALITY INFRASTRUCTURE", which is undertaken by Fikreab Markos for the partial fulfillment for the requirements of the degree of Masters of Science in Quality and Productivity Management (QPM) at St. Mary University, is an original work and not submitted earlier for any degree either at this University or any other University.

_____   _____
Research Advisor   **Signature & Date**

ACKNOWLEDGEMENTS

LIST OF ABBREVIATIONS AND ACRONYMS

AFRIMETS	Inter Africa Metrology Organization
BIPM	International Bureau of Weights and Measures
BPR	Business Process Reengineering
ECAE	Ethiopian Conformity Assessment Enterprise
ENAO	Ethiopian National Accreditation Office
EUROMET	European Metrology system
ESA	Ethiopian Standard Agency
Frqu.	Frequency
HACCP	Hazard Analysis and Critical Control Points
IAF	International Accreditation Forum
IEC	International Electric Commission
ILAC	International Laboratory Accreditation Cooperation
ISO	International Organization for Standards
ITU	International Telecommunication Union
KCDB	Key Comparison Database
NMIE	National Metrology Institute of Ethiopia
NQI	National Quality Infrastructure
MoST	Ministry of Science and Technology
OIML	International Organization for Legal Metrology
SADC	Southern Africa Development Community
SIM	Inter-American Metrology System
Stdv.	Standard deviation
TBT	Technical Barrier to Trade
WTO	World Trade Organization

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ABSTRACT

National Quality Infrastructure (NQI) is a combination of standardization, metrology, accreditation and testing. A fully functional NQI is essential for quality improvement actions within the country as well as to facilitate trade with international partners. Despite a number of study have been conducted to understand the opportunities and challenge of the National Quality Infrastructure (NQI), detail work is needed to understand the factors affecting the current NQIs performance. This study is, therefore intended to investigate factors that can affect the effectiveness of Ethiopian NQIs and give a base to identify measures that can lead to an improvement for NQI activities and performance in the future. In this study, basic questions like, to what extent do the services provided by NQIs contribute to the performance of NQIs and what are the factors affecting the development of NQIs in Ethiopia are raised and analyzed to know the causes that can affect the NQI effectiveness. Both qualitative and quantitative research is employed in the study for the collection of data. To analyze the data, both descriptive and inferential statistics were used. Results of the findings were presented both in qualitative and quantitative manner. The statistical result shows that the overall NQI achievement was found on an average level. In general, results revealed that poor knowledge management, poor resource allocation and poor equipment utilization as well as frequent failure and inefficient maintenance activities have retarded the implementation of NQIs. In connection with these findings it was recommended that NQI institutions need to improve their ICT and technology utilization; improves motivation of employees; strengthened international collaboration and recognitions etc. Moreover, it is suggested that NQI need to improve coordination, leadership commitment, and provide resources to overcome the barriers that prevent the NQIs to perform its activities in an effective manner.

Key words; National Quality Infrastructure, organizational performance and effectiveness.

CHAPTER ONE: INTRODUCTION

This chapter deals with the background of the study, the statement of the problem, the objectives, the significance of the research work, the limitation and its scope, definition of basic terms and the organization of the study.

1.1.   Background of the Study

The National Quality Infrastructure (NQI) is the institutional framework that establishes and implements maintain and control the practice of standardization, conformity assessment, metrology, and accreditation. It enhances competitiveness by offering authorization on the quality of products and services that they adhere to requirements of governments or the market place. When used effectively, they facilitate international trade and contribute to technology upgrading and absorption. Since the researcher have a decade experience in the working environments of the NQI institutions and also has an interest to know and contribute for the improvement of the NQIs performance, this study was initiated. This initiation leads the researcher to focuses on those problems that can have an impediment on the effectiveness of the NQIs performances. The 2015 and 2016 annual reports of the NQI institutions showed that there are problems regarding to customer satisfaction, problem of implementation of system standards, problem of stakeholder participation, failures in scientific equipments, and also inadequacy and inefficiency of related NQI service provisions. Therefore this study has covered a wide spectrum of factors to understand the things that can affect the NQI institutions effectiveness.

In the literature, there is no single model of organizational effectiveness to fit all organizations. To study the NQI effectiveness this study relied on four main approach forwarded by (Balduck & Buelens, 2008). According to Balduck & Buelens, 2008 the issue of effectiveness in organizations revolves round four main approaches: the system resource approach, the goal approach, the strategic constituency approach and the internal process approach. This model is being used for analyzing, the effectiveness of the NQIs.

The first extensively used approach in organizational effectiveness is the goal approach. Its focus is on the output to figure out the essential operating objectives like profit, innovation and finally product quality (Schermerhorn, Hunt, R. N. Osborn, & R. Osborn, 2004). The second approach which is named the system resource approach, explains the effectiveness from the point of view of the ability to obtain necessary resources from the environments outside the organization (Schermerhorn *et. al.*, 2004). As the third approach is known as the process approach which pays attention to the transformation process and is dedicated to seeing the extent to which the resources are officially used to give services or produce goods (Schermerhorn *et. al.*, 2004). The fourth approach is the strategic constituency approach, which deals with the effect of the organization on the main stakeholders and their interests (Schermerhorn *et. al.*, 2004). In line with these approaches the effectiveness of the NQIs were studied from its internal and external perspectives. The NQI is considered as an important tool that can be utilized to improve competitiveness, to facilitate global trade, to facilitate international harmonization and recognition. The goal of this study is to explore those factors that can affect the effectiveness of Ethiopian NQIs and recommend and give suggestions to the institutions.

1.2.   Statement of the Problem

Secondary data showed that the NQI institutions have conducted an independent assessment to understand their respective organizational performance and effectiveness focusing on customer and employee satisfaction, for which the satisfaction level is found an average. Moreover, none of the institution has touched both the administrative and technical aspect of the NQI functions in their studies to explore its effectiveness. This thesis work discussed the importance, the central elements and the factors that affect the effectiveness of the Ethiopian National Quality Infrastructure (NQI). The study got in depth to understand those factors which can affect the effectiveness of the NQIs.

To understand the factors that can affect the NQIs effectiveness, the researcher has analyzed NQI institutions' 2015 and 2016 annual report and found that there is a noticeable problem in the sector with respect to quality service provision, management of system standards, stakeholders participation and resource utilization within the

institutions. Generally the identified problem indicates that there is inefficiency of service delivery of the NQIs. Moreover, according to the World Bank report of August 2016 the Ethiopia's NQI fails short of meeting the increasing demand from industries and suffers from weaknesses that hinder promoting and strengthening the use of NQI services among the private sector as tools to increase their competitiveness. These weaknesses include:

(i) Capability of service delivery of existing NQI institutions;

(ii) Lack of consultation on NQI service development with industries;

(iii) Low level of understanding on the NQI services among the private sector and local consumers;

(iv) Inadequate incentives for industries to comply with quality standards;

(v) Lack of private NQI service providers;

(vi) Weak coordination and collaboration in the implementation of technical regulations among the regulatory agencies and NQI institutions.

As a result of these indicated problems and weaknesses, there seems to emerge lack of competitiveness of Ethiopian products and services and which then affect the improvement and creativity in the country. Therefore, this study is dedicated to expose and understand the factor that can affect effectiveness of the NQI's from resource utilization, management of system standards, services and customer satisfaction, and stakeholder participation and related issues in the indicated institutions.

In light of the above perspectives the study was guided by the following basic questions.

1) To what extent do the services provided by NQIs contribute to overall performance of the firm in the selected textile, pharmaceuticals and metal industries and able to assist them in product and process quality?

2) What are the factors affecting the development of NQIs in Ethiopia? In this research question specific areas like awareness of the society on the role of NQIs, the extent of resources such as manpower, finance and material as well as leadership were seen.

3) What is the level of the current performance of NQIs services?

4) To what extent that the activities of the NQI elements do affect NQIs effectiveness?

1.3.   Objectives of the Study

1.4.1 General Objective

The general objective of this study is to investigate factors affecting the effectiveness of Ethiopian NQIs.

1.4.2 Specific Objectives

1) To understand those factors which can have an effect in the effectiveness of the NQI?
2) To identify the current status of the NQI, especially its strengths, weaknesses and challenges.
3) To provide the research findings to the NQI institutions.

1.4.   Significance of the Study

This research is important to the NQI institutions to know their gap and to understand what they have to do in the future. If this research would not be conducted and shows the existing gaps, the problem in the area would be left unanswered for a while and they could not be able to identify the root cause of the ineffectiveness in the NQI activities. The findings of this study are also expected to guide and show proper direction to provide adequate NQI services for institutions that have direct or indirect contribution in implementing NQI activities. The findings of the study could also provide some new strategies and show directions for policy maker to help them in reviewing and formulating related policies. Furthermore, the study is expected to fill gaps in the literature regarding factors affecting the effectiveness of the National Quality Infrastructure, thereby add to the existing body of literature and can serve as a stepping stone for future studies. For its practical implication the finding of this research work could contribute to understand the major factors that can determine its effectiveness. More specifically, the study addressed the major constraint around the NQI system in the country. Generally, the importance can have both theoretical contribution and practical implication.

1.5.   Scope of the Study

This study focused on NQIs at Federal level, because the regional level NQIs are at their infant stage for they have been established in not more than a year or two years. The study focused in assessing the factors related to stakeholder participation, the extent of services provided to industries by NQIs, and factors affecting the development of NQIs.

1.6.   Limitation of the Study

Small number of respondents creates a limitation on the data coverage and limited the researcher to get extra detail information to study the problem. Moreover, the tight schedules of the NQIs manager forced the researcher to use limited contact time with them to gather information through interview. Moreover, there were unreturned questionnaires and improperly filled which were totally ignored. Thus, the research is limited on the gathered information; out of 223 distributed questionnaires, only 162 (72.6%) correctly filled questionnaire were able to be collected.

1.7.   Definitions of Key Terms

National Quality Infrastructure (NQI):- The NQI comprises a variety of organizations each of which plays a role in establishing standards; evaluating whether products, process, or services fulfill specified technical requirements; and certifying that these requirements are met. Each of the central components of the NQI are National Metrology Institute, National Standard Body, National Accreditation Body, Calibration Bodies, Testing Bodies, Inspection Bodies, Certification Bodies, Enterprises, Authorities, Consumers and General Public.

Effectiveness: Means the extent to which the organization's current performance system meets the criteria for an effective performance appraisal system (McCann, 2004)

Organizational Effectiveness:- Organizational effectiveness is related to issues such as the ability of an organization to access and attract resources and consequently achieve its aims (Federman, 2006). The criterion of the organization's successful completion of their purposes is through core strategies (McCann, 2004).

1.8.   Organization of the Study

This study is structured into five chapters. The first chapter, which is the introductory part, deals with the background of the study, overview of the study area, statement of the problem, objectives and significance of the study, scope of the study and definition of the key terms used in the study. Chapter two presents the review of the related literature which treats the fundamental of the NQI system, the need for NQI and detailed explanation on the NQI activities both in the international and national perspectives. Moreover, the literature review describes theoretical issues regarding organizational effectiveness. The research design and methodology is explicitly presented in the chapter three of the research document. Chapter four is dedicated to discuss the results and the findings obtained from the study. Finally, the summary of major findings, conclusions and recommendations are explained in chapter five.

CHAPTER TWO : REVIEW OF THE RELATED LITERATURE

The chapter deals with the details of the theoretical issues in the National Quality Infrastructure System, the importance of National Quality Infrastructure in Ethiopia, the current status of the Ethiopian National Quality Infrastructure, Empirical Literature on Organizational Effectiveness and the conceptual framework.

2.1. Theoretical Issues of the National Quality Infrastructure System

The core elements of a Quality Infrastructure fall under Metrology, Standardization, Conformity Assessment and Accreditation. QI is not a disciplinary system; rather it seeks to support technical competence and compliance with international requirements. Technical competence makes it reliable for every kind of application so that, instead of setting up costly parallel structures, industries, consumers, public sector and regulatory bodies can all benefit from it for quality and for consumer protection purposes. When properly implemented and recognized by governments, it reduces use of resources in each ministry to a "one-stop shop" and serves for any kind of product and service. (Clamense et. at., 2007)

Quality infrastructure is based on a number of components that are closely interrelated and form a network whose logical links are based on a technical hierarchy. Five components can be identified which have been described by (Sanetra & Marbán, 2007): These five components comprise a national QI (NQI). Its fundamental institutions are the metrology institute as well as the standards and the accreditation-body (Sanetra & Stoldt, 2014Marbán, 2007). The NQI, however, cannot been seen as an isolated system. In order to get access to world markets and enhance international competiveness, a national QI system must be oriented according to international framework conditions (). The service provided by the NQIs is described in Table 2.1.1. These NQI institutions are highly related each other in their function to realize their objectives; this is pictorial described on figure 1 and figure 2.

Table 2.1.1: Elements and Services of a Quality Infrastructure

Element	Description of the service	Institution involved
Metrology	The science of measurement. Metrology can be subdivided into: ► *Scientific metrology*: the development and organization of the highest level of measurement standards ► *Legal metrology*: the assurance of correctness of measurements where these have an influence on the transparency of trade, law enforcement, health and safety ► *Industrial metrology*: the satisfactory functioning of measurement instruments in industry, production and testing laboratories	► National Metrology Institute (NMI) ► Legal Metrology Department (LMD) ► Calibration laboratories The NMIs and LMDs are mostly public organizations. Calibration laboratories may be public or private – the trend is towards private.
Standards	Publication of a formal document (the standards), generally developed by consensus, containing the requirements a product, process or service should comply with. Standards are essentially voluntary in nature and producers can choose when to use them. But once standards are used in contracts or are referenced in technical regulation, compliance becomes obligatory.	► National Standards Body (NSB) ► IEC National Committee (NC) ► Sectoral standards development organization (SDO) ► Industry based standards development organization Most NSBs are public or not-for-profit organizations. SDOs are mostly from the private sector, but do not exist in many countries.
Accreditation	Third-party attestation related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tasks.	► National Accreditation Body ► Industry-based Accreditation Body The NABs are either public or not-for-profit organizations. Industry-based accreditation bodies operate in very specific schemes on a world-wide basis.

Conformity Assessment	Inspection	The examination of a product design, product, process or installation and the determination of this conformity with specific requirements or, based on professional judgment with general requirements. Inspection is often conducted on consignments – for example import inspection – to ensure that the entire batch is equivalent to the product sample tested.	▶ General inspection agencies ▶ Import inspection agencies Inspection agencies can be public or private entities.
	Testing	The determination of a product's characteristic against the requirements of a standard. Testing can vary from non-destructive evaluation (e.g. X-ray, ultra-sound, pressure testing, electrical, etc. where after the product is still fit for use) to a total destructive analysis (e.g. chemical, mechanical, physical, microbiological, etc. where after the product is no longer fit for use) or any combination thereof.	▶ Test laboratories ▶ Pathology laboratories ▶ Environmental laboratories Laboratories can be public or private entities.
	Certification	Third-party confirmation related to products, processes, systems or persons. NOTE 1 Certification of a management system is sometimes also called registration. NOTE 2 Certification is applicable to all objects of conformity assessment except for conformity assessment bodies themselves, to which accreditation is applicable.	▶ Product certification bodies ▶ System certification bodies ▶ Personnel certification bodies Certification bodies can be public or private entities.

Source: - Working Paper, Donor Committee for Enterprise Development, 2015
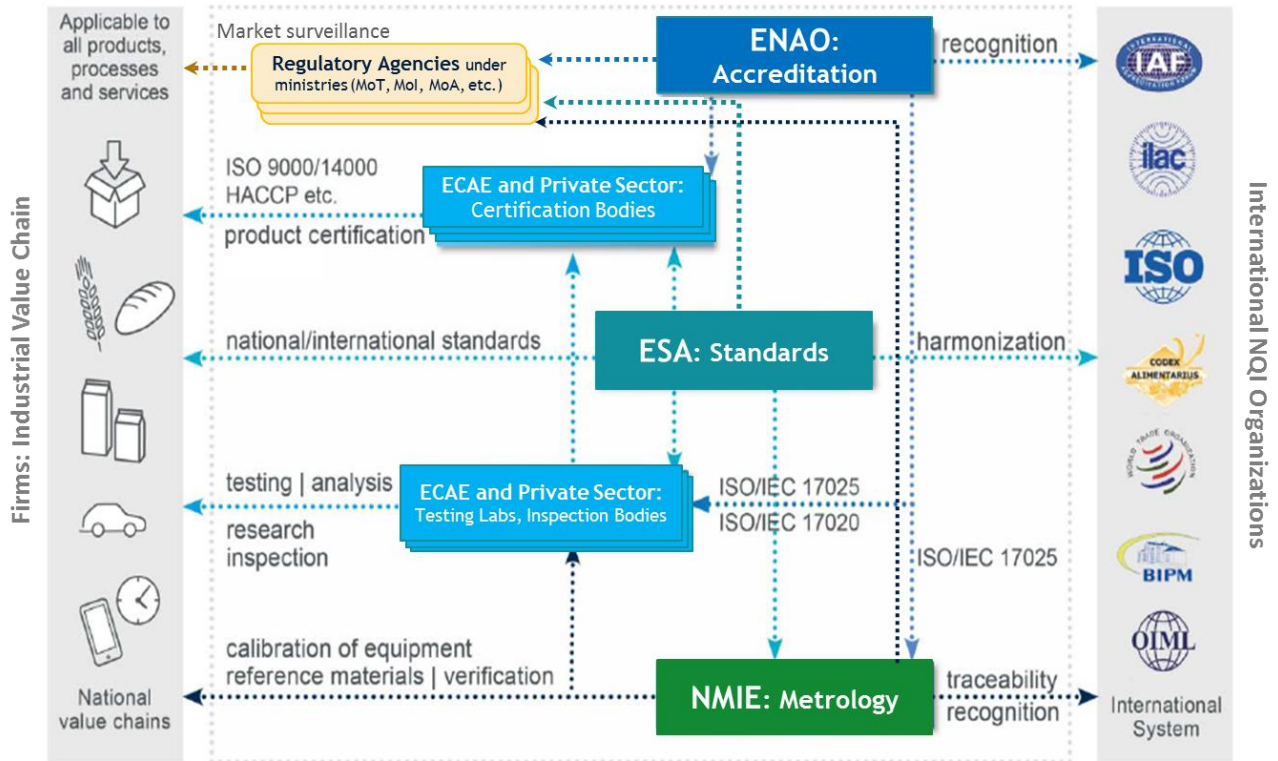
Figure 1. International Relationships Among Elements of the NQI.
Source:- Working Paper, Donor Committee for Enterprise Development, 2015

2.2. Why National Quality Infrastructure is Needed in Ethiopia?

Under the reform taken by the Ethiopian Government in 2011, the former Quality and Standards Authority of Ethiopia was divided into four legally autonomous NQI institutions, responsible for providing quality assurance services in the fields of standards, accreditation, metrology, and conformity assessment (testing, inspection, and certification) to ensure good governance, create institutions free from conflicts of interest and be aligned with the international practice. The four main actors in the National Quality Infrastructure organization's of Ethiopia fall under the administrative mandate of the Ministry of Science and Technology. They are the NMIE, ECAE, ENAO and ESA. These government organizations are established by a rules and law ratified by the ministry of council.

The proclamation for the establishment of the Ethiopian Standard Agency is established by the Council of Ministers Regulation no. 193/2010 to provide standardization services

in the country. Some of the power and duties given for the agency, which is relevant to this research topic is stated as follow:

i. develop, implement and follow up standardization strategy for the purpose of quality promotion activities which are in line with the country's developmental programs;

ii. recognize any standard published by a national, regional, intimation or any other standardization body as Ethiopian standard, as may be relevant;

iii. establish national technical committees for the purpose of developing Ethiopian standards and determine their working guidelines;

iv. establish national enquiry point and deliver services on standardization, conformity assessment guidelines and technical regulations; develop and implement awareness creation strategies for consumers on quality and standards;

v. build the capability of companies through technical support, training and consultancy services for developing their own company standards;

Powers and duties of the NMIE granted by the proclamation No. 194/2010, which is relevant to the topic of this study, are described below;

i. transform existing traditional measurement instruments into modernity trough introducing international system of units and by enabling to use other acceptable measurement instruments in the country; determine, and maintain national measurement etalons;

ii. based on other countries best practices, provide support in building the capacities of universities and research in situations in curriculum designing and implementation process and conducting research in the field of metrology;

iii. represent the country's interest in international forums regarding metrology and follow up the implementation of treaties to which Ethiopia is a party;

iv. work in cooperation with the relevant stakeholders to ensure the existence of an integrated support for strengthening the national . quality infrastructure;

v. conduct research in the field of metrology in collaboration with universities and research in situations and disseminate the results thereof to industries;

Ethiopian National Accreditation office Re-establishment by a regulation No. 279/2012 to perform the following activities

i.   To provide accreditation service to conformity assessment bodies based on national and international requirements.

ii.   Issue and implement directives governing the accreditation process, in particular, the assessment of applicants and granting, suspending and withdrawing of accreditations and handling of grievance relating thereto.

iii.   Works in collaboration with the relevant stakeholders to ensure the existence of an integrated support for strengthen the national quality infrastructure.

iv.   Represent the country's interest in international forums regarding accreditation and follow up the implementation of treaties to which Ethiopia is a party.

The Ethiopian-Conformity Assessment Enterprise is established by the Council of Ministers Regulation No. 196/2010. The purposes for which the Enterprise is established are, by organizing robust certification, inspection and testing laboratory services, to:

i.   provide certificate of conformity to production enterprises or service providers by assessing the conformity of their production processes or service provisions to the relevant national or international standards and legal requirements;

ii.   provide certificate of conformity with respect to the country's export products by assessing their conformity to the relevant Ethiopian standards, international standards or the standards of other countries;

iii.   provide certificate of conformity with respect to imported products by assessing their conformity to the relevant national or international' standards and legal requirements;

2.3. Current Status of the Ethiopian National Quality Infrastructure.

2.3.1. Ethiopian Standard Agency

The Ethiopian Standard Agency (ESA) is a governmental organization established by the proclamation of the council of ministers regulation no. 193/2010 to provide standardization services in the country. The primary responsibilities of ESA are to oversee the development of national standards and to publish the same. Ethiopian standards agency has three core business areas which mainly focus on the standard

formulation, training and Technical support and organizing and disseminating standards, Conformity assessment procedures and Technical regulation for the customers

The most important functions of ESA are:

i. To lead and coordinate national standardization.

ii. To confirm and publish the national Ethiopian Standards;

iii. To promote the implementation of standards;

iv. To Promote Ethiopian Standard Mark and authorize its use;

v. To represent Ethiopia in the International Standards Organization and work in collaboration with other foreign national standard bodies;

vi. To establishes National Enquiry Point and deliver services on Standardization, Conformity Assessment Guidelines and Technical Regulation;

vii. To enable Ethiopian industries to benefit from technology transfer by providing Technical Support, Trainings and Consultancy Services and assisting them in implementation of standards.

The standards development sector takes place in technical committees which are representative of all stakeholders. With respect to standards information the ESA has a well equipped standards information centre, where users can obtain up-to-date information on international, regional and national standards, also of main trading partners, or are able to purchase the document.

2.3.2. National Metrology Institute of Ethiopia

The National Metrology Institute of Ethiopia (NMIE) is a governmental institute that is established by the Council of Ministers regulation No. 194/2010. The mission of the NMIE is to make the society beneficiary of the modern measurement system by implementing national measurement system based on the internationally accepted practices.

The main responsibility of the NMIE is to ensure that any measurement made in a country can be traced to the International System of Units (the SI) via international standards, thereby helping to facilitate acceptance of products, processes, measurements and testing in the local and foreign markets. The institute is also responsible for the

maintenance of Ethiopian National Measurement Standards and Certified Reference Materials (CRM). It also provides calibration, training and consultancy services in the areas of metrology and scientific equipments. NMIE perform its activities in Addis Ababa as a head office and has branches laboratories at Desie, Jimma, Bahirdar, Awassa and Diredawa.

NMIE is a member of the Inter Africa Metrology Organization (AFRIMETS) and is an associate member of the BIPM. It is through this cooperation that the country's measurement system will gain international recognition. The list of the NMIE's Calibration and Measurement Capabilities (CMCs) needs to be recognized through key comparisons and peer evaluations, and thereafter listed in the key comparison database (KCDB) managed by the BIPM. Without such CMC entries, the country's industry will find it hard in the long run to gain acceptance of measurement results in the international markets.

2.3.3. Ethiopian Conformity Assessment Enterprise

The Ethiopian-Conformity Assessment Enterprise is a governmental organization which is Establishment Council of Ministers Regulation No. 196/2010 it is a federal owned Public Enterprise, governed by the Ministry of Science and Technology. ECAE's mission is to provide internationally accepted and recognized testing, inspection and certification services for exporters, producers, service providers, regulatory bodies, consumers and importers as well as the public through credible, effective, accessible and efficient conformity assessment services to ensure the availability of quality products and services. ECAE has 6 specialized testing laboratories operating at the head quarter, and 5 of them are accredited (Chemical, Electrical, Mechanical, Microbiology & textile) Radiation laboratory is in process to be accredited. Chemical laboratory is one of those accredited laboratories, the products Tested by ECAE's Chemical Laboratory among many are the chemical and agricultural and food products are some among many. Under electrical laboratory solar battery charge controller, solar panel, solar inventor, electric cable, electric wires, circuit breakers, plug and socket outlets are some of the equipments which are getting services.

The Textile and Leather laboratory of the ECAE's textile and leather laboratory is performing a test for Textile fabric, paper, pulp, paper board, paper products, and chrome

crust leather. The ECAE's mechanical laboratory is performing a test of galvanized steel wire, corrugated/plain steel sheets, nails, reinforcement steel bars, cement, building lime, hollow concrete blocks, roof tiles, ceramic wall and floor tiles, course and fine/ aggregate, concrete cubes, river sand are some from many. ECAE provides Certification services for product, system, persons and certified companies based on Mandatory and Voluntary Ethiopian Standards and International Standards. ECAE provide international training and certification on Quality Management with the collaboration of Quality Austria. The international qualification programs offered by ECAE are Quality Management Representative, Quality Management Internal Auditor and Quality Management Technician. ECAE provides independent third-party and internationally accredited inspection services on the following areas based on ISO/IEC 17020. Factory Evaluation:- Inspecting whether factories/industries are following the required manufacturing systems during production process. Pre-Production Inspection: Inspecting the raw materials and components to be used during the production process. During Production Inspection: Inspecting after the first product leave the production line for any defects or deviation from quality parameters and suggesting practical and effective ways in which these can be improved.

Pre-Shipment Inspection: Inspecting the merchandise when it is packed and ready for shipment by pulling out random samples based on international sampling techniques verifying quantity, function, color, size, specifications, labeling details to make sure that requirements are met Supervision of Loading: After pre-shipment inspection is over inspecting the loading materials appropriateness, environmental conditions, cleanliness and integrity of the containers to ensure the safety deliver of the products

2.3.4. Ethiopian National Accreditation Office

Ethiopian National Accreditation Office (ENAO) is a governmental institute that is re-established by the Council of Ministers regulation No. 279/2012. The key responsibility of the ENAO is to give formal recognition those laboratories of various kinds, certification bodies, inspection bodies, proficiency scheme providers and good laboratory practice test facilities are competent to carry out specific tasks. The ENAO accreditation process is based on international standards such as ISO/IEC 17025, ISO/IEC 17020,

ISO/IEC 17021, ISO/IEC 17065 and others. Such accreditation has become a precondition for the recognition of results from conformity assessment service providers in technical regulation and in the marketplace at the local and international level. ENAO's mission is to provide an internationally recognized, cost-effective, national accreditation service within the borders of the Federal Democratic Republic of Ethiopia which is aimed at:

I.   supporting the credibility of the National Quality Infrastructure of Ethiopia;

II. supporting regional and international trade;

III. enhancing the protection of consumers;

IV. and improve the competitiveness of Ethiopian produced products and services, in both the voluntary and regulatory areas.

ENAO provides assurance to trading partners that accredited Conformity Assessment Bodies in Ethiopia are competent to test, calibrate, inspect or certify to the trading partners' requirements, while at the same time overcoming trade barriers by assuring compliance to the WTO TBT agreement. Consequently, one of ENAO's medium-term goals in the next few years is to gain full recognition, by peer-evaluation, of the International Laboratory Accreditation Co-operation (ILAC) and the International Accreditation Forum (IAF). This recognition will ensure that organizations that are accredited by ENAO will be recognized internationally to produce reliable and traceable conformity assessment services. ILAC manages recognition in the field of laboratory and inspection accreditation, and the IAF the fields of management systems, products, services, personnel and other similar programs of conformity assessment. ILAC and IAF work together and coordinate their efforts to enhance the accreditation and the conformity assessment worldwide. In order to gain such international recognition, the ENAO has to demonstrate its own competency vis-à-vis its peers.
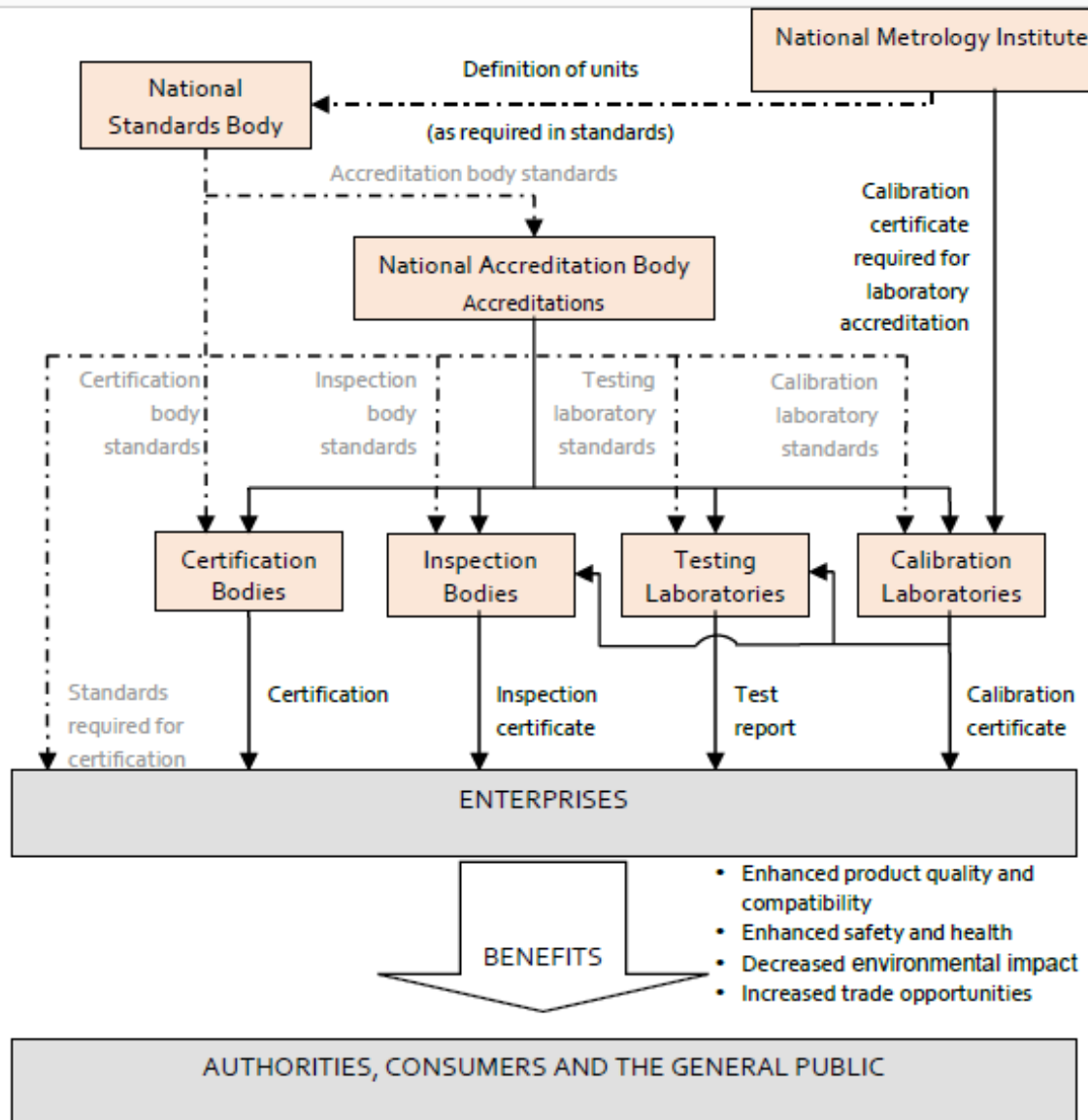
Figure 2. Interaction of NQI elements
Source:- World Bank 2007

2.4. Empirical Literature on Organizational Effectiveness

Organizational effectiveness is a multifaceted concept; there are several approaches to explain what it means. Since organizational effectiveness is a complex concept, there are a number of approaches to explain what it means. Various organizational theories are structured based on the different conditions and organizational factors while effectiveness is one of the most used criteria (Baker et.al., 1997) and (Ajilia, 2006). According to (Kushner & Poole, 1996) the effectiveness of an organization can be evaluated using four

components which are resource acquisitions, efficiency, goal achievement, and customer satisfaction. (Parhizgari & Gilbert, 2004) assume that a domain including effective factors can be defined with its constraints due to feasibility considerations for each company, or each industry, or each sector and the measurement of organizational effectiveness could be done based on this domain of effective factors using the views of the employees and/or the customers. In the literature, there is no single model of organizational effectiveness to fit all organizations. According to (Balduck & Buelens, 2008), the issue of effectiveness in organizations revolves round four main approaches: the system resource approach, the goal approach, the strategic constituency approach and the internal process approach. These are effective and efficient approaches which are dependent upon the type of situation to arise.

2.4.1. The Goal Approach

The goal approach focus is on the output to outline the essential operating objectives like profit, improvement and finally product quality (Schermerhorn *et. al.*, 2004). According to Robbins, 2003 the basic assumptions for the goal approach is that there should be a general agreement on the specific goals and the people involved should feel committed to fulfilling them. The next assumption is that the number of goals is limited and achieving them requires certain essential resources.

2.4.2. The System Resource Approach

This approach focused on the inputs. It explains the effectiveness from the point of view of the ability to obtain necessary resources from the environments outside the organization (Schermerhorn *et. al.*, 2004). The application of system resource can be effective if a clear relation exists between the resources which an organization receives and the goods or services it produces (Cameron, 1981). This approach invites managers to consider the organization not only as a whole but as a part of a larger group as well.

2.4.3. The Process Approach

The third approach is known as the process approach which pays consideration to the transformation process and is dedicated to seeing to what extent the resources are officially used to give services or produce goods (Schermerhorn *et. al.*, 2004). By

effectiveness, it is meant that the organization is internally well and efficient and the internal processes and measures in that place are quite well oriented. In an effective organization, there is no trace of stress and damage. The members are completely part of the system and the system itself works smoothly. The relationship between the members is based on faith, integrity, and good will.

2.4.4. The Strategic Constituency Approach

It deals with the effect of the organization on the main stakeholders and their interests (Schermerhorn *et. al.*, 2004). Based on this approach, effectiveness refers to the smallest agreement of all of the strategic constituencies of the organization. Strategic constituency involves all the people that are somehow associated to the organization. These people may have different roles such as the users of the services or products of the organization, the resource suppliers, the facilitators of the organization's output, the main supporters and the dependents of the organization (Cameron, 1981).

CHAPTER THREE: THE RESEARCH DESIGN AND METHODOLOGY

(Kumar, 1999) stated that a research design is a procedural plan that is adopted by researchers to answer questions objectively, accurately, economically and with validity. Moreover, (Bryman & Bell, 2007) stressed that research design should provide the overall structure and orientation of an investigation as well as a framework within which data can be collected and analyzed. Therefore in this study a detailed descriptions of the essential considerations in designing the research project which encompass the research method, source of samples data and sampling techniques, data gathering instruments, procedure of data collection, methods of data analysis and ethical considerations.

3.1.   The Research Design

This study used a mixed method of design. (Creswell, 2007) described that a strong mixed design study should start with a mixed methods research question, to shape the methods and the overall design of a study. Mixed type approach was used for both qualitative and quantitative methods. The research was examined in qualitative and quantitative for the fact that the focus of the research had on understanding and interpretation of the data, as well it deals with the effects of variables that affects the NQI effectiveness. More specifically, in this study exploratory design was employed. Regarding the importance of exploratory design experiences depict that if any event is taught to be new to the research participants, it is advisable to have a clear picture of the phenomena prior to collecting data. (Saunders, Lewis & Thronhill, 2004)

3.2.   The Research Methods

In this study a descriptive survey method was used for it used to measure the characteristics described in the research question, which portray an accurate profile of a person, his or her attitude and beliefs. In connection with the application of descriptive survey method, it was stated that this method is a method of investigation which attempts to describe and interpret what exists at present in the form of conditions, practice,

process, trends, effects, attitudes, beliefs, etc (Crosswell & Plano Clark, 2011). More specifically, cross sectional descriptive survey method was employed in this study for it is a method to collect data only once at time.

3.3. Source of Data

In this study both the primary and secondary sources of data was used. Primary source of data was collected from interview, observation and questionnaire from NQI and industry respondents. Moreover data collection through literature review, journals, and periodicals was referred as secondary sources of data.

3.4. Samples and Sampling Techniques

During designing samples, (Copper & Schindler, 2008) suggested that the following should be clearly described: the target population, parameters of interest, sampling frame, appropriate sampling method and the required sample size of the sample. The target population of this study included management member and experts from NQI institutions (NMIE, ECAE, ESA and ENAO). The sample was taken from the target population being researched. As a sample, the senior technical staff of NQIs was selected using purposive sampling techniques for they were assumed to be rich in information. (Cresswell, J. W., & Plano Clark, V. L., 2011), stated that purposive sampling involves identification and selection of individuals or groups of individuals that are proficient and well-informed with a phenomenon of interest. The reasons for this purposive sampling was because that the researcher believes that these people can satisfy and reliable because of the following criteria. Firstly, they are working directly on specialized assignment on NQI core issues and are experts in the field of quality infrastructure. Secondly, they are the one who works in international recognition area and even some of them are participating as a member in international organizations. Thirdly, they are the ones that manage to liaison between their organization and stakeholders in quality related issues in the country. The sampling number was determined by the equation, where (Yamane, 1967) cited on Israel (2013) provided a simplified formula to calculate a sample size as presented hereunder.

$$n = N/(1+N*E^2)$$

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Where n stands for number of sample, N stands population size, and E stands for margin of error. In this study the confidence interval was used is 95% and estimated population is one hundred fifty two, which comprises experts and management of NQI institutions. Based on this technique, the sample size taken was one hundred and thirty three respondents. First the number of sample from each institution of the NQIs was calculated using proportional sampling techniques and data were collected using simple random sampling techniques. A proportional stratified sampling technique is used because this technique enables to give an equal chance for the respondents to be selected (Battaglia & M. P., 2008).

Table 3.4.1. Population, Sampling Frame and Number of Respondents from NQI Institutions.

No.	Organization	Total experts	Management Expert	Total number	Selected Department for sampling the experts	Total sampling using proportionate
1	NMIE	50	10	60	Industrial and scientific Metrology Directorate	52
2	ECAE	35	10	45	Testing, Certification and inspection departments.	40
3	ESA	20	10	30	Standard Preparation and from training	26
4	ENAO	10	7	17	Inspection and testing	15
	Total	115	37	152		133

Moreover, based on the customer registration data base of the NQI institutions, it was obtained that about two hundred different companies were getting direct services in standardization, calibration, testing, inspection and consultancy services in their core business area. From these institutions the Textile, Leather, Pharmaceuticals and Metal Industry found in Addis Ababa have been taken as a population of interest for this study and selected using purposive sampling techniques. As shown in the tables below from a population of one hundred around ninety samples were taken using the formula of

(Yamane, 1967). Then after, the total number of samples from the industries was selected using proportional stratified sampling techniques and the samples from each industry was selected using simple random sampling technique.

Table 3.4.2. Population, Sampling Frame and Number of Respondents from Selected Industry.

No.	Organization	Selected Department	Total management and experts related to quality activities	Total sampling using stratified sampling techniques
1	Ayka Addis Textile	Production and laboratory	25	22
2	Ethiopian Pharmaceuticals Manufacturing Sh. Co.	Production and laboratory	25	22
3	Metal Engineering Technology Industry	Production and laboratory	30	28
4	Ethiopian Leather Institute	Production and laboratory	20	18
	Total		100	90

3.5. Instruments of Data Collection

Both (Drew, 1980) and (Kothari, 1985) regard questionnaires, interviews and direct observations as the most important means of data collection tools. Therefore, in this study, both closed and open ended questionnaires and semi structured interviews were employed. A Likert Scale, which is a five point scale was used to allow the individual to express how much they agree or disagree with a particular statement in the questionnaire. Questionnaires were distributed to those experts who were selected from both the NQIs and Industries. The questionnaire has five parts and was given to both categories of the respondents, however part five of the questionnaire was give only to the NQI respondents. Officials and senior management staff from both NQIs and industries were interviewed for 20 to 30 minutes besides the questionnaire. For conducting the interview the researcher was listed areas to be discussed, make the appointment with the interviewee, and arranged the time and place and finally the interview was conducted using both Amharic and English language, but the questionnaire was prepared in English

language because participants of this study are assumed that they are educated in English language.

3.5.1. Standardization of Data Gathering Instruments

3.5.1.1. Validity

According to (Paul, 1998) validity is defined as how much any measuring instrument measures what it is intended to measure. Validity is the most critical criterion and indicates the degree to which an instrument measures what it is supposed to measure. There are three types of validity check for data. These are: (i) Content validity; (ii) Criterion-related validity and (iii) Construct validity, according to (Kothari, 1985).

(i) Content validity is the extent to which a measuring instrument provides adequate coverage of the topic under study, ii) Criterion-related validity relates to our ability to predict some outcome or estimate the existence of some current condition and iii) Construct validity is the most complex and abstract. A measure is said to possess construct validity to the degree that it confirms to predicted correlations with other theoretical propositions. It is believed that the instrument of this research work contains a representative sample of the population of both the NQI and industry respondents. The sample drawn from the population that was taken from the log book of the NQI institutions which shows institutions that frequently uses NQI's services in the year 2017.

3.5.1.2. Reliability

The validity of the data gathering tools was checked by selecting ten experts, who have back ground and experience on the issue under the study. And then the reliability of the tools was checked using Cronbach's alpha values. The descriptive statistics helped to determine uni-dimensionality and construct validity of the measures and the Cronbach's alpha values of the factors helped to show the reliability about the factor affecting the NQIs effectiveness and its performance scales. The Cronbach's alpha measures the internal consistency of a group of items by measuring the homogeneity of the group of items. "It is an indication of how well the different items complement each other in their measurement of different aspects of the same variable or quality" (Litwin, 2003, p.22).

Cronbach's alpha ranges in value between zero and one. Values closer to one indicate a higher internal consistency; values closer to zero indicate a lower internal consistency. (McMillan & Schumacher, 2001) suggest that groups of items with an alpha below 0.70 should be used with caution. The internal consistency of a scale can also be examined with item-to-scale correlations and inter-correlations of items within a scale (DeVellis, 2003). Finally, Pilot test was conducted on ten selected experts from all NQI institutions which were not included as participants in the main study. According to Tavakol & Dennick, 2011 reliability refers to the ability of the data to produce same result consistently and reliability of the data was calculated by using Cronbach alpha coefficient (Pallant, 2007). It is a measurement of internal consistency among the items and its range is from 0 to 1 with a minimum of 0.7. Accordingly, the reliability scale from the analyzed data in the study was obtained 0.788. This indicates that there is a high internal consistency.

Table 3.9.1: Case Processing Summary and Reliability Statistics for Pilot-Test for Current Performance of NQIs Institutions with Respect to the Given Statement.

Case Processing Summary			
		N	%
Cases	Valid	10	90.9
	Excluded[a]	1	9.1
	Total	11	100.0
a. List wise deletion based on all variables in the procedure.			
Reliability Statistics			
Cronbach's Alpha	N of Items		
0.788	9		

Likewise the reliability statistics was calculated for all parts of the questionnaire, the result is described as follow: Pilot-test to understand NQIs' achievement from its process perspectives (section 4.3) = 0.796; Pilot-test for understanding the NQIs' performance from strategic constituency approach (section 4.4)= 0.80; the pilot-test that was done to know NQI performance from System Resource Approach (section 4.5)= 0.751and the

pilot-test that was done to know the NQIs' achievement (section 4.6)= 0.815 and these shows that there is a high internal consistency among the variable.

3.6.   Procedures of Data Collection

After checking and conducting test for reliability and the pilot test, the data gathering instruments was edited. Then after, data were collected by the researcher. Accordingly, the researcher had set up respondents for the research individuals, groups, and a panel of respondents whose opinion might seek on specific issues. Interviewing and questionnaires were the two main data collection methods in survey research. From a total of 223 questionnaires that were distributed to both the NQIs and the industries respondents found in Addis Ababa, a total of 162 questionnaires, which is 72.64%, were collected. Finally, data was also collected using participant observation using checklists.

3.7.   Methods of Data Analysis

The quantitative data first had been organized and put into tables to suit for analysis. Then after these data were analyzed using descriptive statistical methods like mean, standard deviation and percentages and be calculated suing statistical package for the social sciences (SPSS) version 20. Other than this, the qualitative data was transcribed and then coded and put into categories and discussed. Moreover, a two tailed t -test as an inferential statistical method was employed to analyze if there is idea difference between the two groups of respondents. Finally the two types of data were triangulated to forward summaries, conclusions and recommendations.

3.8.   Ethical Consideration

The researcher informed the respondents that the information collected from them will not be used for any other purpose other than this research objective. During data collection a brief explanation was given to the respondents about the benefit obtained from this research activity. Moreover they are informed that the information given by the respondent was used only for the purpose of this research and their rights and well-being is adequately protected.

CHAPTER FOUR: RESULT AND DISCUSSION

This chapter has six sub sections, section 4.1 presents the demographic characteristics of the respondents, section 4.2 describes about the analysis of current performance of NQIs institutions, section 4.3 deals with the analysis of NQIs' achievement from its process perspectives, section 4.4 illustrates the NQIs' performance from strategic constituency approach, section 4.5 presents the NQI performance from system resource perspectives and the last section (4.6) describes about the NQIs' achievement from its expected goal and outcome.

4.1 Demographic Characteristics of the Respondents

A total of 162 (male=129, female=33) person were participated in the study. From this, 102 participants were from the NQI institution and 60 participants were from the industry. Thus, table 4.1.1 and Table 4.1.2 below represent the profile of the research participant from NQI institutions and from selected industries getting services from NQI institutions respectively in terms of sex, age, educational qualification and years of experience in their current working positions in their respective organization as well as their total work experiences. Moreover, twelve participants from NQI and twelve participants from industry were participated on interview questions, i.e from each selected institutions four interviewee were selected.

Table 4.1.1. The profile of the Respondents from NQI Institution.

No.	Variable		F	Percent
1	Gender	Male	85	83.33
		Female	17	16.67
2	Age	18-25	3	2.78
		26-35	70	68.63
		36-45	21	20.37
		>45	9	8.52
3	Education Level	Diploma	3	2.78
		First Degree	95	93.52
		Second Degree and above	4	3.7
4	Work Experience in years	1- 5	36	35.19
		6-10	41	39.81
		11-15	11	10.19
		>15	4	3.7

Source: Data collected by the researcher through Questionnaire, 2018

From Table 4.1.1 above, it could be seen that 85 (88.33%) of the respondents from NQI institutions were male and 17 (16.6%) were females. From this finding, it could be deduced that female participation in NQI institutions seems below expected which in turn could affect the performance levels of the NQI institutions.

Concerning the age distributions of the participants from NQI institutions, only 3 (2.78%) were aged from 18-25; 70 (76.3%) were having their ages from 26-35; Moreover, 21 (20.37%) were aged from 36-45 while the rest 9 (8.52%) were above 45 years old. From this one can infer that most of the respondents are at their energetic ages to carry out their responsibilities in their respective institutes.

From the same Table, it could also be seen that 99 (97.22%) of the research participants from NQI institutions have qualifications equal to and above first degree while the rest 3 (2.78%) were qualified at diploma level. This shows that there are adequate number of intellectuals in the institutions where is could have high contribution to promote the service provision of the NQI institutions if their commitment is added.

With regard to work experience of the participants from NQI institutions 36 (35.19%) have served from one to five years, 51 (50%) have experience from six to ten years, 11 (10.9%) were having a services years from eleven to fifteen years and 4 (4.7%) have served above 15 years in their respective organizations. From this, it could be inferred that the staff of the NQI institutes have adequate experiences to implement what they have been assigned to do in their respective institutions.

In general the demographic data shows that the educational capacity, work experience and a composition of young experts and management in the NQI institutions are expected to transform the institutional activities in a better way and to a higher level of achievements.

Table. 4.1.2 Profile of Respondents' from the Selected Industry.

No.	Variable		F	Percent
1	Gender	Male	44	73.3
		Female	16	26.7
2	Age	18-25	2	3.3
		26-35	47	78.3
		36-45	9	15
		>45	2	3.3
3	Education Level	Diploma	2	3.3
		First Degree	52	86.7
		Second Degree	6	10
4	Work Experience in years	1- 5	27	45
		6-10	22	36.7
		11-15	7	11.7
		>15	3	5

Source: Data collected by the researcher through Questionnaire, 2018

In Table 4.1.2 above, it could be seen that 44 (73.3%) of the respondents from the industry respondents were male and 16 (26.7%) were females. This shows that the sex composition of the respondents from the male group is twice greater than the females and the participation of the female is below the expected level which calls for mainstream the situation to enhance the female participation in industrial activities.

The age distributions of the industry participants showed that only 2 (3.3%) were aged from 18-25; 45 (78.33%) were having their ages from 26 to 35; 9 (15%) from 36-45 while the rest 2 (3.3%) were above 45 years old. From this one can understand that most of the respondents were at their active ages to carry out their responsibilities in their respective industries. From the same Table, it could also be seen that 58 (86.7%) of the research participants from the industry have qualifications equal to and above first degree while few numbers 2 (3.3%) were qualified at diploma level. This shows that there are enough number of intellectuals who are working in the industry, which can have its own contribution to promote the production of the industry if they exert their effort to their maximum.

With regard to work experience of the participants from the selected industries 27 (45%) have served from one to five years, 22 (36.7%) have experiences from six to ten years, 7 (11.7%) were having a services years from eleven to fifteen years and 4 (4.7%) have served above 15 years in their respected organization. From this it could be inferred that the staff of the selected industries have adequate experiences to implement the objectives of their respective industries.

In general, the educational capacity, work experience and a composition of young experts and management in the industries are expected to enhance the provision of adequate services from the industries. Thus, the respondents' age, educational capacity and work experience of both categories of participants that is those from NQI institutions and from industries show that most of the employees are qualified, energetic, quite representative and competent in filing the questionnaire, assuming that they are working in relevant field of practice in relation to their educational qualifications in their respective organizations. Furthermore, the experience and educational back ground of the respondents were reliable and it makes the study easier and able to get informative data for analysis.

4.2 Provision of Service Quality by NQI Institutions.

4.2.1   The Performance of NQI Institutions with Respect to Service Quality.

The questionnaire was designed by using Likert Scale and almost all of the statements were measured on a five point Likert Scale with 1 = Very Poor, 2 = Poor, 3 = Average, 4 = Good, and 5 = Very Good. Moreover, the calculated means are interpreted as; above 4= Strongly Agree, 3.01 to 4.00 = Agree, 2.51 to 3.00= Average, 1.50 to 2.50 = Disagree and below 1.5 it is interpreted as strongly disagree. The information obtained from the questionnaires are summarized and discussed in the following manner.

Table 4.2.1.1: Evaluation of NQI's Service Quality by the NQI Institutions' Respondents.

No.	Question	NQI institutions	No. of responde	Very poor		Poor		Average		Good		Very Good		mean	Stdv
				Frq	%	Frq	%	Frq	%	Frq	%	Frq	%		
1	Provision of quality Service by NQI institutions	NMIE	40	1	2.5	8	20.0	16	40.0	13	32.5	2	5.0	3.18	0.9
		ECAE	26	1	3.8			9	36	11	42.3	5	19.2	3.73	0.92
		ESA	26					11	42.3	10	38.5	5	19.2	3.77	0.77
		ENAO	10					4	40.0	4	40.0	2	20.0	3.8	0.79
		Sum	102	2		8		40		38		14			
		NQI		1.96		7.84		39.2		37.2		13.7		Average Mean = 3.53 Stdv= 0.845	

Source: Data collected by the researcher through Questionnaire, 2018

Table 4.2.1 shows that 10 (9.8%) of the respondents rated the provision of quality service by the NQI institutions is poor and very poor; 40 (39.2%) rated average, while 52 (50.9%) responded good and very good. Moreover, the average mean (3.53) of the evaluation showed that the service quality is above average. This shows that the quality service provision is adequate. The provision of quality service could be implied that it is because of the experience and adequate educational level of the staff in the NQI institutions.

On the other hand, majority of the respondents of the NQI interviewees replied the existence of problem related to absence of data quality, miss-interpretation of results and miss-handling of laboratory equipment were common problems during the time of analysis of data. This could imply that even though most experts have an educational qualification of first degree, they may lack know-how of ICT and handling of scientific/laboratory equipments.

Table 4.2.1.2: Evaluation of NQIs' Service Quality by Industry Respondents.

Question	Rating	ECAE		NMIE		ESA		ENAO		NQI Average	
		Frq	%	Frq	%	Frq	%	Frq	%	Frq	%
Provision of quality Service by NQI institutions	Very Poor	3	5	10	16.7	1	1.7			14	5.83
	Poor	5	8.3	11	18.3	8	13.3	7	11.7	31	12.92
	Average	12	20	25	41.7	23	38.3	9	15	69	28.75
	Good	35	58.3	13	21.7	26	43.3	36	60	110	45.83
	Very Good	5	8.3	1	1.7	2	3.3	8	13.3	16	6.67
Mean		3.57		2.73		3.33		3.75		3.35	
Std. Deviation		0.945		1.039		0.816		0.836		0.909	

Source: Data collected by the researcher through Questionnaire, 2018

Table 4.2.1.2 depicts, that 44 (18.75%) industry respondents rated the provision of quality service by the NQI institutions is poor and very poor; 69 (28.75%) respondents rated average, while 126 (52.5%) respondents showed that the service quality is good and very good level. Moreover, the average mean value (3.35) of the evaluation showed that the service quality is above average. On the other hand 50% of the industry interviewee said that there is inconsistency of result during measurement of calibration and testing items. This may be that the experts in NQI may lack deep knowledge in precision and accuracy measurements.

Thus from the analysis of both the quantitative and qualitative data it could be said that the provision of quality services by NQI institutions are adequate. From this one can infer that even though there are no as such a high level qualified (above first degree holders) that can work on high precision and accuracy, the educational qualifications and the experience of the staff have impacted positively for the performance of NQI institutions.

As shown in Table 4.2.1.3 below for item 1, the Levene's test for equality of variances has p value of 0.280 which is greater than 5%. Thus we do not reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances assumed' row. The p-value is 0.245 which is greater than 5% and we do not reject the hypothesis of equality of means of the two groups. Thus, the two groups also showed that there is no significant difference in the idea of the two groups. Thus from the foregoing analyses from Table 4.2.1 and 4.2.1.2 it could be seen that the responses from both NQI institutions and industries showed that the provision of service by NQI institutions is adequate.

Table 4.2.1.3 Two Tailed t- Test analysis, for the Provision of Service Quality by NQI Institutions.

Item	Identification	Respondents	N	Mean	Std. Deviation	Equal Variances	Levene's Test for Equality of Variances		t-test for Equality of Means			
							F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
1	NQI SERVICE QUALITY	NQI	102	3.53	.898	Assumed	1.175	.280	1.168	160	.245	.163
		INDUSTRY	60	3.35	.909	not assumed			1.211	137.827	.228	.163
2	NQI Customer Handling	NQI	102	3.67	.785	assumed	.338	.562	2.231	160	.027	.302
		INDUSTRY	60	3.42	.89	not assumed			2.199	118.330	.030	.302
3	NQI Scope of Services	NQI	102	3.54	.951	assumed	1.151	.285	5.159	160	.000	.839
		INDUSTRY	60	3.34	0.971	not assumed			4.993	111.684	.000	.839
4	NQI Service Deliverability	NQI	102	3.52	.853	assumed	1.341	.249	6.820	160	.000	.986
		INDUSTRY	60	2.95	1.774	not assumed			6.637	113.598	.000	.986
5	NQI Stakeholder Participation	NQI	102	3.32	.865	assumed	4.787	.030	4.571	160	.000	.668
		INDUSTRY	60	2.75	.877	not assumed			4.769	140.128	.000	.668
6	NQI Employees performance	NQI	102	3.57	0.893	assumed	1.895	.171	3.616	160	.000	.574
		INDUSTRY	60	3.16	.96	not assumed			3.691	131.802	.000	.574
7	NQI Leadership Commitment	NQI	102	3.48	.845	assumed	5.055	.026	3.257	160	.001	.480
		INDUSTRY	60	3.27	.887	not assumed			3.413	141.731	.001	.480
8	NQI Technology/ICT usage	NQI	102	3.58	.969	assumed	1.936	.166	-.118	159	.906	-.049
		INDUSTRY	60	3.63	1.625	Not assumed			-.092	62.001	.927	-.049

Source: SPSS Independent Samples Test, 2018.

Table 4.2.2.1: Belief of the NQI Respondents on Customer Handling of the NQI Institutions.

No.	Question	NQI institutions	No. of respondent	Very poor		Poor		Average		Good		Very Good		Mean	Stdv
				Frq	%	Frq	%	Frq	%	Frq	%	Frq	%		
	Customer Handling by NQI institutions	NMIE	40			8	20.0	16	40.0	15	37.5	1	2.5	3.23	0.8
		ECAE	26					8	30.8	15	57.7	3	11.5	3.80	0.63
		ESA	26					13	50.0	7	26.9	6	23.1	3.77	0.83
		ENAO	10					4	40.0	3	30.0	3	30.0	3.9	0.88
		sum	102	0		8		41		40.0		13.0			
2		NQI		0		7.84		40.20		39.22		12.75		Mean = 3.67 Stdv= 0.785	

Source: Data collected by the researcher through Questionnaire, 2018

As shown in the table 4.2.2.1 eight (7.8%) of the NQI respondents said that customer handling of the NQI is poor; 41 (40.20%) of them rated it is an average, while 53 (51.97%) responded that the customer handling is good and very good. Moreover, the average mean value (3.67) indicates that the customer handling is above average. On the other hand from the NQI respondents interviewee it was shown that about 25% of the respondents said that customer handing is somewhat a compromised issues by very few individuals and they explained that there is a tendency to favors the customers. Moreover, in the responses to open ended questions 50% of the respondents reported customer handling of the NQI is satisfactory. From this it could be implied that handling of the customer was fair. This can be due to most staffs were matured and having adequate work experience.

Table 4.2.2.2: Belief of the Industry Respondents on Customer Handling of the NQIs Institutions.

Statement	Rating	ECAE Frqu	%	NMIE Frqu	%	ESA Frqu	%	ENAO Frqu	%	NQI Average Frqu	%
Customer Handling	Very Poor			1	1.7					1	1.50
	Poor	5	8.3	12	20	4	6.7	4	6.7	25	10.42
	Average	26	43.3	18	30	17	28.3	16	26.7	77	32.08
	Good	22	36.7	28	46.7	26	43.3	18	30	94	39.17
	Very Good	7	11.7	1	1.7	13	21.7	22	36.7	43	17.83
Mean		3.52		3.27		3.8		3.87		3.42	
Std. Deviation		0.813		0.86		0.86		0.956		0.89	

Source: Data collected by the researcher through Questionnaire, 2018

Table 4.2.2.2 shows that 26 (11.92 %) of the industry respondents said that customer handling is poor and very poor; 77 (32.08%) rated this services as an average one and 137 (58%) agrees that the customer handling was good and very good. The average mean value (3.42) also indicates that the customer handling was encouraging. Furthermore; even though, 10% of the interview respondents of the industry showed that there is a biased and impartiality in customer handling in the NQI institutions, the rest 90% responded that there exist better customer handling.   From this it could be implied that customer handing was good.

As shown in Table 4.2.1.3 above for item 2, NQI customer handling, and the Levene's test for equality of variances has p value of 0.562 which is greater than 5%. Thus we do not reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances assumed' row. The p-value is 0.027 which is less than 5% and we do reject the hypothesis of equality of means of the two groups. Thus, there is significant difference in the idea of the two groups.

Thus from the foregoing analyses from Table 4.2.2.1 and 4.2.2.2 it could be seen that the responses from both NQI institutions and industries showed that the provision of service

by NQI institutions is adequate. Thus even though there exists significant difference in the response of the two groups, the data depicted that there are better customer handling mechanisms in NQI institutions. This may be that the NQI institutions understand the entrepreneur concept.

4.2.3   Scope of Services

Table 4.2.3.1: Belief of the NQI Respondents on the Scope of Services of the NQIs

No.	Statement	NQI instituti ons'	No. of respon dent	Very poor		Poor		Average		Good		Very Good		Mean	Stdv
				Frq	%	Frq	%	Frq	%	Frq	%	Frq	%		
		NMIE	40	2	5.0	9	22.5	15	37.5	9	22.5	5	12.5	**3.15**	**1.07**
		ECAE	26					7	26.9	12	46.2	7	26.9	**3.5**	**0.76**
	Scope of Services	ESA	26			1	3.8	12	46.2	7	26.9	6	23.1	**3.6**	**0.88**
		ENAO	10					3	30.0	7	70.0			**3.65**	**0.48**
		sum	102	2		10		37		35		18		Mean=3.35	
3		NQI			1.96		9.80		36.3		34.3		17.65	`Stdv=0.785	

Source: Data collected by the researcher through Questionnaire, 2018

As it can be seen from Table 4.2.3.1, that 12 (11.76%) of the NQI respondents claimed that the scope of the service given by the NQI is poor and very poor; 37 (36.3%) responded average while 53 (51.9%) said it was good and very good. Besides that, the average mean value (3.35) showed that the scope of the service provision is at adequate level.

On the contrary 45% of the interview and 40% of the respondents on the open ended questionnaire indicated that there are areas where the scope of the NQI need to be improved specifically in calibration and testing sector. This could be for the case that the government gave emphasis to extend and raise the quality of industrial product for the number of industries is getting is larger and larger.

Table 4.2.3.2: Belief of the Industry Respondents on the Scope of Services of the NQIs

Statement	Rating	ECAE		NMIE		ESA		ENAO		NQI Average	
		Frq	%	Frq	%	Frq	%	Frq	%	Frq	**%**
Scope of Services	Very Poor	1	1.7	8	13.3	3	5			12	5.00
	Poor	11	18.3	19	31.7			4	6.7	34	14.17
	Average	25	41.7	20	33.3	22	36.7	15	25	82	34.17
	Good	19	31.7	10	16.7	20	33.3	22	36.7	71	29.58
	Very Good	4	6.7	3	5	15	25	19	31.7	41	17.08
Mean		3.23		2.68		3.73		3.93		Mean=3.34	
Stdv.		0.89		1.066		1.01		0.918		Stdv=0.971	

Source: Data collected by the researcher through Questionnaire, 2018

From the above Table 4.2.3.2 it is shown that 46 (19.17%) of the respondents of the industry said that the scope of the services is poor and very poor; 82 (34.17%) showed that it is an average and 112 (46.66%0claimed that the scope was good and very good. Moreover; the mean value (3.34) showed that the scope of the service of the NQIs is on average level. Moreover, regarding to the interview response about 10% of the industry respondents showed that they are forced to test and calibrate some of their equipments' outside the country because of limited scope in the country. This result is completely in agreement with the response given by the NQIs' respondents. Thus, from the forgoing result one can infer that the service scope of NQI institutions is getting expanded because of the emphasis given from the government side.

As shown in Table 4.2.1.3 above for item 3, NQI scope of service, the Levene's test for equality of variances has p value of 0.285 which is greater than 5%. Thus we do not reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances assumed' row. The p-value is 0.000 which is less than 5% and we do reject the hypothesis of equality of means of the two groups. Thus, there is significant difference in the idea of the two groups regarding to the NQI scope of services.

The implication of the two groups of responses showed that the current scope of services is trying to address the existing demand. But the responses also showed that there is a growing demand in the sector, which might be associated with the country's economic growth.

4.2.4 Service Deliverability.

Table 4.2.4.1: Attitude of NQI Respondents on NQIs Service Deliverability.

No.	Question	NQI institutions'	No. of respondent	Very poor		Poor		Average		Good		Very Good		Mean	Stdv
				Frq	%	Frq	%	Frq	%	Frq	%	Frq	%		
		NMIE	40			9	22.5	16	40.0	15	37.5			2.88	0.91
		ECAE	26			3	11.5	7	26.9	12	46.2	4	15.4	3.65	0.89
	NQI Service Deliverability	ESA	26					13	50.0	7	26.9	6	23.1	3.73	0.83
		ENAO	10					2	20.0	7	70.0	1	10.0	3.9	0.57
			102			12		38.0		41		11		Mean = 3.54	
4		NQI					11.8		37.3		40.2		10.9	Stdv. = 0.85	

Source: Data collected by the researcher through Questionnaire, 2018

Table 4.2.4.1 showed that about 12 (11.8%) of NQI respondents replied that there is poor service deliverability within the NQI institutions. Moreover, a significant number of respondents that is 38 (37.3 %) explained that the service is on an average level, while 52 (51.2%) replied that service deliverability of the NQIs is good and very good. In addition, the average mean value (3.54) shows that their service deliverability is high. This may be for they have an adequate experiences and adequate educational qualification to handle their responsibilities in their respective institutions.

It is also learned that 15% of NQI respondents on the open ended questionnaire indicates that the current service deliverability of the NQIs shows that there is a tendency of good service provision.

Table 4.2.4.2: Attitude of Industry Respondents on NQIs Service Deliverability.

Question	Rating	ECAE		NMIE		ESA		ENAO		NQI Average	
Service Deliverability		Frq	%	Frq	%	Frq	%	Frq	%	**Frq**	**%**
	Very Poor			8	13.3	5	8.3	5	8.3	18	7.50
	Poor	21	35	23	38.3	2	3.3			46	19.17
	Average	23	38.3	17	28.3	17	28.3	20	29.9	77	32.08
	Good	14	23.3	11	18.3	23	38.3	23	34.3	71	29.58
	Very Good	2	3.3	1	1.7	13	21.7	12	17.9	28	11.67
Mean		2.95		3.03		3.62		3.62		2.95	
Stdv.		0.852		4.05		1.12		1.075		1.774	

Source: Data collected by the researcher through Questionnaire, 2018

The industry respondents on Table 4.2.4.2 showed that 64 (26.67%) of the response is claimed that the service deliverability of the NQI institutions were poor and very poor; about 77 (32.08%) of the respondents replied that it is on average, while 99 (41.25%) of the response were agreed that the service deliverability system were good and very good. In general the service deliverability rated average with the mean value of (m=2.95). In addition to that, the response obtained from the industry interviewee showed that the majority of the respondents demanded that the service deliverability of the NQIs is poor as regards to giving timely services for their request. This may be due to lack of adequate manpower in NQI institutions which could be due to high turnover rate of the employees.

In general the service deliverability of the NQI institutions is found on its average level. As shown in Table 4.2.1.3 above for item 4, NQI's service deliverability, and the Levene's test for equality of variances has p value of 0.249 which is greater than 5%. Thus we do not reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances assumed' row. The p-value is 0.000 which is less than 5% and we do reject the hypothesis of equality of means of the two groups. Thus, there is significant difference in the idea of the two groups regarding to the NQI's service deliverability.

4.2.5 Stakeholder Participation

Table 4.2.5.1: Evaluation of Stakeholder Participation by the NQI respondents.

No.	Question	NQI institutions'	No. of respondents	Very poor		Poor		Average		Good		Very Good		Mean	Stdv
				Frq	%	Frq	%	Frq	%	Frq	%	Frq	%		
		NMIE	40			19	47.5	7	17.5	14	35.0			2.88	0.91
		ECAE	26					10	38.5	13	50.0	3	11.5	3.73	0.67
	Stakeholder Participation	ESA	26	1	3.8	4	15.4	7	26.9	10	38.5	4	15.4	3.46	1.07
		ENAO	10			2	20.0	3	30.0	5	50.0			3.30	0.82
		Sum	102	1		25		27		42		7		Mean = 3.32	
5		NQI			0.98		24.5		26.4		41.2		6.8	Stdv. = 0.865	

Source: Data collected by the researcher through Questionnaire, 2018

Table 4.2.5.1, shows about 26 (25.38%) of the respondents have replied that the stakeholder participation was poor and very poor; 27 (26.5%) said the participation is average, while 49 (48%) of the respondents evaluated the stakeholder participation is good and very good. The average mean value (3.32) showed that the stakeholder participation is adequate in the NQI institutions. On the other hand regarding the stakeholders participation in NQI institution 25% of NQI respondents' interviewee replied that there is some form of integration with the stakeholder but it is not well developed and the attachment is loosely held with the stakeholders. Thus, from the above responses one can deduce that there is some gap in stakeholder participation.

Table 4.2.5.2: Evaluation of Stakeholder Participation by the Industry Respondents.

Question	Rating	ECAE		NMIE		ESA		ENAO		NQI Average	
		Frqu	%	Frqu	%	Frqu	%	Frqu	%	Frq	%
Stakeholder Participation	Very Poor			2	3.3			1	1.7	3	1.25
	Poor	19	31.7	27	45.0	20	32.8	26	43.3	92	38.33
	Average	21	35.0	25	41.7	19	31.1	18	30.0	83	34.58
	Good	14	23.3	4	6.7	17	27.9	13	21.7	48	20
	Very Good	6	10.0	2	3.3	4	6.6	2	3.3	14	5.8
Mean		2.95		2.52		3.18		2.82		Mean= 2.75	
Stdv		0.852		0.804		0.944		0.911			

Source: Data collected by the researcher through Questionnaire, 2018

Table 4.2.5.2 shows that 95 (39.58%) of the industry participants replied that the stakeholder participation is poor and very poor; 83 (34.58%) responses evaluated the stakeholder participation is average, while 62 (25.8%) claimed that the stakeholder participation was good and very good. The average mean value (2.75) also indicates that the stakeholder participation is average. Moreover, the majority of the industry interviewee respondents showed that there is good start from the NQI institutions in discussing with the stakeholder in quality issues and this have been done on a quarterly basis. But they said that things are not improved according to the claim raised during the meeting in their previous discussion with the NQIs. This idea is also supported by 15% of the open ended questions. This could imply that the NQI institutions have not yet clearly identified their respective stakeholders. From the data collected from both groups of the respondent they have agreed that the stakeholder participation was found at a average level.

As shown in Table 4.2.1.3 above for item 5, NQI's stakeholders' participation, the Levene's test for equality of variances has P value of 0.03 which is less than 5%. Thus we do reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances not assumed' row. The p-value is 0.000 which is less than 5% and we

do reject the hypothesis of equality of means of the two groups. Thus, there is significant difference in the idea of the two groups regarding to the NQI's stakeholder participation.

4.2.6   Employee Performance

Table 4.2.6.1: Evaluation of Employee Performance by the NQI Respondents.

No.	Question	NQI institutions'	No. of responde	Very poor		Poor		Average		Good		Very Good		Mean	Stdv
				Frq	%	Frq	%	Frq	%	Frq	%	Frq	%		
		NMIE	40	1	2.5	8	20.0	16	40.0	13	32.5	2	5.0	3.18	0.90
		ECAE	26	3	11.5	2	7.7	6	23.1	12	46.2	3	11.5	3.38	1.17
	Employees performance	ESA	26					13	50.0	7	26.9	6	23.1	3.73	0.83
		ENAO	10					2	20.0	6	60.0	2	20.0	4.00	0.67
6		NQI	102	4		10		37		38		13		Mean = 3.57	
					3.92		9.80		36.3		37.25		12.8	Stdv= 0.893	

Source: Data collected by the researcher through Questionnaire, 2018

Table 4.2.6.1 showed that 14 (13.72%) of the NQI respondents replied that the employee performance of the NQI is poor and very poor; 37 (36.3%) responded that it is on average level, while 51 (50.05%) agreed that it is good and very good. Besides this, the average mean value (3.57) showed that the employee performance is above the average level. This illustrated that the employees educational level and experience helped them to exhibit this level, but also it is indicated in the result that there is some limitation with respect to employee performance in some parameters of the working activities within the NQI system.

From the interview response also, 37% of them showed that there are employees who were assigned to work on some parameters without getting enough training and experience in the specific fields of activities. This might be as a result of shortage or absences of experts in that particular practice. If such practice is continually done it might have contribution to the poor performance of the employees within the NQI.

Table 4.2.6.2: Evaluation of Employee Performance by the Industry Respondents.

Question	Rating	ECAE Frqu	%	NMIE Frqu	%	ESA Frqu	%	ENAO Frqu	%	NQI Average Frqu	%
Employees performance	Very Poor	3	2.25	2	3.3					5	2.08
	Poor	6	10.0	19	31.7	2	3.3	6	10	33	13.75
	Average	25	41.60	24	40.0	16	26.7	28	46.7	93	38.75
	Good	20	33.3	12	20.0	30	50.0	21	35.0	83	34.58
	Very Good	6	10.0	3	5.0	12	20.0	5	8.3	26	10.83
Mean			2.93		2.92		3.37		3.42		3.16
Stdv			0.867		0.926		0.769		0.787		0.96

Source: Data collected by the researcher through Questionnaire, 2018

From the above Table 4.2.6.2 employee performance is rated poor and very poor by 38 (15.83%) of the industry respondents and 93 (38.75%) of them replied that employee performance is at an average level, while 109 (45.41%) has showed a tendency that employee performance is at good and very good stage. The average mean value (3.16) showed that the employee performance was rated adequate. This reply is almost similar with the respond obtained from the NQI experts.

From the interviewee and open ended questions 10% of the industry respondents asserted that most employees have an outstanding performance in their specific fields of practice and also in some case there are employees who have a series limitation in performing their activities during field works.

As shown in Table 4.2.1.3 above for item 6, NQI's employee performance, and the Levene's test for equality of variances has P value of 0.171 which is greater than 5%. Thus we do not reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances assumed' row. The p-value is 0.000 which is less than 5% and we do reject the hypothesis of equality of means of the two groups. Thus, there is

significant difference in the idea of the two groups regarding to the NQI's employee performance.

In general, the respondents from both categories showed that the employee's performances of the NQI institutions are found to be satisfactory. This may be due to lack of adequate motivation for employee's particularly inadequate salary when compared to the services they are providing.

4.2.7   Leadership Commitment

Table 4.2.7.1: Proportion of the NQI Respondents Towards NQIs Leadership Commitment.

No.	Question	NQI institutions'	No. of respondent	Very poor		Poor		Average		Good		Very Good		Mean	Stdv
				Frq	%	Frq	%	Frq	%	Frq	%	Frq	%		
	Leadership Commitment	NMIE	40	1	2.5	7	17.5	15	37.5	15	37.5	2	5	3.25	0.90
		ECAE	26	1	3.8	2	7.7	6	23.1	14	53.8	3	11.5	3.77	0.77
		ESA	26			3	7.9	5	19.2	15	57.7	3	11.5	3.69	0.83
		ENAO	10					4	40	3	30	3	30	3.90	0.88
			102	2		12		30		47		11		Mean= 3.48	
7		NQI			1.96		11.8		29.4		46.1		10.8	Stdv = 0.845	

Source: Data collected by the researcher through Questionnaire, 2018

Table 4.2.7.1 shows that 14 (13.76%) of NQI respondents replied that the leadership commitment of the NQI is poor and very poor; 30 (29.4%) said it is on average, while 58 (56.9%) respondents rated the leadership commitment of the NQIs are good and very good. Moreover, the average mean value (3.48) indicated that the leadership commitment is above average. This response is substantiated by 50% of the interview response by saying that there is good commitment from the leadership to improve the performance of the NQI activities ranging from improving employee performance to service rendering. On the contrary 30% of the written response has showed leadership commitment, which

can be explained as a focal point to inspire and motivate other to achieve the objectives are poorly practiced and needs to be improved.

Table 4.2.7.2: Proportion of the Industry Respondents Towards NQIs Leadership Commitment.

Question	Rating	ECAE		NMIE		ESA		ENAO		**NQI Average**	
		Frqu	%	Frqu	%	Frqu	%	Frqu	%	Frqu	%
leadership Commitment	Very Poor			1	1.7			2	3.3	3	1.25
	Poor	11	18.3	16	26.7	5	8.33	2	3.3	34	14.16
	Average	16	26.6	25	41.7	12	20.0	22	36.7	78	34.17
	Good	29	48.3	18	30.0	31	51.7	22	36.7	100	41.67
	Very Good	4	6.7			12	20.0	12	20	28	11.67
Mean			3.16		3.00		3.45		3.50		3.27
Stdv			0.867		0.803		0.730		0.951		0.887

Source: Data collected by the researcher through Questionnaire, 2018

As can be described by Table 4.2.7.2 from the industry 128 (53.3 %) of the respondents showed that the NQIs leadership commitment is good and very good, 82 (34.17%) explained it is on average level, whereas 30 (12.5 %) responded that it is poor. Moreover, the average mean value (3.27) tells us that the NQIs leadership commitment is on average. This could imply that the leadership in NQI institutions have given due emphasis in promoting the activities of the NQI institutions.

As shown in Table 4.2.1.3 above for item 7, NQI's leadership commitment, and the Levene's test for equality of variances has p value of 0.026 which is less than 5%. Thus we do reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances not assumed' row. The p-value is 0.001 which is less than 5% and we do reject the hypothesis of equality of means of the two groups. Thus, there is a significant difference in the idea of the two groups regarding to the NQI's leadership commitment.

4.2.8   Technology/ICT usage

Table 4.2.8.1: Proportion of the NQI Respondents Regarding Technology/ICT usage

No.	Question	Organization	No. of respondent	Very poor		Poor		Average		Good		Very Good		Mean	Stdv
				Frqu	%	Frqu	%	Frqu	%	Frqu	%	Frqu	%		
		NMIE	40	2	5.0	4	10.0	18	45.0	8	20.0	8	20.0	3.4	1.08
		ECAE	26			3	11.5	7	26.9	14	53.8	2	7.7	3.62	0.94
		ESA	26	1	3.8	3	11.5	11	42.3	5	19.2	6	23.1	3.46	1.10
	Technology/ICT usage	ENAO	10					4	40.0	6	60.0			3.6	0.52
8			102	3		10		40		33		16		3.4	1.08
		NQI			2.94		9.8		39.2		32.4		15.7	Mean = 3.52; Stdv =0.91	

Source: Data collected by the researcher through Questionnaire, 2018

As shown in Table 4.2.8.1 as the respondents from the NQI institutions explained, that 13 (12.24%) said that the technology/ICT usage of the NQI is poor and very poor, 40 (39.2%) have asserted that it is on average, while 49 (48.1%) stressed that it is good and very good. Moreover, the average mean value (3.5) showed that the technology/ICT usage of the NQI is above average. This shows that NQI can able to utilize the benefit of technology on a satisfactory basis to improve its service deliverability and performance. On the other hand interview response (60%) showed that NQI have not adequate use of technology to maximize their reporting system through the use of different software application, email, web site and other electronic media rather than relying up on the hard copy result and report format. Moreover, it has not revolutionalized itself to use the benefit of the technology specifically through automating their activities and to avail their services online for the customer. Thus, even though, the average mean indicated that technology usage is better, the other results pulled down the response rate, indicating that there are gaps in utilizing ICT in NQI institutions. This could imply that NQIs give more emphasis for their regular works rather than giving time to modern technological data usage.

Table 4.2.8.2: Proportion of the Industry Respondents Regarding Technology/ICT usage

Question	Rating	ECAE		NMIE		ESA		ENAO		NQI Average	
		Frqu	Percent	Frqu	Percent	Frqu	Percent	Frqu	Percent	Frqu	Percent
Technology / ICT usage	Very Poor									0	0.00
	Poor	2	3.3	17	28.3	3	5	3	5	25	37.08
	Average	20	33.3	21	35	23	38.3	25	41.7	89	43.33
	Good	32	53.3	19	31.7	28	46.7	25	41.7	104	8.75
	Very Good	6	10	2	3.3	6	10	7	11.7	21	8.75
Mean		3.7		3.6		3.62		3.6		3.63	
Stdv		0.696		3.954		0.739		0.764		1.625	

Source: Data collected by the researcher through Questionnaire, 2018

Table 4.2.8.2 showed that 25 (37%)of the industry respondents replied that the technology/ICT usage is poor;89 (43.33%) of them said that it is on average stage, while 125 (17.5%) declared that it is good and very good. Moreover, the average mean value (3.63) shows that the utilization of ICT by the NQI is above average. This may be that even the mean and percentage indicated the industries may not have adequate information on how NQIs are performing in their respective organizations. Nevertheless the quality part of the data agrees with that of the NQI respondents. However, the interview respondents from industries reported that ICT utilization by NQI is poor.

As shown in Table 4.2.1.3 above for item 8, NQI's technology/ICT usage, the Levene's test for equality of variances has P value of 0.166 which is greater than 5%. Thus we do not reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances assumed' row. The P-value is 0.906 which is greater than 5% and we do not reject the hypothesis of equality of means of the two groups. Thus, there is no significant difference in the idea of the two groups regarding to the NQI's technology/ICT usage.

4.3   NQIs' Achievement on its Technical Services from Process Perspectives.

The questionnaire was designed by using Likert Scale and almost all of the statements were measured on a five point Likert scale with 1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Very Good. Moreover, the calculated means are interpreted as; above 4= Strongly agree, 3.01 to 4.00 = Agree, 2.51 to 3.00= Average, 1.50 to 2.50 = Disagree and below 1.5 it is interpreted as strongly disagree. The information obtained from the questionnaires are summarized and discussed in the following manner

4.3.1   NQI Institutions Provision of Standard Documents

Table 4.3.1.1: Response for Provision of Standardize Documents

Item	Provision of standard documents to the industry		Very Poor	Poor	Average	Good	Very Good	Mean	Stdv
I	NQI respondents	Frqu	1	5	16	52	28	3.99	0.852
		%	1	4.9	15.7	51	27.5		
	Industry respondents	Frqu	12	8	14	23	3	2.95	1.24
		%	20	13.3	23.3	38.3	5		

Source: Data collected by the researcher through Questionnaire, 2018

Table 4.3.1.2: Two Tailed t-Test for the Analysis of NQIs' Achievement from its Process Perspectives

Group Statistics						Independent Samples Test						
Item	Identification	Groups	N	Mean	Std. Deviation	Levene's Test for Equality of Variances			t-test for Equality of Means			
						Equal variances	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
I	Provision of standardize documents to your industry	NQI	102	3.99	0.852	assumed	8.739	0.004	5.201	160	0.000	0.923
		INDUSTRY	60	2.95	1.241	not assumed			4.91	103.16	0.000	0.923
II	Provision of training of your interest	NQI	102	3.77	0.84	assumed	13.151	0.000	5.057	160	0.000	0.932
		INDUSTRY	60	2.95	1.333	not assumed			4.698	98.084	0.000	0.932
III	Provision of technical support and consultancy services	NQI	102	4.07	0.861	assumed	2.997	0.085	7.078	160	0.000	1.008
		INDUSTRY	60	2.77	0.927	not assumed			6.905	114.526	0.000	1.008
IV	Encourage you to promote the use of technologies in your industry	NQI	102	3.75	0.861	assumed	1.902	0.17	7.531	160	0.000	1.088
		INDUSTRY	60	2.67	0.933	not assumed			7.376	115.947	0.000	1.088
V	NQIs support your organization to bring Product quality and compatibility	NQI	102	3.66	0.951	assumed	1.017	0.315	6.746	160	0.000	1.007
		INDUSTRY	60	2.65	0.954	not assumed			6.637	117.601	0.000	1.007

Source: SPSS Independent Samples Test, 2018.

In response to item I of Table 4.3.1.1 above, 80 (78.5%) of the NQI respondents rated the provision of standardized documents to the industry as good and very good; 16 (15.7%) claimed that it was an average, while 6 (5.9%) asserted that it is poor and very poor. Moreover, the average mean value (3.99) of their responses asserted that the provision of standardized document is good. It is implied that the respondents were agreed that NQI institutions are effectively utilizing their manpower in preparation of standard documents that suits the demand of the industry.

Regarding to the industry respondents on the same item, 26 (43.3%) of the industry respondents showed that a provision of a standardize documents to their industry was good and very good; 14 (23.3%) respondents said that it is an average level, while 20 (33.3%) claimed that provision of standardized document is poor and very poor. The average mean value (2.95) of their responses showed that the provision of standardized document to the industry is average level.

On the analysis using two tailed t-test to check whether there exists idea difference between the two groups it was observed that there was idea difference between the groups where (t= 4.91 and P value $0.000 < 0.05$) as seen on Table 4.3.1.2 on page 51.

From the responses obtained through questionnaire it can be inferred that preparation of standardized document that support the NQI activities are done properly whereas documents that are required by the industry is averagely performed. This difference might be associated with the NQI experts have an experience and knowledge, which is focused on NQI activities. On the other hand, the preparation of industry document has its own complexity as it is industry specific documents, since it needs special and specific knowledge in accordance with the industry requirements. Since NQI is mandated to prepare standardized document to the industry, there has to be a need to improve their performance with this respect. Thus, from this analysis one could infer that NQI institutions may have some sort of bias not to expose their weakness in this regards.

4.3.2   Provision of Training

Table 4.3.2.1: Response for Provision of Training

item	Provision of training of your interest		Very Poor	poor	average	Good	Very Good	Mean	Std. Deviation
	NQI respondents	Frqu	1	4	16	47	34	3.77	0.84
		%	1	3.9	15.7	46.1	33.3		
II	Industry respondents	Frqu	12	11	12	18	7	2.95	1.33
		%	20	18.3	20	30	11.7		

Source: Data collected by the researcher through Questionnaire, 2018

Regarding to item II of Table, 81 (79.4%) of the NQI respondents agreed that the NQIs provision of training to the industry was good and very good; 16 (15.7%) claimed that it was an average, while five (4.9%) of the respondents asserted that it is poor and very poor. The average mean value (3.77) also supported that the provision of training was good. This shows that NQI institutions have a developed capability in the provision of training to the end users. This helps to ensure enhancing the capabilities of the industry to provide quality services.

For the same item, 25 (41.7%) of industry respondents rated the provision of training by the NQIs are good and very good; among the respondents 12 (20%) showed that it is average, but 23 (38.3%) respondents said that this service is poor and very poor. Besides this, the averages mean value (2.95) also support the findings in this respect is an average level. This shows that the industry's demand was not satisfactorily addressed in getting a training of their interest.

On the analysis using two tailed t-test to check whether there exists idea difference between the two groups it was observed that there was idea difference between the groups where (t= 4.698 and p< 0.05) as seen on Table 4.3.2.1 and this shows that there is significance difference between the mean value of the NQI and industry response. This shows that there is idea difference between the two groups of respondents with regard to

provision of training. From the two responses it can be implied that training provision to capacitate the employees and thereby to enhance competiveness in both productivity and quality is found to be improved.

4.3.3   Technical Support and Consultancy Services

Table 4.3.3.1: Response for Provision of Technical Support and Consultancy Services

item	Provision of technical support and consultancy services		Very Poor	poor	average	Good	Very Good	Mean	Std. Deviation
	NQI Respondents	Frqu		7	29	46	20	4.07	0.86
		%		6.9	28.4	45.1	19.6		
III	Industry respondents	%	3	25	15	17		2.77	0.927
		Frqu	5	42	25	28			

Source: Data collected by the researcher through Questionnaire, 2018

For item III, 66 (64.7%) of the NQI respondents claimed that there is good and very good provision of technical support and consultancy services; 29 (28.4%) rated this services as an average level and only seven respondents (6.9%) rated as poor services. The mean value 4.07 signifies that there respondents were strongly agree that the service is given in a very good condition to the end users. This shows that the capacity of the employee in supporting technical activities is good and this has to be maintained and strengthened to keep the continuity of the services.

The industry respondents 17 (25%) have replied that the service was good; 15 (25%) rated average while, 28 (47%) of the industry respondents said that the service was poor. At the same time the average mean value (2.77) showed that this service provision is about an average status. This indicates that the consultancy service provided to the industry is below average this might be attributed by lack of understanding about the industry dynamics.

On the analysis using two tailed t-test to check whether there exists idea difference between the two groups it was observed that there was idea difference between the groups where (t= 6.905 and P value 0.000 < 0.05) as seen on Table 4.3.2.1 this shows that there is a significance difference between the mean value of the NQI and industry response. This shows that there is an idea difference between the two groups of respondents regarding to the provision of technical support and consultancy services.

The response from both respondent group implied that there is a difference in the provision of technical and consultancy service levels between the NQI and the industry. It has been seen that this service is at good stance to the NQI institutions than the industry. Since it requires a deep understanding and experience in the industry practice and knowledge, the NQI needs to revisit its consultancy services strategies.

4.3.4   Use of Technologies.
Table 4.3.4.1: Response for the Use of Technologies.

Item	They encourage you to promote the use of technologies in industry		Very Poor	poor	average	Good	Very Good	Mean	Std. Deviation
	NQI Respondents	Frqu		8	29	45	20	3.75	0.861
		%		7.8	28.4	44.1	19.6		
		%	5	24	17	14		2.67	0.933
IV	Industry respondents	Frqu	8.3	40	28.3	23.3			

Source: Data collected by the researcher through Questionnaire, 2018

In response to item IV, 67 (65.7%) of the NQI respondents replied that NQI institutes encourage them to promote the use of technologies in their respective organizations; among the respondents 29 (28.4%) said that the promotion of technologies by the NQI is an average level, while eight (7.78%) of the respondents were said that it was poor. Moreover, the average mean value (3.75) showed that promotion of technologies by the NQI found to be good. This might be associated with the level to understand the

technological improvement in this dynamic world is continuously updated by the NQI managements and experts.

Regarding to item IV, 14 (28.3%) industry respondents were asserted that there is a good encouragement from the NQI's to promote the use of technologies in their industry, 17 (23.3%) gave an average ranking, while 29 (48.3%) said it is poor. The average mean value (2.67) showed that these services were an average level. This might be associated with there is a limited capability to support the industry in promoting the use of technologies from the NQI standpoints. 50% of the interview respondents with respect to technological support from the NQIs assured that this kind of support is in a rudimentary level. Moreover, majority of the written response from both respondent groups claimed that promotion of technologies is not carried to the expected level.

On the analysis using two tailed t-test to check whether there exists idea difference between the two groups it was observed that there was idea difference between the groups where (t= 7.376 and P Value 0.000 < 0.05) as seen on Table 4.3.2.1 on page 51 and this shows that there is significance difference between the mean value of the NQI and industry response. This illustrates that there is idea difference between the two group of respondents regarding to the promotion the use of technologies in industry.

4.3.5 Product Quality and Compatibility

Table 4.3.5.1: Response for Product Quality and Compatibility.

Item	NQIs support your organization to bring Product quality and compatibility		Very Poor	poor	average	Good	Very Good	Mean	Std. Deviation
	NQI respondents	Frqu		12	28	45	17	3.65	0.95
		%		11.8	27.5	44.1	16.7		
V	Industry respondents	%	6	23	17	14		2.65	0.95
		Frqu	10	38.3	28.3	23.3			

Source: Data collected by the researcher through Questionnaire, 2018

In response to item V on Table 4.3.5.1, 62 (60.8%) of the NQI respondents agreed that the NQIs' support to bring product quality and compatibility is good and very good. Along with this a substantial amount 28 (27.5%) of the respondents claimed the support is not that much as required and they said it is on average, while 12 (11.8%) of the respondents were said was poor. The average mean value (3.65) showed that the respondents agreed that the support in regard to quality and productivity is above the adequate level. This finding also supported by the 27% of the interviewee that they claimed that NQI is performing very well by focusing on the improvement of productivity and quality of its work. Moreover, the majority of written response showed that NQI's support in bringing product quality and compatibility needs to be improved.

In the response to item V on Table 4.3.5.1, 14 (23.3%) of the respondents of the industry said it is good, and 17 (28.3%) said that it was on average level, while 28 (48.3%) claimed it is poor and very poor status. The average mean value (2.65) showed that support in regard to product quality and compatibility is an average level. This might be associated with lack of understanding the demand of the industry and this is a flash light for the NQI to know how to support the industry in this respect. This might also be due to that fact that NQI is currently busy as it is found in a state of change to improve its service provisions and may have a problem in getting enough time for contributing for the industry's activities.

On the analysis using two tailed t-test to check whether there exists idea difference between the two groups it was observed that there was idea difference between the groups where (t= 6.637 and P Value 0.000 < 0.05) as seen on Table 4.3.2.1 on page 51. This shows that there is a significance difference between the mean value of the NQI and industry response, which tells that there is idea variation between the two groups of respondents with respect to NQIs support to the organization to bring product quality and compatibility.
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In general the NQI activities towards product quality and compatibility to support the industry need to be given due attention, because keeping product quality is one of the foundation of competitiveness in the global market.

4.4 NQIs' performance from Strategic Constituency Approach

The questionnaire was designed by using Likert Scale and almost all of the statements were measured on a five point scale with 1= Strongly Disagree; 2= Disagree; 3= Moderate; 4= Agree; 5=Strongly Agree. The information obtained from the questionnaires are summarized and discussed in the following manner.

4.4.1 Lesson Learned Experience

Table 4.4.1.1. Response for Lack of Lesson Learned Experience

Item	Lack of lesson learned experience		Strongly Disagree	Disagree	medium	Agree	Strongly Agree	Mean	Std. Deviation
I	NQI respondents	Frqu		5	16	64	17	3.91	0.719
		%		4.9	15.7	62.7	16.7		
	Industry Respondents	Frqu		4	9	30	17	4	0.844
		%		6.7	15	50	28.3		

Source: Data collected by the researcher through Questionnaire, 2018

Table 4.4.1.1 shows that 81(79.4%) of the NQI respondents were agreed and strongly agreed that there is lack of lesson learned experience in the NQI; while 16(15.7%) were asserted that it is on an average level. Moreover, the mean value (3.91) tells that the respondents were agreed that there is lack of lesson learned experience in the NQI institutions.

The industry respondents 47(78.3%) were agreed and strongly agreed that there is lack of lesson learning experience in the NQI institutions, while nine (15%) were said it is medium level.

Table 4.4.1.2 Two Tailed t- Test, for Analyzing the NQIs' Performance from Strategic Constituency Approach:

	Group Statistics					Independent Sample Test						
							Levene's Test for Equality of Variances		t-test for Equality of Means			
Item	Identification	Group	N	Mean	Std. Deviation	Equal variances	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
I	Lack of lesson learned experience	NQI	102	3.91	.719	assumed	1.008	.317	-.707	160	.481	-.088
		industry	60	4.00	.844	not assumed			-.678	108.591	.499	-.088
III	NQIs perform their activities without proper market surveillance,	NQI	102	3.92	.655	s assumed	.401	.528	-1.441	158	.151	-.147
		industry	58	4.07	.558	not assumed			-1.507	134.770	.134	-.147
IV	Lack of motivating factors	NQI	102	3.84	.656	assumed	.298	.586	-1.523	160	.130	-.174
		industry	60	4.02	.770	not assumed			-1.461	108.597	.147	-.174
V	Conflict of interest among NQIs	NQI	102	2.12	.836	assumed	13.165	.000	-8.229	160	.000	-1.216
		industry	60	3.33	1.020	not assumed			-7.818	105.275	.000	-1.216
VI	Weak coordination and collaboration in the implementation of technical regulations among the regulatory agencies and NQI institutions.	NQI	102	3.89	1.033	assumed	4.331	.039	-.151	160	.880	-.025
		industry	60	3.92	.926	not assumed			-.156	134.824	.876	-.025
VII	Poor quality concepts across the society	NQI	102	3.69	.645	assumed	14.007	.000	-.462	160	.645	-.064
		industry	60	3.75	1.114	not assumed			-.405	82.643	.687	-.064
VIII	Lack of understanding of the importance of the NQI services by the firms,	NQI	102	2.38	1.081	assumed	.950	.331	-7.687	160	.000 / .000	-1.368
		industry	60	2.13	1.114	not assumed			-7.627	120.815		-1.368
IX	Lack of private NQI service providers	NQI	102	4.26	.820	assumed	1.507	.221	.885	160	.377	.115
		industry	60	4.15	.755	not assumed			.904	132.052	.368	.115

Source: SPSS Independent Samples Test, 2018.

As shown in Table 4.4.1.2 above for item I, lack of lesson learned experience, the Levene's test for equality of variances has p value of (0.317) which is greater than 5%. Thus we do not reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances assumed' row. The P-value is 0.481 which is greater than 5% and we do not reject the hypothesis of equality of means of the two groups. Thus, there is no significant difference in the idea of the two groups regarding to lack of lesson learned experience in the NQI institutions.

The response in this regard implied that NQI need to design the way of how to learn from experience to improve their practice in the future, because strengthening of the national infrastructure needs learning from the stakeholders, the industry, and the international and regional counterparts in the fields of quality.

4.4.2 Revision and Evaluation of Customer Satisfaction Level

Table 4.4.2.1 NQI Response for Revision and Evaluation of Customer Satisfaction Level.

Item	Lack of revision and evaluation of customer satisfaction level		Strongly agree	disagree	Medium	Agree	Strongly agree	mean	Stdv
II	NQI respondents	Frqu		4	19	66	13	3.56	0.675
		%		3.9	18.6	64.7	12.7		

Source: Data collected by the researcher through Questionnaire, 2018

From the NQI respondents 79 (77.4%) of the participants were agreed and strongly agreed that there is lack of revision and evaluation of customer satisfaction level in the NQI institutions. Whereas 19 (18.6%) of the respondents were in a medium position, while 4 (3.9%) claimed they are disagreed that there is lack of revision and evaluation of customer satisfaction level in the NQI institutions. Moreover, the average mean value (3.56) showed that there is lack of revision and evaluation of customer satisfaction level. This might show that there are no proper methods of recording of complaints and conduction of customer's satisfaction level within the NQI institutions. If there is

improper customer revision methods persist in the institutions there is a possibility to repeat mistakes since mistakes may not be recorded and revised. Moreover, constructive suggestion might also be missed, which can be regarded as an opportunities for development.

4.4.3 Market Surveillance

Table 4.4.3.1 Response for Proper Market Surveillance.

Item	NQIs perform their activities without proper market surveillance		Strongly agree	Disagree	Medium	agree	Strongly agree	Mean	STDV.
III	NQIs response	Frqu		4	14	70	14	3.92	0.655
		%		3.9	13.7	68.6	13.7		
	Industry response	%			9	40	11	4.07	0.558
		Frqu			15	66.7	18.3		

Source: Data Collected through Questionnaire, 2018

Response from the NQI respondents shows that 84 (82.3%) were agree and strongly agree that NQI perform their activities without proper market surveillance; 14 (13.7%) were said it is in medium while four (3.9%) were disagreed. The average mean value (4.07) showed that NQI performs their activities without proper market surveillance. This might show that it is an indication for the limitation in the NQI scope of services.

Table 4.4.3.1, item III, shows that 51(85%) of the industry response were agreed and strongly agreed that the NQI perform their activities without proper market surveillance; 9 (15%) of them said it is a medium level. This indicates that many of the industries demand are not covered by the NQI system as their demand is not accessed and addressed in the frame work of the NQI activities.

As shown on page 59 in Table 4.4.1.2 above for item III, NQIs perform their activities without proper market surveillance, the Levene's test for equality of variances has shown that the P value of 0.528 is greater than 5%. Thus we do not reject the equal variances

assumed and consequently, we refer to the result in the 'Equal variances assumed' row. The P-value is 0.151 which is greater than 5% and we do not reject the hypothesis of equality of means of the two groups. Thus, there is no significant difference in the idea of the two groups in this regard.

4.4.4 Motivating Factors

Table 4.4.4.1 Response for Motivating Factors.

Item	Lack of motivating factors		Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Std. Deviation
IV	NQI response	Frqu		5	16	71	10	3.84	0.656
		%		4.9	15.7	69.6	9.8		
	Industry response	%	1		11	33	15	4.02	0.770
		Frqu	1.7		18.3	55	25		

Source: Data collected by the researcher through Questionnaire, 2018

Table 4.4.4.1 item IV, shows that NQI respondents 81 (79.7%) were agreed and strongly agreed that there is a strong tendency that there is lack of motivating factors; 16 (15.7%) were have a medium response, while five (4.9%) were disagreed on the statement. Moreover, the average mean value (3.84) showed that the NQI respondents were agreed that there is lack of motivating factor in the NQI. In addition to this, the written response from the NQI institution showed there is no strong motivation scheme in the NQI system. This lack of motivation factors may be associated with lack of incentives in the institutions. This indicates us that NQI needs to design incentive mechanisms to improve the motivation of its worker.

For the same statement the industry respondents showed that 48 (80%) agreed and strongly agreed; 33 (55%) asserted that it is a medium, while 12 (18.3%) claimed they are disagreed and strongly disagreed for the statement of lack of motivating factor. The average mean value (4.02) tells the respondents were agreed that there is lack of motivation factor within the NQI institutions. This shows that service provided to the

industry is hampered by lacking motivation from the worker. This statement is also supported by the written response of the industry respondents. They were claimed that they believed that NQI employees have a serious motivation problem in their activities. As shown in Table 4.4.1.2 above for item IV, lack of motivating factors, the Levene's test for equality of variances has shown that the P value of 0.586 is greater than 5%. Thus we do not reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances assumed' row. The P-value is 0.130 which is greater than 5% and we do not reject the hypothesis of equality of means of the two groups. Thus, there is no significant difference in the idea of the two groups in this regard.

The response from both groups showed that there is lack of motivation factor in the working forces. This can be corrected if NQI able to enhance motivation through empowering the working force and offering opportunities for advancement. Therefore as an intrinsic motivation NQI need to hire self motivated people, provide training and opportunity and provide a challenging work environment, and as an intrinsic motivation NQI needs to introduce a rewards and punishments practice in their system.

4.4.5   NQIs' Integration

Table 4.4.5.1 Response for Conflict of Interest Among NQIs.

Item	Conflict of interest among NQIs		Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Std. Deviation
	NQI response	Frqu	23	51	21	7			
		%	22	52	19.1	6.9		2.12	0.836
	Industry response	Frqu	19	7	29	5			
V		%	31.7	11.7	48.3	8.3		2.33	1.02

Source: Data collected by the researcher through Questionnaire, 2018

On Table 4.4.5.1 item V, shows the majority 74 (68.9%) of the respondents were disagreed for the statement; 21 (19.1%) were agreed, while seven (6.9%) of the respondents asserted that there is conflict. The average mean value (2.2) showed that the respondents were disagreed for the statement that there is conflict of interest in the NQI institutions. This shows that there is no noticeable conflict within the NQI institutions.

This might be due to proper implementation of the NQI structure and clear mandate, hierarchy and responsibilities among the NQI institutions. The absence of conflict among the NQI enable them to work cooperatively to solve their problem and to maximize the opportunities that will be obtained from their performance.

Regarding to the industry respondents, for the statement in item I, 26 (43.4%) of the respondents were disagreed and strongly disagreed; 29 (48.3%) had a medium response, whereas a small proportion of 5 (8.3%) of the respondents were favored (agree and strongly agreed) to the statement. Moreover, the mean value 2.33 shows that there is negligible conflict of interest that may avail among the NQIs. Besides this, the written response from both groups of respondents, it can be learnt that NQI has a good structure to run its functions properly. This might be attributed that there is clear policy, strategy and clearly shown mandate and responsibilities among the NQIs.

As shown in Table 4.4.1.2 above for item V, conflict of interest among NQIs, the Levene's test for equality of variances has shown that the P value of 0.000 is less than 5%. Thus we do reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances not assumed' row. The P-value is 0.000, which is less than 5% and we do reject the hypothesis of equality of means of the two groups. Thus, there is a significant difference in the idea of the two groups in this regard. From this we can understand that the NQI system, structures and responsibility is clearly defined to avoid conflict of interest among them. This helps them to avoid misunderstanding among them.

Table 4.4.5.3 Response for Coordination and Collaboration.

Item	Weak coordination and collaboration in the implementation of technical regulations among the regulatory agencies and NQI institutions.		Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Stdv.
	NQI response	Frqu		15	15	38	34	3.89	1.03
		%		14.7	14.7	37.3	30.9		
VI	Industry response	Frqu	3		10	33	14	3.92	0.926
		%	5		16.7	55	23.3		

Source: Data collected by the researcher through Questionnaire, 2018

For item VI in Table 4.4.5.3, the NQI respondents 72 (68.2%) asserted that they agree and strongly agreed that NQIs have weak coordination and collaboration in the implementation of technical regulation among the regulatory agencies and within the NQI institutions; 15 (14.7%) have medium responses, while 15 (14.7) disagreed the statement. The average mean value (3.89) showed that there is an agreement among the respondents on the statement. This shows that there weak coordination and collaboration in the implementation of technical regulations among the regulatory agencies and NQI institutions.

The industry respondents 47 (78.3%) for the same questions were showed agreed and strongly agreed response that there is weak coordination and collaboration in the implementation of technical regulations among the regulatory agencies and NQI institutions. While, 10 (16.7%) respondents were in a medium response and an insignificant number also claimed that they are strongly disagree the statement. This result is much similar with the response given by the NQI respondents.

As shown in Table 4.4.1.2 above for item VI, weak coordination and collaboration in the implementation of technical regulations among the regulatory agencies and NQI institutions, the Levene's test for equality of variances has shown that the p value of 0.039 is less than 5%. Thus we do reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances not assumed' row. The p-value is 0.876, which is greater than 5% and we do not reject the hypothesis of equality of means of the two groups. Thus, there is no significant difference in the idea of the two groups in this regard.

This response implied that there is a problem in coordinating between the regulatory agencies and the NQI institutions. Unless there is a clear coordination and collaboration between NQI and regulatory agencies the costlier services of the NQI is impractical to see it on the ground, this implies that all the effort to bring quality and compatibility is at stake.

4.4.6 Concept and Importance of NQI Services

Table 4.4.6.1 Response for Quality Concepts Across the Society

Item	Poor quality concepts across the society		Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Stdv
	NQI response	Frqu		4	30	62	6	3.69	0.65
		%		3.6	27.3	56.4	7.3		
VII	Industry response	Frqu	4	4	10	27	15	3.75	1.114
		%	6.7	6.7	16.7	45	25		

Source: Data collected by the researcher through Questionnaire, 2018

Regarding to item VII on Table 4.4.6.1 about 72 (66.7%) of the NQI respondents have replied that they were agreed and strongly agreed that there is poor quality concepts across the society. Whereas 30 (27.3%) of the respondents were in medium response while, four (3.6%) were disagreed the statement. This fact can tell us that this factor can have a negative effect on NQI development.

In response to item VII, the majority of the respondents from the industry 42 (70%) were agreed and strongly agreed that there is poor quality concepts across the society; 10 (16.7%) were replied that it is medium; while eight of them (13.4%) showed that they disagreed and strongly disagreed the statement. In overall the average mean value (3.75) indicates that most of the respondents were agreed that there are poor concepts about quality among the people.

As shown in Table 4.4.1.2 above for item VII, poor quality concepts across the society, the Levene's test for equality of variances has shown that the p value of 0.000 is less than 5%. Thus we do reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances not assumed' row. The p-value is 0.687, which is greater than 5% and we do not reject the hypothesis of equality of means of the two groups. Thus, there is no significant difference in the idea of the two groups in regard to poor quality concepts across the society.

The response from the two groups of respondents indicates that NQI needs to launch continual awareness-raising campaign in the society, through different media, inclusion of quality education in the curriculum and also through encouraging the building of networks of actors to support the flow of information to change the culture and attitudes towards quality in the society. This can help to enhance and upgrade the societal concept in regard to quality issues in the country.

Table 4.4.6.3 Response for the Understanding the Importance of the NQI Services by the Firms.

Item	Lack of understanding the importance of the NQI services by the firms		Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Std. Deviation
VIII	NQI response	Frqu		26	32	23	21	2.38	1.08
		%		25.5	31.4	22.5	20.6		
	Industry response	Frqu	14	30	10	6		2.13	0.965
		%	23.3	50	16.7	10			

Source: Data collected by the researcher through Questionnaire, 2018

The majority 32 (31.4%) of the NQI respondents for item VIII on Table 4.4.6.3 shows a medium response to the statement that there is lack of understanding in the importance of the NQI services by the firms and 26 (25.5%) of the respondents to the same questions were asserted that they were disagreed to the statement and declared that there is no understanding problem in the importance of the NQI services by the firm. But, 44 (43.1%) of them showed that they were agreed that there is lack of understanding in the importance of the NQI services by the firms. The average mean (2.38) showed that most of the respondents were disagreed the statement. This shows that there is no lack of understanding in NQIs services by the firm.

With regard to the industry, 44 (73.3%) of the respondent were disagreed and strongly disagreed; 10 (16.7%) were in a medium response while six of the participant (16.7%) were agreed the statement. Moreover the average mean value (2.02) showed that most of the respondents were disagreed the statement which says there lack of understanding the importance of NQIs service by the firm. This shows that there is no problem in understanding the importance of the NQI service by the firm. Moreover; 70% of the

industry respondents on the interview and on the written responses tell that they knew the kind of service that is rendered in the NQI institutions.

As shown in Table 4.4.1.2 above for item VIII, lack of understanding the importance of the NQI services by the firms, the Levene's test for equality of variances has shown that the P value of 0.331 is greater than 5%. Thus we do not reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances assumed' row. The P-value is 0.000, which is less than 5% and we do reject the hypothesis of equality of means of the two groups. Thus, there is significant difference in the idea of the two groups in this regard.

The response showed that the NQI services are known by the firms, so using these opportunities the NQI need to expand their service coverage to address the demand of the firms with respect to provision of quality services.

4.4.7 Private NQI Service Providers.
Table 4.4.7.1 Response for Private NQI Service Providers.

Item	Lack of private NQI service providers		Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Median	Std. Deviation
	NQI response	Frqu		5	9	42	46	4.26	4	0.82
		%		4.9	8.8	41.2	37.3			
IX	Industry response	Frqu		2	7	31	20	4.15	4	0.755
		%		3.3	11.7	51.7	33.3			

Source: Data collected by the researcher through Questionnaire, 2018

From the above table for item IX, it can be shown that 88 (86.3%) of the NQI respondents replied that there is lack of private NQI services providers in the country. Whereas nine (8.8%) were responded medium while, five (4.9%) showed that they were disagreed the statement. Moreover the average mean value (4.26) showed that there is an agreement by the respondents that there is lack of private NQI services providers in the country.

From the industry respondents for item III, 51 (85%) of them agreed and strongly agreed that there is lack of private NQI service providers in the country. Whereas seven (11.7%) of respondents were replied that they were disagreed to the statement. This response is much more similar with the response obtained from the NQIs in the same question

As shown in Table 4.4.1.2 above for item IX, lack of private NQI service providers, the Levene's test for equality of variances has shown that the p value of 0.221 is greater than 5%. Thus we do not reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances assumed' row. The p-value is 0.377, which is greater than 5% and we do not reject the hypothesis of equality of means of the two groups. Thus, there is no significant difference in the idea of the two groups in regard to lack of private service providers.

The response from the two groups showed that there is few or no service provider with respect to quality services in the country. Therefore, service provider need to be supported to join this business so as to enhance the coverage of quality service in the country. For this the government needs to facilitate a proper investment ground and incentives to the service providers in this sector.

4.5   NQI Performance from System Resource Approach

4.5.1   Management of Resource

Table 4.5.1.1 Response for Knowledge Management

No.	There is lack of knowledge management		Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Std. Deviation
	NQI respondents	Frqu		4	16	64	18	3.94	0.70
		%		3.9	15.7	62.7	17.6		
I	Industry respondents	%		4	16	27	13	3.82	0.854
		Frqu		6.7	26.7	45	21.7		

Source: Data collected by the researcher through Questionnaire, 2018

In response to item I of Table 4.5.1.1, 82 (80.3%) of the NQI respondents agreed and strongly agreed for the question that there is lack of knowledge management in NQI institutions; 16 (15.7%) responded that it is in a medium level while four respondents disagreed the statement. Moreover, the mean value (3.94) also showed that the respondents were agreed that there is lack of knowledge management in NQI institutions.

The industry respondents 40 (66.7%) were agreed and strongly agreed that there is lack of knowledge management in NQI institutions; a significant number 16 (26.7%) of the respondents showed a medium response to this statement. The average mean value (3.82) of the respondents showed that they were agreed that there is lack of knowledge management in the NQI institutions.

Majority of the written response showed that NQI's knowledge management is found to be in its lowest stage. They claimed also that there is no proper mechanism for knowledge transfer and as a result of this accumulation of knowledge is very poor in the NQI institutions.

As shown in Table 4.5.1.2 below for item I, lack of knowledge management, the Levene's test for equality of variances has shown that the p value of 0.008 is smaller than 5%. Thus we do reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances not assumed' row. The p-value is 0.341, which is greater than 5% and we do not reject the hypothesis of equality of means of the two groups. Thus, there is no significant difference in the idea of the two groups in regard to lack of private service providers.

The two categories of response dictate that there is a need to develop a knowledge management mainstream and incentivize contributions in the sector. This can be achieved through institution wide activities and a need in an overall cultural shift in attitudes towards knowledge management and preservation.

Table 4.5.1.2 Two Tailed t-Test for NQI Performance from System Resource Approach

		Group Statistics				Independent Sample Test						
							Levene's Test for Equality of Variances		t-test for Equality of Means			
Item	Identification		N	Mean	Std. Deviation	Equal variances	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
	Lack of knowledge management,	NQI	102	3.94	.701	assumed not	7.179	.008	1.006	160	.316	.125
I		INDUSTRY	60	3.82	.854	assumed			.956	105.426	.341	.125
	Lack of resources within the NQI framework,	NQI	102	3.81	.671	assumed	13.751	.000	.102	160	.919	.014
III		INDUSTRY	60	3.80	1.038	not assumed			.092	88.426	.927	.014
	Poor equipments utilization, frequent failure and inefficient maintenance activities,	NQI	102	3.86	.630	assumed	21.299	.000	.504	160	.615	.063
IV		INDUSTRY	60	3.80	.953	not assumed			.455	89.752	.650	.063

Source: SPSS Independent Samples Test, 2018.

Table 4.5.1.3 Response for implementation of standards

No.	Lack of implementation of standards in NQIs		Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Median	Std. Deviation
		Frqu		18	49	24	11	2.27	2	0.88
II	NQI response	Valid %		17.6	48	23.5	10.8			

Source: Data collected by the researcher through Questionnaire, 2018

Regarding to item II, 49 (48%) NQI respondents have showed a medium response and 18 (17.6%) replied that they were disagreed the statement that there is lack of implementation of standards in NQI institutions. Whereas 35 (34.3%) of respondents said that they were agreed and strongly agreed that there are lack of implementation of standards in the NQIs. Moreover, the average mean value (2.27) showed that there is disagreement for the statement. This finding implies that that there exists good implementation of standards in the NQI institutions. This trend helps the NQI institutions to use technical standards to function their technical activities very well.

Table 4.5.1.4 Response for Resources within the NQI Framework

No.	Lack of resources within the NQI framework		Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Stdv
	NQI	Frqu.		6	16	71	9	3.81	0.67
		%		5.9	15.7	69.6	8.8		
	Industry	%	3	2	15	24	16	3.8	1.04
III		Frqu	5	3.3	25	40	26.7		

Source: Data collected by the researcher through Questionnaire, 2018

With regard to item III on Table 4.5.1.4, the data shows that 80 (78.4%) of the NQI respondents agreed and strongly agreed that there is lack of resources within the NQI framework, whereas 16 (15.7%) of the respondents showed that their response is a

medium. The mean value 3.81 also supported that the respondents were agreed that there is lack of resources within the NQI framework.

For the statement III, regarding to the resources within the NQI framework 40 (66.7%) of the industry respondents were agreed that there is lack of resources within the NQI framework, only five (8.3%) of the respondents were disagreed and strongly disagreed to the statement. That means there is resource problem in NQI institutions.

As shown in Table 4.5.1.2 above for item III, lack of resources within the NQI framework, the Levene's test for equality of variances has shown that the p value of 0.000 is smaller than 5%. Thus we do reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances not assumed' row. The p-value is 0.927, which is greater than 5% and we do not reject the hypothesis of equality of means of the two groups. Thus, there is no significant difference in the idea of the two groups in regard to lack of private service providers.

4.5.2   Handling of Equipments and Working Standards

Table 4.5.2.1 Response for Equipments Utilization.

Item	Poor equipments utilization, frequent failure and inefficient maintenance activities in NQIs		Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Median	Std. Deviation
	NQI response	Frqu		4	16	72	10			0.63
		%		3.9	15.7	70.6	9.1	3.86	4	
IV		Frqu		6	16	22	16			
	Industry response	%		10	26.7	36.7	26.7	3.8	4	0.953

Source: Data collected by the researcher through Questionnaire, 2018

On Table 4.5.2.1 for item IV, 82 (79.7%) of the NQI respondents agreed and strongly agreed that there is poor equipments utilization, frequent failure and inefficient maintenance activities in NQI institutions, whereas 16 (15.7%) were given a medium response and only 4 (3.9%) of them were in disagreement to the statement. Moreover, the

average mean value (3.86) asserted that there is poor equipments utilization, frequent failure and inefficient maintenance activities in the NQI institutions. This shows that the NQI institutions are failed to use their equipments properly.

In response to item I, the majority 38 (63.4%) of the industry respondents were agreed and strongly agreed that there is poor equipments utilization, frequent failure and inefficient maintenance activities which affects the NQI development; 16 (26.7%) of the respondents gave a medium response to the statement. Besides, the average mean value (3.8) asserted that there is poor equipments utilization, frequent failure and inefficient maintenance activities in the NQI institutions.

As shown in Table 4.5.1.2 above for item IV, poor equipments utilization, frequent failure and inefficient maintenance activities in NQIs, the Levene's test for equality of variances has shown that the p value of 0.000 is smaller than 5%. Thus we do reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances not assumed' row. The p-value is 0.650, which is greater than 5% and we do not reject the hypothesis of equality of means of the two groups. Thus, there is no significant difference in the idea of the two groups in regard to lack of private service providers.

The responses from both categories showed that poor equipments utilization, frequent failure and inefficient maintenance activities are prevalent in the NQI institutions and this exposes the institutions to a huge scientific equipments loss and an increased maintenance costs. Therefore NQI needs to upgrade the existing scientific equipment maintenance services in capacity development both in infrastructure and human capital.

Table 4.5.2.3 Response for Validating Working Standards, Procedures and Methods.

Item	Lack of validating working standards, procedures and methods.		Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Median	Std. Deviation
	NQI response	Frqu	42	36	14	10				
II		%	41.2	35.29	13.72	9.8		1.92	2	0.972

Source: Data collected by the researcher through Questionnaire, 2018

In regard to item II, the majority 78 (76.49%) of the NQIs respondents showed that they were disagreed and strongly disagreed for the statement; 14 (13.72%) showed a medium response whereas 10 (9.8%) of them agreed that there is lack of validating working standards, procedures and methods. The average man value (1.92) showed that the respondents were disagreed the statement.

This shows that the NQIs are active and have an established system in validating their working standards and methods on a regular base. This might be resulted from NQI institutions employees' experience, skill and educational capacity.

4.6   NQIs' Achievement

Could you please show the extent of your agreement on the statements by circling the numbers in the column using the following rating scale (Likert Scale). This helps the researcher to answer the question to what extent do that the NQIs achieve their expected outcome? Where: 1 = Strongly Disagree 2 = Disagree 3 = Medium 4 = Agree 5 = Strongly Agree.

4.6.1 Product Quality Aspects within a Specific Value Chain is Strengthened

Table 4.6.1.1 Response Regarding to Product Quality in the Value Chain

Item	Product quality aspects within a specific value chain is strengthened		Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Std. Deviation
I	NQI respondents	Frqu	8	57	11	24	2	2.56	0.991
		%	7.8	55.9	10.8	23.5	2		
	Industry respondents	Frqu	16	31	10	3		2.00	0.803
		%	26.7	51.6	16.7	5			

Source: Data collected by the researcher through Questionnaire, 2018

In regard to the response for item I of TABLE 4.6.1.1, the majority of the NQI respondents 65 (63.7%) were disagreed and strongly disagreed for the statement that product quality aspects within a specific value chain is strengthened, whereas 26 (25.5%) of the respondents were agreed and strongly agreed for the statement. The mean average value (2.56) shows that product quality aspects within a specific value chain are found to be below medium level. This shows that the product quality aspects within a specific value chain are not strengthened according to the NQI respondents.

The industry respondents to the item in the table 4.6.1 showed that 47 (78.3%) of the respondents were disagree and strongly disagreed; 10 (16.7%) claimed it is a medium, while 3 (5%) were agreed that for the statement that describe product quality aspects within a specific value chain is strengthened. The average mean value (2.00) tells that the product quality aspects within a specific value chain are not strengthened.

As shown in Table 4.6.1.2 below on page 76 for item I, product quality aspects within a specific value chain is strengthened, the Levene's test for equality of variances has shown that the p value of 0.000 is smaller than 5%. Thus we do reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances not assumed' row. The p-value is 0.000, which is less than 5% and we do reject the hypothesis of equality of means of the two groups. Thus, there is significant difference in the idea of the two groups in this regard.

This signifies that both respondents categories have claimed that the product quality aspect within the specific value chain is not strengthened, which is a good call for notice to the NQI institutions to participate in the value addition activities to products and services produced in the country as they pass from one link in the chain to the next until reaching the final consumer. This is quite helpful to realize competency of products and services in the globalized market.

Therefore coordination at national as well as global legislative context and socio, economic and with in political environment is quite needed to strengthens the value chain by participating in the whole system.

Table 4.6.1.2 Two Tailed t- Test for the Analysis of NQIs' Achievement

Item	Identification	Group	N	Mean	Std. Deviation	Equal variances	Levene's Test for Equality of Variances		t-test for Equality of Means			
							F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
I	Product quality aspects within a specific value chain is strengthened	NQI	102	2.56	.991	assumed not	14.180	.000	3.710	160	.000	.559
		INDUSTRY	60	2.00	.803	assumed			3.917	144.410	.000	.559
II	Quality institutions are gaining international recognition	NQI	102	3.48	1.208	assumed not assumed	.276	.600	3.319	160	.001	.647
		INDUSTRY	60	2.83	1.181				3.338	126.074	.001	.647
III	Number of requests for Quality institutions services is increased	NQI	102	4.49	.558	assumed	3.633	.058	4.449	160	.000	.474
		INDUSTRY	60	4.02	.792	not assumed			4.075	93.881	.000	.474

Source: SPSS Independent Samples Test, 2018.

4.6.2 International Recognition

Table 4.6.2.1 Response Regarding to Gaining International Recognition

Item	Quality institutions are gaining international recognition		Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Std. Deviatio
II	NQI respondents	Frqu	1	37		44	20	3.48	1.208
		%	1	36.3		43.1	18.5		
	Industry Respondents	Frqu	9	18	9	22	2	2.83	1.181
		%	15	30	15	36.7	3.3		

Source: Data collected by the researcher through Questionnaire, 2018

With respect to the statement quality institutions are gaining international recognition, 38 (37.3%) of NQI respondents were disagreed and strongly disagreed for the statement; while 66 (61.6%) were agreed and strongly agreed. The average mean value (3.44) showed that gaining international recognition by quality institution is adequate. This shows that there are some areas of quality issues need to get international recognition in addition to the current recognition status of the NQI activities.

In relation to statement II on Table 4.6.2.1, 27 (45%), of the industry respondents were disagreed and strongly disagreed that quality institutions are gaining international recognition; whereas 9 (15%) responded medium level and 24 (40%) respondents agreed and strongly agreed that quality institutions are gaining international recognition. The average mean value (2.8) showed that gaining international recognition by quality institution is in the range of satisfactory level. These responses are also strengthening by 35% the interviewee of both respondents group who said that NQI services need to get international recognition for expanding its service in the country.

As shown in Table 4.6.1.2 below for item II, quality institutions are gaining international recognition, the Levene's test for equality of variances has shown that the p value of 0.600 is greater than 5%. Thus we do not reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances assumed' row. The p-value is

0.001, which is less than 5% and we do reject the hypothesis of equality of means of the two groups. Thus, there is significant differences in the idea of the two groups in regard to Quality institutions are gaining international recognition. This might be as a result of understanding about the essence of international recognition by the two respondents group. Issue of international recognition is much more emphasized in the NQI institution, for which they take part in the form of compliance with guidelines and membership in international or regional accreditation organizations.

This result implied that NQI need to strengthen their international recognition to increase their acceptance and assures to get confidence in their services. This can helps to NQIs to evaluate their technical competence and quality of service and has proven that it meets recognized standards and this in turn helps to achieve capable services in line with national and international standards.

4.6.3   Number of Requests for Quality Institutions Services is Increased

Table 4.6.3.1 Response Regarding the Number of Requests for Quality Institutions Services.

Item	Number of requests for Quality institutions services is increased Statement		Strongly Disagree	Disagree	Medium	Agree	Strongly Agree	Mean	Std. Deviatio
III	NQI respondents	Frqu		1		52	49	4.49	0.558
		%		1	2	51	48		
	Industry respondents	Frqu			18	23	19	4.02	0.792
		%			30	38.3	31.7		

Source: Data collected by the researcher through Questionnaire, 2018

In response to item III on Table 4.6.3.1, 101 (99%) of the respondents are unanimously agreed that the number of requests for quality institutions services is increased. This shows that firms have a growing interest on getting quality services in metrology and testing, which are further helpful for getting accreditation and assists them to be competent in the global market.

With regard to industry response, 42 (70%) of them agreed and strongly agreed that the number of requests for quality institutions services is increased. Whereas, nearly one third of the respondent were rated it is a medium level. The average mean value (4.02) showed that the number of request is increasing. Moreover; the majority more than two-third of the interviewee and the written response showed that the number of service request in metrology and testing is increasing from time to time.

As shown in Table 4.6.1.2 below for item III, number of requests for quality institutions services is increased Statement, the Levene's test for equality of variances has shown that the p value of 0.058 is greater than 5%. Thus we do not reject the equal variances assumed and consequently, we refer to the result in the 'Equal variances assumed' row. The p-value is 0.000, which is less than 5% and we do reject the hypothesis of equality of means of the two groups. Thus, there is significant difference in the idea of the two groups in this regard.

From both groups of respondents it is evident that the number of requests for quality institutions services is increased. This shows that the expansion of the industrial growth and their demand to quality services in the country is increasing from time to time.

CHAPTER FIVE : SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Based on the results of quantitative and qualitative data analysis and interpretation in the previous chapter, the following summary major findings, conclusions and recommendations are presented.

5.1   Summary

The major findings of the study were to assess the factors affecting the effectiveness of Ethiopian NQIs.

Table 5.1 Summary of Analyzed Data.

Provision of Service Quality by NQI Institutions		**RATING**			
ITEM		Poor	average	Good	Very Good
I	Service Quality	x			
II	Customer Handling			x	
III	Scope of Services		x		
IV	Service Deliverability		x		
V	Stakeholder Participation		x		
VI	Employees performance			x	
VII	Leadership Commitment		x		
VIII	ICT/Technology usage	x			
NQIs' Achievement on its Technical Services from Process Perspectives.		**Poor**	**average**	**Good**	**Very Good**
I	Provision of standardize documents to industry		x		
II	Provision of training		x		
III	Provision of technical support and consultancy services		x		
IV	NQIs encourage you to promote the use of technologies in your industry	x			
V	NQIs support organization to bring product quality and compatibility	x			
NQIs' performance from Strategic Constituency Approach		**Poor**	**average**	**Good**	**Very Good**
I	NQI's Lesson learned experience	x			
II	NQI's Revision and evaluation of customer satisfaction level.	x			

		Poor	average	Good	Very Good
III	NQI's perform their activities with proper market surveillance	x			
IV	NQI's Motivating factors	x			
NQIs' Integration		**Poor**	**average**	**Good**	**Very Good**
V	Interest among NQIs			x	
VI	Coordination and collaboration in the implementation of technical regulations among the regulatory agencies and NQI institutions.	x			
VII	Quality concepts across the society	x			
VIII	Understanding of the importance of the NQI services by the firms			x	
IX	Private NQI service providers	x			
NQI Performance from System Resource Approach		**Poor**	**average**	**Good**	**Very Good**
I	Knowledge management,		x		
II	Implementation of standards in NQIs		x		
III	Presence of resources within the NQI framework,		x		
IV	Equipments utilization and maintenance activities	x			
NQIs' Achievement		**Poor**	**average**	**Good**	
I	Product quality aspects within a specific value chain is strengthened	x			
II	Quality institutions are gaining international recognition			x	
III	Number of requests for Quality institutions services is increased			x	

I.   <u>**Provision of Service Quality by NQI Institutions.**</u>

- Fifty percent of the respondents were skeptical on the service quality of the NQIs. The study revealed that the poor result of service quality can be associated with lack of inconsistency of performance and in some of the services it has been shown that there is inappropriateness measurement result on calibration and testing items.

- Regarding to customer handling by the NQI institutions, it is found that there is better customer handling mechanisms in NQI institutions. This may be due to that the NQI

institutions are able to understand the industrialist thought and they have matured work force that can respect the value of customer.

- The study revealed that the scope of the service provision of the NQI services were found on an average level, even if there is still a significant demand from the respondents for the NMIE and ECAE services.

- Majority of the respondents showed that the service deliverability of the NQI institutions is found on its average level and have less capability to satisfy the customer both in timely response and service coverage.

- Most of the respondents from both groups have rated that the technology/ ICT usage of the NQI institutions are on average. But, from the qualitative response of both groups it could be able to see that the NQIs did not modernize their technology/ICT to meet the demand of the current need of the sector and a significant work is remained by the NQI institutions in promoting the use of technologies in the industry.

II.   **NQIs' Achievement on its Technical Services from Process Perspectives.**

- The result showed that preparation of standardized document by the NQI institutions it was found on an average level.
- The NQI respondents indicated that provision of training to the end users was at a good level of achievements, while the industry's demand was satisfactorily addressed in getting a training of their interest.
- The provision of technical support and consultancy service to the industry is found unsatisfactory, while among the NQI institutions it was found adequate. This might be attributed by those departments that render the technical support lacks understanding about the industry dynamics.

- The study revealed that NQI itself is not capacitated itself with modernizing ICT technologies for its activities and also nothing is conducted in promoting the use of technologies in the industry. Majority of the interview respondents with respect

to technological support from the NQI assured this kind of support is in a rudimentary level.

III.   NQIs' Performance from Strategic Constituency Approach

- The finding indicates that there is lack of lesson learned experience in the NQI institutions. Majority of the respondents in the open ended qualitative questions exhibited that NQI is not a learning institution. In the same development, the NQI methods of recording complaints are not proper and have not continuity, and it was found that there is poor revision of customer's satisfaction level within the NQI institutions.

- The study revealed that NQI performs their activities without proper market surveillance. This might show that it is an indication for the limitation in the NQI scope of services. Response from open ended questionnaire of the study showed that conducting market inspection is much helpful to understand the real need of the industry.

- The response from the majority of the respondents showed that there is lack of motivation factor in the working forces.

IV.   NQIs' Integration

- The finding of the study indicates that there is no observable conflict within the NQI institutions. This might be due to proper implementation of the NQI structure and have a clear mandate, hierarchy and responsibilities among the NQI institutions.

- It is found that there is a weak coordination and collaboration among the NQI institutions and the regulatory agencies to implement technical and regulatory issues. This response is mutually agreed by the two groups of the respondents.

- Result indicates that most of the respondents were agreed that there are poor concepts about quality among the society. The majority of the written responses from the industry respondents further supports that they knew most of services rendered in the NQI institutions.

V.   NQI Performance from System Resource Approach

- The study showed that there is lack of knowledge management in NQI institutions. They claimed also that there is no proper mechanism for knowledge transfer and as a result of this accumulation of knowledge is very poor within the NQI institutions. And it was shown that both groups of respondents have no idea difference in their responses.

- The finding showed that there exist good implementation of standards and validating working standards, procedures and methods in the NQI institutions. Majority of the interview respondents also acknowledged the implementation of standards in the NQI institutions help to use technical standards to function their technical activities very well.

- Both groups of respondents have claimed that the equipments utilization of the NQI institutions is poor and there is frequent failure and inefficient maintenance activities for their equipments. The finding shows that NQI did not use their limited equipments properly.

VI.   NQIs' Achievement

- The study shows that product quality aspects within a specific value chain are found to be below medium level. This shows that the product quality aspects within a specific value chain are not well strengthened.

- Gaining international recognition by quality institution was found adequate. This shows that there are some areas of quality issues need to get international recognition in addition to the current recognition status of the NQI activities.

- The study showed that there is a continual increment in the number of requests for quality institutions services.

5.2   Conclusion

This section provides the conclusion that is inferred from the result of empirical exploration conducted to know the effectiveness of the NQI institutions. It has high contributions in improving and understanding the current situation of the National Quality Infrastructure activities. From the result of the study it can be concluded that:

To enhance the customer handling of the NQI institutions they need to develop a right skill for managing the customers' needs. These can be through developing work ethic, creating good communication, through enhancing customer service strategy and make ready to adapt the ever changing needs of the customer properly.

The study shows that there exists a limited services within the NQIs, particularly, calibration and the testing scope of service is narrowed as a result of high expense of equipments. To increase their service coverage, NQI institutions need to study and analyze the existing and the future demand of the customer to increase the coverage of the services in the field of measurement.

NQI's lack qualified human resource on the technical activities, which can associated with high turnover of employees and unable to keep and transfer knowledge properly. It has been seen that the NQI leadership commitment was rated as an average level and this signifies that the NQI have to enhance the leadership commitment though using communication to excellence and continuous improvement. Moreover; leaders role in police and strategy development, allocation of appropriate resources, motivation and recognition of employee's effort need to be strengthened within the NQI frame work.

Majority of respondents were agreed that there are poor quality concepts across the society. This shows that there is a need of participatory approach and education to increase understanding of NQI services by the firm and the society at large.

The provision of NQIs supports to bring product quality and compatibility need to be improved in its scope and quality to address the demand both for the NQIs and for the customer.

The global experience shows that when there is development and growth in an industry, the demand for the provision of capable NQI services will increase, which in turn attracts private investments and therefore the government should facilitate and encourage the private sector to provide the NQI services.

The study showed that knowledge management within the NQI system is not improved and is a neglected sector. To boost employee productivity and service quality there is a need to capitalize on intellectual and knowledge management. NQIs should instill appropriate knowledge management system in their institutions though continuous training, education, skill development and community participation program.

It can be concluded that lack of harmonization among the NQI institutions decline the effectiveness of the NQIs. Therefore NQI forum need to be in place and active. Creating a medium in this regard and encourage to participate the service provider can also help to engage private sector to provide additional input and feedback on the NQI services and the challenges to the NQI institutions that hinders its development. A lack of harmonization within the NQIs system may have a potential to decrease productivity and create impediment on the NQIs process.

5.3   Recommendation

Based on the research findings, the following possible recommendations are forwarded to all the concerned bodies.

The NQI needs to enhance the role of services, features and benefits of service provision and concepts of service quality management in their system to improve the service quality through a continuous improvement. This can be achieved by enhancing its service quality through organizing quality circles, who can effectively identify and address

problems and able to recommend improvements, all with the goal of promoting quality, efficiency, and productivity in their service provisions.

NQI institutions need to focus on stakeholder participation, which can be improved by treating stakeholder as partners and keep track of new stakeholders. Since, calibration, testing and most of quality related questions are presented on voluntary it is advisable to create awareness to increase stakeholder participation.

The NIQ need to build institutional capability through support and recommend on suitable governance, this can be achieved through involving outstanding industrialist at the strategic management level.

NQI institutions need to establish a training center for assisting an extensive staff training rather than relying on train the trainer approach only. This will help the NQI to adapt, maintain and uplift a practical skill level in fields which is subjected to frequent technological changes. Moreover, collaboration between the international and the national experts is an effective and sustainable way to achieve know-how transfer. Institutionalizing training within counterpart institutions might be an effective way to extend the impact of trainings beyond a limited number of persons and time. It also alleviates a staff turnover problem. Another good way to ensure sustainability of trainings is to support and facilitates technological universities in offering specific curricula for quality specialists in the fields of measurements, testing, and standard setting.

Coordination among the NQIs can be improved by optimizing product/ service process, creating collaborative supporting process and perform a process planning and control throughout their operation at all levels of the institutions. To have a coordinated effort NQI should initiate an efficient integration of a process that creates responsibility within its system. To implement sustainable coordination system, NQIs need to avoid duplication of works and strictness in their system. If NQIs does not extend support to coordinated efforts, innovation and progress can become inactive within the system.

Moreover, this coordination should be also need to be extended to potential stakeholders who can contribute to the achievements of the NQIs.

An integrative and participatory approach need to be formulated by the NQI institutions to continually satisfy the customer need. Furthermore; the NQIs need to device to create adaptability according to the customer needs and economic development of the country. This can be improved by treating stakeholder as partners and keep track of new stakeholders.

Participation in international organization, particularly to meet the standard required by the market and it is clearly fundamental for the conformity aspects. Therefore, NQI institutions need to collaborate with financial institutions and industry groups to scale up and expand the investment in standards adoption. This will assist in value addition to products and increases their marketability.

International recognition in the field of laboratory and inspection to get accreditation through ILAC and recognition in the fields of management systems, products, services and personnel assessment through IAF is needed to be sought by the NQI institutions. For increasing acceptance of conformity assessment service in the export market obtaining an international recognition is significantly needed to the NQIs. In this regard, the Ethiopian standard agency should actively participate and contributed in international and regional technical committees relevant to the country.

NQIs need to implement a customer feedback system and continually monitor and update, this helps to capitalize on previously unrealized opportunities. The NQIs should work to promote the employee satisfaction and to increase workers commitment level through the provision of a positive working environment and implementing system of reward and recognition. Moreover, the NQI need to work on developing the skills and knowledge of their workforce and conduct a continuous evaluation and measure of job satisfaction.

Adequate budge allotment and provision of equipments is one of a core elements for the NQI institutions. NQI needs to upgrade the capabilities in maintaining the modern technical equipments through regular maintenance and need to get a timely dependable repair services. For doing so, the NQI needs to upgrade the existing scientific equipments maintenances center found in the NMIE.

NQIs need to design market surveillance techniques to address their activities to ensure that products on the market are in conformity with the applicable law. This helps to promote confidence from consumers buying products. It also, helps producers which comply to stay in business and not lose market share as a result of poor competition. Moreover, understanding industries' demands is critical to create demand driven NQI institutions for sustainable services provision.

To promote the service providers in calibration and testing service provision and to make the industry an attractive and competitive end, MoST has to offer various incentives/benefits package such as provision of plot of land from lease free, tax fee import for their equipment and financial support and incentive are among others to be recommended in this research work. Assisting the service providers in this area will have an impact on increasing number of jobs, facilitating an increased private sector competitiveness and assist for improvement of business climate/private sector development in the field of quality.

The NQIs should strengthen its strategic direction to undertake quality problems in the country and to demonstrate its effective implementation of systems to ensure competitiveness in the country's product and need to play a very important role in trade facilitations. This will help to reduce boarder rejection and can be achieved an increased trade flows due to the synchronization of national legal and regulatory framework with international standards.

NQI institution should create a favorable environment in creating good transfer of knowledge and best practice of quality infrastructure system through devising different training scheme both in the country and outside.

NQI institutions need to understand that the ongoing changes in how quality institution systems work internationally require a constant upgrading of professional knowledge. In this regard good practice is to conduct and participate in a regular international conference to exchange best practices among experts in the field of quality infrastructure development is desirable.

Implications of the study for future research work.

i)   Since understanding the impact created by NQI institution on productivity and quality in the country is not the focus of the study, it is advisable to conduct further study which NQI services can have a significant impact on product and process quality in the manufacturing industries.

ii) The response between the two groups of respondents, i.e. the NQI and the industry on issues like provision of standardize documents, training, technical support and consultancy services and others described in the study have showed a significant difference in their idea of response. The root cause for this inconsistency of response is not covered by this research and the researcher recommends a further study why this disparity is happening.

iii) This research focused on the response of four industries as a service user of the NQI institutions. Had it include more than this, the response coverage would have a possibility to be extraordinary. Therefore, the researcher recommend further study that encompass and covered a number of institutions that get services from the NQIs. This helps to have a wide coverage of responses and a multitude spectrum of idea on the factors that can have effects on the NQI effectiveness.

iv) The researcher recommends the same research can be addressed in different context, this can be; to what extent that NQI institutions are effective in supporting the agricultural development lead industrialization policy of the Federal Democratic Republic of Ethiopia?

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ANNEX

ANNEX A.

QUESTIONNAIRE
ST. MARY UNIVERSITY
SCHOOL OF GRADUATE STUDIES
INSTITUTE OF QUALITY AND PRODUCTIVITY MANAGEMENT
DEPARTMENT OF QUALITY AND PRODUCTIVITY MANAGEMENT

This questionnaire is filled by both groups of selected respondents (from NQI and Industry)

Dear Respondents:

This questionnaire is designed to collect information regarding to the **factors that affect the effectiveness of National Quality Infrastructure.** Moreover, the study will contribute towards the fulfillment of the researcher's Degree of Master's of Science Degree in Quality and Productivity Management (QPM).

I kindly ask you in all regard to fill the questionnaire carefully at your best knowledge. The accuracy of information you provide determines the ultimate reliability of the study.

Note: Your answers will be strictly confidential and will only be used for academic purposes.

Contact Address: Fikreab Markos Tel:- +251 9113473791 or E-mail;- fikreab2004@yhaoo.com

Thank you in advance for your cooperation and timely response!

Part One: Demographical Information - Please put '**X**' in the box

1.1.
| Male | | Female | | Your Sex : |

1.2. Your Age Group:
| 18 –25 | | 26-35 | | 36-45 | | 46-55 | | >56 | |

1.3. Your Educational Status:
| Grade 12 Complete | | Diploma | | First Degree | | Second Degree and above | |

Other please specify _____

1.4 Your organization
| |

1.5. Your service year in the organization you are working in?

| 0-5 | | 6-10 | | 11-15 | | >15 | |

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Part Two:

The following questions are helpful to the researcher to know the current performance of NQIs institutions with respect to the given statement. *Industry respondents are expected to fill all questions of this part, whereas the NQI respondents are expected to fill only their respective organization.*

Can you please show your agreement on the statements by circling the numbers in the column using the following rating scale

(Likert Scale). Where: 1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Very Good

No	Statement	National Metrology Institute of Ethiopia					Ethiopian Standard Agency					Ethiopian Accreditation Office					Ethiopian Conformity Assessment Enterprises				
1	Service Quality	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
2	Customer Handling	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
3	Scope of Services	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
4	Service Deliverability	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
5	Stakeholder Participation	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
6	Employees performance	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
7	Leadership Commitment	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
8	Technology/ICT usage	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Part Three: Answering these questions helps to understand the services extent provided by the NQI institutions. Both NQI and industry respondents are expected to fill all the questions of this part
 Can you please indicate your answer by Circling the numbers in the column using the following rating scale (Likert Scale).
Where: 1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Very Good

Item.	Statement	Rating				
I	Provision of standardize documents to your industry	1	2	3	4	5
II	Provision of training of your interest	1	2	3	4	5
III	Provision of technical support and consultancy services	1	2	3	4	5
IV	They encourage you to promote the use of technologies in your industry	1	2	3	4	5
V	NQIs support your organization to bring Product quality and compatibility	1	2	3	4	5

Part Four:

Answering these questions can help the researcher to answer the question what are the factors affecting the development of NQIs in Ethiopia. Both groups of the respondents are expected to fill the questionnaire. Except part 4.1 and 4.4, item II this is only for NQI respondents.

Could you please show the extent of your agreement on the statements by circling the numbers in the column using the following rating scale (Likert Scale).

Where: 1 = Strongly Disagree 2 = Disagree 3 = Medium 4 = Agree 5 = Strongly Agree

4.1 NQIs' performance from Strategic Constituency Approach

Item	Statement	Rating				
I	Lack of lesson learned experience	1	2	3	4	5
II	Lack of revision and evaluation of customer satisfaction level,	1	2	3	4	5
III	NQIs perform their activities without proper market surveillance,	1	2	3	4	5
IV	Lack of motivating factors	1	2	3	4	5

4.2 NQIs' Integration

Item	**Statement**	Rating				
V	Conflict of interest among NQIs	1	2	3	4	5
VI	Weak coordination and collaboration in the implementation of technical regulations among the regulatory agencies and NQI institutions.	1	2	3	4	5

4.3 Concept and importance of NQI services

Item	**Statement**	Rating				
VII	Poor quality concepts across the society	1	2	3	4	5
VIII	Lack of understanding of the importance of the NQI services by the firms,	1	2	3	4	5
IX	Lack of private NQI service providers	1	2	3	4	5

4.4.NQI performance from System Resource Approach

Item	statement	Rating				
I	Lack of knowledge management	1	2	3	4	5
II	Lack of implementation of standards	1	2	3	4	5
III	Lack of resources within the NQI framework	1	2	3	4	5

4.5 Handling of equipments and working standards

item	Statement	Rating				
I	Poor equipments utilization, frequent failure and inefficient maintenance activities,	1	2	3	4	5
II	Lack of validating working standards, procedures and methods	1	2	3	4	5

4. 6 NQIs' achievement

Item.	Statement	Rating				
I	Product quality aspects within a specific value chain is strengthened	1	2	3	4	5
II	Quality institutions are gaining international recognition	1	2	3	4	5
III	Number of requests for Quality institutions services is increased	1	2	3	4	5

ANNEX B.

INTERVIEW QUESTIONS.

This interview question is filled by senior experts and management group of both the respondents from NQI and industry. The answer from the question helps the researcher to understand the overall performance of the NQI institutions, which is the basic question of this study.

1) What are the strength and challenge of the NQIs in your view?

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2) Which service of the NQI needs to be improved to address need of the industry?

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3) What is the stand of the NQI in encouraging technology usage?

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4) What needs that NQI needs to consider for improving its service? ----------------------------

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5) What are the weakness of NQIs

   Thank you for giving your precious time!

ANNEX C:

ANALYSIS OF INTERVIEW DATA

In order to enrich the data and gather further information, interview were conducted with twenty senior expert and management of both the industry and the NQI respondents. Their response to the questions is tabulated as follow:

No.	Interview Questions	Response	
		Industry	NQI
1	What are the strengths of the NQIs	Majority responded that NQI has good implementation of standardization strategy.	75 % responded that there is good and promising government commitment. 25% the interviewee said that NQI's international recognition is good but need to be expanded.
2	Which service of the NQI needs to be improved to address need of the industry?	35% said scope of the NQI need to improve specifically in calibration and testing sector.	40% said scope of the NQI need to improve specifically in calibration and testing sector.
3	What is the stand of the NQI in encouraging technology usage	27% of the interviewee said that they claimed that NQI focused on itself rather than focusing on the improvement of productivity and quality for other. 50% assured promotion of technology of this kind of support is in a rudimentary level.	25% interviewee showed that NQI is rarely encouraging the promotion of technologies 50% replied that the level of ICT usage is very low.
4	What needs that NQI needs to consider for improving its service?	50% of the industry respondents of the industry interviewee replied that there exist inappropriateness of result is found in the measured result of calibration and testing items. So they have to introduce proper check and balance in there system	More than 50% of the respondents replied that the NQI need to recognize the influence of social, technological, economic, environmental and political /legislative factors to enhance their service quality.
5	What are the weakness of NQIs	25% responded that there is lack of linkages between different levels and lack of coalition in performances	• Lack of information networking infrastructure • Lack of support with information technology on activities performed

ANNEX D.

OPEN ENDED QUESTIONNAIRE ASKED QUESTIONS AND RESPONSE

Furthermore, the respondents from the NQIs and the industry were given the chance to write down if they observe any other problems and their recommendation related with the factor affecting the effectiveness of the NQIs. The administered question and the response is summarized and listed below as a cumulative result of both respondents.

Questions	Written response			
	25%	50%	75%	100%
1) **What are the strengths of the NQIs**		▶ they follow their mandate properly		
2) **Opportunities of the NQI**		▶ Current industrialization in Ethiopia,	▶ Presence of government commitment and Policy.	▶ the demand of quality services from the industry.
3) **What are the challenge of the NQIs in your view?**	▶ Their separation lead them to become week in their performance	▶ high turnover of the employee and low salary	▶ There is a tendency of NQIs to work alone with respect to quality issues	▶ inconsistency in performance
	▶ weak regulatory system	▶ delayed inter-comparison exercise	▶ Lack of qualified human resource	▶ no proficiency test provider in the country
	▶ lack of sound and focused quality policy and strategy,	▶ institutionalization problem, lack of regulatory capabilities,	▶ inadequacy of lesson learned experience,	▶ inability to satisfy customer needs and expectations, problems of safety and health hazards,

	► unclear support and collaboration among the stakeholders,	► immaturity of the NQI institutions,	► low scope of calibration and testing services	
	► devoid of reviewing and evaluation of customer satisfaction level,	► lack of resource and weak management commitment	► poor competence evaluation in proficiency testing	
	► keeping quality of services is a big challenge	► lack of professional commitment and poor knowledge management,	► lack of resources and low budget allocation,	
	things are performed in traditional way than systematic and scientific approach	lack of implementation of standards,	lack of system for proper implementation of quality infrastructure	
4) How do you evaluate the performance of your institutions from the institution's mandate given by the council of Ministers?	NQI lack perfection in practicing their mandate	they did not utilized their mandate properly	There seem a trend to follow and apply their mandate	The workers did not know the mandate given by the council of ministers
	► they are practicing their mandate to chive their objectives.		There is no communication regarding to briefing the mandate of our institutions.	► there is big gap in understanding the mandate of the NQIs.

5) How do you describe the challenge of NQI from international recognitions perspectives?	▶ there is no clear understanding the importance of recognition	There is no continuity, once we got the recognition, the activities become as usual and traditional	▶ it is not properly managed	▶ There are few who know this issues
	There are some activities started and continued, but a lot work is required		Unable to participate effectively in the international perspectives.	
6) What do you recommend the NQIs to improve their services?	▶ creating in a continual basis to aware the community in quality issues	▶ to restructure their system so suit the current demand of the sector	▶ work to widen up their scope of services	▶ to create interaction and communication with appropriate stakeholders
	▶ Increase employee salary and incentive to lab professional.	▶ empower the employees and the institutions	▶ to increase scope of laboratory calibration services	▶ to work on knowledge management
	▶ Make a thorough study with respect to quality and productivities.	▶ they have to assess the capacity of all organization ▶ support the PT provider	▶ better to reach societal interest an better to work on creating other NQI service providers	to improve the use of high technology analytical instruments

ANNEX E.

TIME SCHEDULE

Ser. no	Activities	Duration in Month							
		November 2017	December 2017	January 2018	February 2018	March 2018	April 2018	May 2018	Jun 2018
1	Proposal Writing	XXXXXXXX	XXXXXXXX						
2	Review of Related Literature			XXXXXXX	XXXXXXX				
3	Data Collection				XXXXXXX	XXXXX			
4	Research Report Writing						XXXXXXX		
5	Submission of Draft Report							XXXXXXX	
6	Submission of Final Report								XXXXXXXX

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