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

Impact of the Ethiopian National Quality Infrastructure Institutions on the Economic Development of the Country:

By
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July, 2020
Addis Ababa

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A Thesis Submitted to the Institute of Qualityand Productivity Management in Partial Fulfillment for the Requirements of the Degree of Masters of Science in Quality and Productivity Management

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The Impact of the Ethiopian National Quality Infrastructure Institutions on the Economic Development of the Country:

APPROVED BY BOARD OF EXAMINERS

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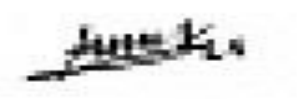

Melaku Girma (PHD) _____

Declaration

I, the under signed, declare that this 'Thesis' entitled with **"**THE IMPACT OF THE ETHIOPIAN NATIONAL QUALITY INFRASTRUCTURE INSTITUTIONS ON THE ECONOMOIC DEVELOPMENT OF THE COUNTRY**"**, 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 degree or any other research.

Reway Madebo Mana — Aug 24, 2020

Name — Signature & Date

Endorsement

This is to certify that this Thesis paper work, entitled "THE IMPACT OF THE ETHIOPIAN NATIONAL QUALITY INFRASTRUCTURE INSTITUTIONS ON THE ECONOMOIC DEVELOPMENT OF THE COUNTRY", which is undertaken by Reway Madebo Mana for the partial fulfillment for the requirements of the degree of Masters of Science in Quality and Productivity Management (QPM) at St. Mary University, my work and not submitted earlier for any degree either at this University or any other University.

Abdu Abagibe (PHD) Aug 29, 2020

Research Advisor **Signature & Date**

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I would like to thank God for giving me endurance to start and finish what I dared as one of educational carrier. My warmest gratitude and appreciation goes to my advisor Abdu Abagibe (PHD) for his unreserved professional guidance, helpful reviews and comments, reference documents and the constructive clarification he has given me throughout this process.

Contents

List of Abbreviations and Acronyms

ECAE	**Ethiopian Conformity Assessment Enterprise**
ecbp	**Engineering Capacity Building Program**
EFMHACA	**Ethiopian Food, Medicine, Health Care Administration & Control Authority**
ENAO	**Ethiopian National Accreditation Office**
ESA	**Ethiopian Standard Agency**
EU	**European Union**
FGD	**Focus Group Discussion**
HACCP	**Hazard Analysis and Critical Control Points**
IAF	**International Accreditation Forum**
IEC	**International Electric Commission**
ILAC	**International Laboratory Accreditation Cooperation**
ISO	**International Organization for Standardization**
TR	**Technical Regulation**
NMIE	**National Metrology Institute of Ethiopia**
NQI	**National Quality Infrastructure**
MoH	**Ministry of Health**
MoTI	**Ministry of Trade and Industry**
MoST	**Ministry of Science and Technology**
OIML	**International Organization for Legal Metrology**
QI	**Quality Infrastructure**
QSAE	**Quality and Standards Authority of Ethiopia**
TBT	**Technical Barrier to Trade**
TeCAT	**Technology Capability Accumulation and Transfer**
WTO	**World Trade Organization**

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Abstract

An institutionalized and functional NQI system is important to the Economic Development, Technological innovations, Technology transfer and usage and smooth trade relations across the globe. The Ethiopian National Quality Infrastructure (ENQI) is a general name given for Ethiopian Standards Agency (ESA), National Metrology Institute of Ethiopia (NMIE), Ethiopian Conformity Assessment Enterprise (ECAE) and EthiopianNational Accreditation Office(ENAO) Combined and of course with a functional enforcing Regulatory institutionalized systems .

Since the global market competition in 21st century is depending on Quality, countries are highly investing and giving attention to their National Quality Infrastructures. So what does it resemble in Ethiopia? The purpose of this thesis is to see what the impact of the NQI looks like in Ethiopia.

The study raises questions about the benefits NQI implementation, the contribution to the economic development, its weaknesses and strengths to implement NQI, the accessibility and the capabilities it lacks to implement the standards developed, the capabilities and coherence of regulatory bodies among themselves and with NQIs was raised. In addition what the industry and NQIs are expected to perform in knowledge management? The availability of the National Quality Policy and the general public and enterprise awareness was also raised.

Purposive sampling technique was employed randomly in a stratified population of experts and mangers. Both qualitative and quantitative research is used in the study. Questionnaires, interviews and document reviews were employed for collection of the data. To analyze the data, both descriptive and inferential statistics were used. Results of the findings are shown both qualitatively and quantitatively.

Results revealed that there is an increasing service demand for NQIs while the overall performance of NQI is at average level and the NQIs are implementing systems and building the necessary facilities to solve the demands. Lack of focused policy and strategy on NQI, poor knowledge management, average collaboration and coherence, poor standard implementation proactively, repetition of mandates of regulatory bodies have hindered the NQs role in economic development. So, frequent awareness creation program, stakeholders' participation in NQI studies should be considered. The coherence of NQI institutions within themselves and with Regulatory bodies has to be increased for a better service, technology transfer and usage.

Key words: National Quality Infrastructure, Industry, Impact, Economic development

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 or delimitation, definition of basic terms and the organization of the study.

1.1.Background of the Study

In the global trade competition, quality is a key component along with price and delivery. Quality has an important role in winning trade competition. According to OECD (1999), 80% of the total global trade is already affected by standards and regulation. The costs associated with technical regulations, standards, compliance certification and testing range from 2 to 10% of total production costs (idem, 1996). So countries around the world are giving attention towards implementation of quality in an institutional frame work called National Quality Infrastructure (NQI). The National Quality Infrastructure is needed to establish, implement, maintain and control the practices of Standardization, Conformity Assessment, Metrology, and Accreditation. In Ethiopia there is an NQI which was formerly accountable to the Federal Ministry of Science and Technology (MoST) and currently to the Federal Ministry of Trade and Industry (MoTI).

Before 2010, the Ethiopian NQI was established in1972 as the Ethiopian Standards Authority, and later it was give the name "Quality and Standards Authority of Ethiopia (QSAE)" in 1998. As specified in the web site of ESA, the history of standardization in Ethiopia, the need for standardization became evident during early 1950's as it was noticed that export of agricultural commodities was being affected due to lack of the support of standardization. Following the emergence of Addis Ababa, the capital of Ethiopia as a modern city, it was also noticed that there is an urgent need for standardization ofbuilding, electrical appliances and water supplies, especially in the new University campus- Addis Ababa University, faculty of science. These were among the problems which are worth monitoring and that have led the way through to creating national standardization body, which happened in 1972 GC as Ethiopian standards Authority.

Again back in 1998 GC this Ethiopianstandards Authority was renamed as Quality and Standards Authority of Ethiopia (QSAE) before it is restructured in to four institutions as can be discussed here.

According to the study made by ecbp (2009), the major conformity assessment is QSAE with a low number of internationally accredited laboratories. Hence, the conformity assessment activities of QSAE are not in a position to fully support the industries in their effort for technological learning. The participation of the private sector in this field is very low as well. Quality Management systems, ISO 9001 QMS for example, are hardly implemented by the industry and only few companies are actually certified. Due to the government's intervention and globalization the numbers are believed to gradually increase.

The metrology department in QSAE is the custodian for measurement standards according to international requirements and guarantees the measurement conformity down to the market place. Unfortunately, there is hardly any linkage with the educational as well as research and development institutions to provide them with correct measurement systems and techniques for technology transfer improvement and innovation.

Standards and quality body, QSAE, as a major player in the overall execution of the NQI in the country for decades are highlighted as the strength in implementing the QI while performing tasks that pose conflicts of interest, infrastructural and human resource deficiencies, poor promotional activities, poor and time consuming services are identified as weakness.

Other than QSAE although there were also other organizations in Ethiopia dealing with standardization ,metrology, conformity assessment services and technical regulations, it is the big weakness where the organizations' are not governed under a consolidated NQI which could have brought a synergy and harmony of tasks thereby streamlining duplication of effort and inefficient resource utilization. The accreditation part which later is established as the Ethiopian National Accreditation bureau was even as functional team within QSAE which was a weakness about the former QSAE leading to more additional accreditation payments for other international accreditation bodies such SANAS (South Africa National Accreditation Service) of South Africa and DAkks of Germany for accreditation of calibration laboratories. The regulatory bodies are

also many and dispersed in different ministries which are yet not corrected leading to a repetitive technical regulations and inefficiency of the use of the limited resources of the nation.

The Private NQIs, the consumer's association representation and the Stakeholder awareness on the participation in NQI was very low that the establishment of NQI becomes eminent.

Those NQI entities in Ethiopia are then established by Ethiopian Council of Minister by their respective Regulation Numbers under ministry of Science and Technology (MoST).

Before the Final Draft Strategy for the Implementation of National Quality Infrastructure (NQI) in Ethiopia was studied in 2009 by the then Engineering Capacity Building Program (ecbp), the NQI Ethiopia was totally integrated in a single organization called Quality and Standards Authority of Ethiopia (QSAE). The functions related to Standards, Metrology, Conformity Assessment are all provided by the same organization, QSAE. QSAE was also responsible for the administration of mandatory standards on behalf of the Ministry of Trade & Industry, Ministry of Health and others. 'This concept of a totally integrated system has come under severe pressure in world markets, because it also leads to unacceptable conflicts of interest, generally manifesting as a serious impediment to trade. The lack of international recognition of QSAE as a whole can be attributed in part to this state of affairs. (ecbp) 2009, these trade impediments not only hindered delivery time but also additional testing and inspection costs by recipient countries due to accreditation and other international recognitions.

The four NQI entities together with the authority to regulate mandatory standards had conflicting interests as opposed to the World Trade Organization (WTO) requirements. Therefore the four NQI components were established by their respective Regulation numbers under ministry of Science and Technology (MoST).

Ethiopian Standard Agency (ESA)

Ethiopian Conformity Assessment Enterprise (ECAE)

National Metrology Institute of Ethiopia (NMIE)

Ethiopian National Accreditation Office (ENAO)

The Current NQI in Ethiopia (after 2010 GC)

NQI in Ethiopia currently has four institutions namely Ethiopian Conformity Assessment Enterprise (ECAE), National Metrology Institute of Ethiopia (NMIE), Ethiopian Standard Agency (ESA) and Ethiopian National Accreditation Office (ENAO). And of course the regulation of mandatory standards or Technical Regulations (TR) are given to the regulatory bodies of the related ministries i.e. those related to health are given to Ministry of Health (MoH), those related to fairness of trade and Industry are given to Ministry of Trade and Industry (MoTI) and so on.

(The Current Status of the Ethiopian National Quality Infrastructure is written in sub-section 2.6 on page 21)

1.2.Statement of the Problem

Studies indicate that there are difficulties in Ethiopian export commodities in the areas of leather and leather products, textile and garments and agro-processed products.

For example the World Bank Group (WBG 2017) indicated the development objective of the linked WBG project is to improve the delivery of quality assurance services to enterprises in targeted sectors: (i) leather and leather products; (ii) textile and garments; and (iii) agro-processed products. The proposed project will contribute to the achievement of the Government of Ethiopia's growth strategy formulated within its second Growth and Transformation Plan (GTP II), which focuses on structural transformation from an agrarian to an industrialized economy by improving the import and export sector.

As part of the requirement of the World Bank to differentiate the conflicting interests of the NQI constituents with in QSAE and solve the drawbacks of the services delivered, this study will focus whether the NQIs have solved the problems raised in study of ecbp ten years ago or not as compared to the service delivered by NQIs.

This study has seen different factors which can impact the use of NQIs to the benefit of the country's economic development. The impact of QIs in research and innovation, environmental protection, food safety, health safety, global economic relations, economic development and competitiveness is mandatory. This research paper considered the 2009 ecbp paper of QSAE as compared to the reports of the 2019 to how the NQIs impacted on service delivery and economy of Ethiopia in general.

Lack of NQI institutions and the capability to perform and compete in the global market was the main obstacle for developing countries especially in the export market and control and testing of substandard products in the import market. In addition to this there was a problem in the NQI sector with respect to quality service delivery, stakeholders' participation, management of system standards, and resource utilization efficiency within the NQI institutions.Several problems were identified that indicate there was disintegrated andinefficiency of service delivery of the NQIs.

The following weaknesses were identified by ecbp (2009. These weaknesses include:

(i) lack of awareness on the NQI services among the private sector and consumers;

(ii) Competence of service delivery of NQI institutions;

(iii) Regulatory bodies and conformity assessment bodies were together in QSAE time leading to conflicting interests

(v) Lack of private NQI service providers and lack of consultation on NQI services

(vi) Weak coordination and collaboration among NQI institutions and in the implementation of mandated standards (technical regulations) with regulatory bodies.

Due to these problems and other related challenges and weaknesses, there was lack of competitiveness of Ethiopian export and industry products and services and which then affect the development of the country. As a result this study is dedicated to explain and understand the factors that can affect the impact of NQI in economic development from Awareness on quality and standards, NQIs role in economic development and safety of human health and environmental impact, resource utilization, management and implementation of system standards, stakeholder participation and collaboration of NQI institutions in technology transfer.

The study was then guided by the following three general questions each having nine statement questions.

1) To what extent do the services provided by NQIs contribute to Economic development of Ethiopia in general and performance of the industries and able to assist them in product and process quality?

2) What are the factors affecting the development of NQIs in Ethiopia?

3) To what extent do that the NQIs achieve their expected outcome?

1.2 Objectives of the Study

General Objectives

The general objective of the research is to

- investigate the Impact of the NQI institutions in the Economic Development of Ethiopia

Specific Objectives

The specific objectives of the study are:

- To assess the major services provided by the four national quality infrastructure (NQI) Institutions (ESA, ENMI, ECAE & ENAO) in Ethiopia.
- To assess the impact of national quality infrastructure (NQI) in Ethiopian economic development since 2010 (the restructuring of QSAE).
- To identify the challenges in implementation of national quality infrastructure (NQI).

1.3 Research Questions

The study addressed the following general research questions by secondary data, a questionnaire and an interview:

1. What were the major services provided by national quality infrastructure (NQI) in Ethiopia?
2. What were the impacts of national quality infrastructure (NQI) in Ethiopian economic development?
3. What were the main challenges in implementation of national quality infrastructure (NQI)?

4. To what extent do the services provided by NQIs contribute to Economic development of Ethiopia in general and performance of the industries and able to assist them in product and process quality?
5. What are the factors affecting the development of NQIs in Ethiopia?
6. To what extent do that the NQIs achieve their expected outcome?

1.4 Significance of the Study

This study helps to have scientific look innational quality infrastructure and economic development for decision making and implementation of effective national quality infrastructure in Ethiopia. Accordingly, this study will help to raise awareness of the issues of national quality infrastructure and possible recommended solutions.

This study gave direction to the program implementers who are working in the issue to clearly identify their strengths and weakness and to improve their programs and strategies. Additionally, this study indicated direction to the future policies and programs of the government and concerned ones to improve their services and scale up the best practices to other places of the country.

Moreover, it will serve as a stepping stone for further studies on the field and encourage the implementers of the program and to those who want to implement future programs in the field of national quality infrastructure and economic development.

1.5 Delimitation (Scope) of the Study

The study is delimited to focus on the main issue of the National Quality Infrastructure at Federal level in the capital Addis Ababa and with some of theInstitutions that have branches in the regional States. Due to the geographic and time constraints some of the regional states will not be covered by interviews and the financial constraints added to travel. So these branches will be covered by questionnaires and interviews only.

1.6 Limitation of the Study

Limited or small number of respondents has created a limitation on the data coverage of the research. The interviews of the NQI managers were done via telephone from the limited time of mangers to gather some information. In addition there was unreturned questionnaires that were distributed. The pandemic Corona virus (COVID 19) was a hindrance to send paper questionnaires to those who were without internet connections and could not interview the managers physically and so as to observe the status of the facility.

1.7 Definitions of Basic Terms

- **Quality Infrastructure (QI):**the system comprising the organizations (public and private) together with policies, relevant legal and regulatory framework, and practices needed to support and enhance the quality, safety and environmental soundness of goods, services and processes. (World Bank)
- **Impact:** isan effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia (Research Excellence Framework, REF, 2011).
- **Conformity Assessment:** ISO/IEC 17000 defines conformity assessment as: "demonstration that specified requirements relating to a product, process, system, person, or body are fulfilled".
- **Standard:** According to ISO 9001:2015 "A standard is document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context" with a note to explain that "Standards should be based on the consolidated results of science, technology and experience, and aimed at the promotion of optimum community benefits."
- **Accreditation:** third-party attestation related to a conformity assessment body conveying formal demonstration of its competence.
- Metrology: is "the science of measurement, embracing both experimental and theoretical determinations at any level of uncertainty in any field of science and technology" as defined by the International Bureau of Weights and Measures (BIPM)

1.8 Organization of the Study

This research proposal paper has five chapters. The first chapter introduces the background of the study, the statement of the problem, objective, significance, and delimitation of the study. The second chapter deals with the review of related literature in relation to the basic theoretical foundations of the main concept of the study. The third chapter pinpoints the materials and methods employed to address the objectives of the study. Here the research design, type, and source of data, data collection techniques, sample size and sampling technique, and the data analysis methods used are clearly stated.Chapter four is dedicated to discuss the results and the findings obtained from the study. Finally, in chapter fivethe summary of major findings, conclusions and recommendations are explained.

Chapter Two: Review of the Related Literature

This chapter deals with the details of the theoretical issues in the National Quality Infrastructure as can be reviewed from different literatures. Therefore the establishments of Quality Infrastructures (QI) and their impacts in Economic development of countries will be seen including the different types of naming's given to the QI. The importance of National Quality Infrastructure in Ethiopia, the current status of the Ethiopian National Quality Infrastructure in Ethiopia as compared to other literatures will be reviewed.

2.1 Quality

The word quality according to David (2007) has different meanings:

- A degree ofexcellence.
- Conformance with requirements.
- The totality of characteristics of an entity that bear on its ability to satisfy Stated or implied needs.
- Fitness for use/purpose.
- Freedom from defects, imperfections or contamination.
- Delighting customers.

ISO 9000:2015 Quality Management System (QMS) fundamentals and vocabulary defines Quality as "the degree to which a set of inherent characteristics of an object fulfills requirements.''

2.2 QualityInfrastructure (QI)

According to the World Bank(2007) Quality Infrastructure (QI) is defined as "The system comprising the organizations (public and private) together with the policies, relevant legal and regulatory framework, and practices needed to support and enhance the quality, safety, and environmental soundness of goods, services, and processes. The quality infrastructure is required

for the effective operation of domestic markets, and its international recognition is important to enable access to foreign markets. It is a critical element in promoting and sustaining economic development as well as environmental and social well-being. It relies on metrology, standardization, accreditation, and conformity assessment."

According to Gonclaves J. et al (2011) Different names or acronyms are used to refer the various combinations of Standards, Metrology, Testing, and quality assurance, Accreditation and Certification. The term Quality Infrastructure (QI) for example is used by the WTO or the EU, in the United States, the term ''Infratechnologies'' is used while others refer to it as the ''Quality system''. In Ethiopia like WTO/EU the term Quality Infrastructure (QI) is used for the above various entities combined.

The metrology which is one of the NQI entities responsible for accuracy of measurement by calibration and keeping traceability is vital as (Swann, 2009, p. 65) stated that "The accurate measurement of product characteristics makes it easier to demonstrate quality and safety, and hence to sustain a price premium for superior products". In addition, According to Sanetra and Marbán (2007, p. 66) the role of a NMI is "to obtain, conserve, develop and disseminate the basic measurement units and the highest level of calibration standards. It provides traceability to the national system and it ensures that international technical guidelines are followed for the metrological performance and testing procedures of measuring instruments subject to legal controls, and from the point of view of manufacturers it ensures that their products meet international specifications for metrological performance and testing".

AFNOR (2009).Study observes the impact of standardization in two dimensions. From a macroeconomic standpoint, standardization directly contributes to the growth in the French economy by an average of 0.89% per year, or almost 25% of GDP growth. The study also confirms the microeconomic benefits of standardization acknowledged by companies of all sizes and from all sectors of activity: product interoperability, increased productivity, market share gains, and ease of cooperation with public R&D institutions.

The conformity assessment has the role within a quality system of differentiating those goods and services that conform to a standard and those that do not. As argued by Guashet al. (2007), without such differentiation, standards is of limited use and the economic benefits associated

NQIare not reaped. Therefore, the importance of the conformity assessment is directly related with the impacts that metrology and standardization are supposed to bring by increasing their magnitude.

The main function of accreditation is to assess the competence of the remaining quality institutions, i.e. to create trust of the economic agents in the quality infrastructure. Accreditation may indirectly also contribute to increase the quality of quality services. For instance, the evaluation of laboratories contains, implicitly or explicitly, suggestions to improve the performance of these laboratories. This represents a transfer of knowledge from the accreditation institutions to the assessed laboratories (Gilmour et al., 2003).

Quality infrastructures may enhance the performance of economic systems in various ways. Depending on their design, their impacts range from the stimulation of network effects and knowledge transfer, to the increase in economic efficiency and markets competition. But quality infrastructure may also have counteracting effects. In this chapter, we start by summarizing a spectrum of possible positive and negative social, economic and environmental impacts from the functioning of a quality system as a whole. (Gonclaves J. et al 2011).

According to the review of (Gonclaves J. et al 2011), the positive impacts include; Better management procedures, network effects through enhancing interoperability, knowledge transfer, competition, economic efficiency, consumers and environmental protection; And the negative impacts are constraints on technological innovation due to variety reduction, constraints on competition due to potential barriers to trade or creating market power by property rights, excusive knowledge or resource. Quality infrastructures may have anticompetitive impacts when only a few players "have property rights, exclusive knowledge, or the exclusive resources needed to use a technology" (Guash et al., 2007, p. 25).

The accurate measurement of product characteristics makes it easier to demonstrate quality and safety, and hence to sustain a price premium for superior products" (Swann, 2009, p. 65).

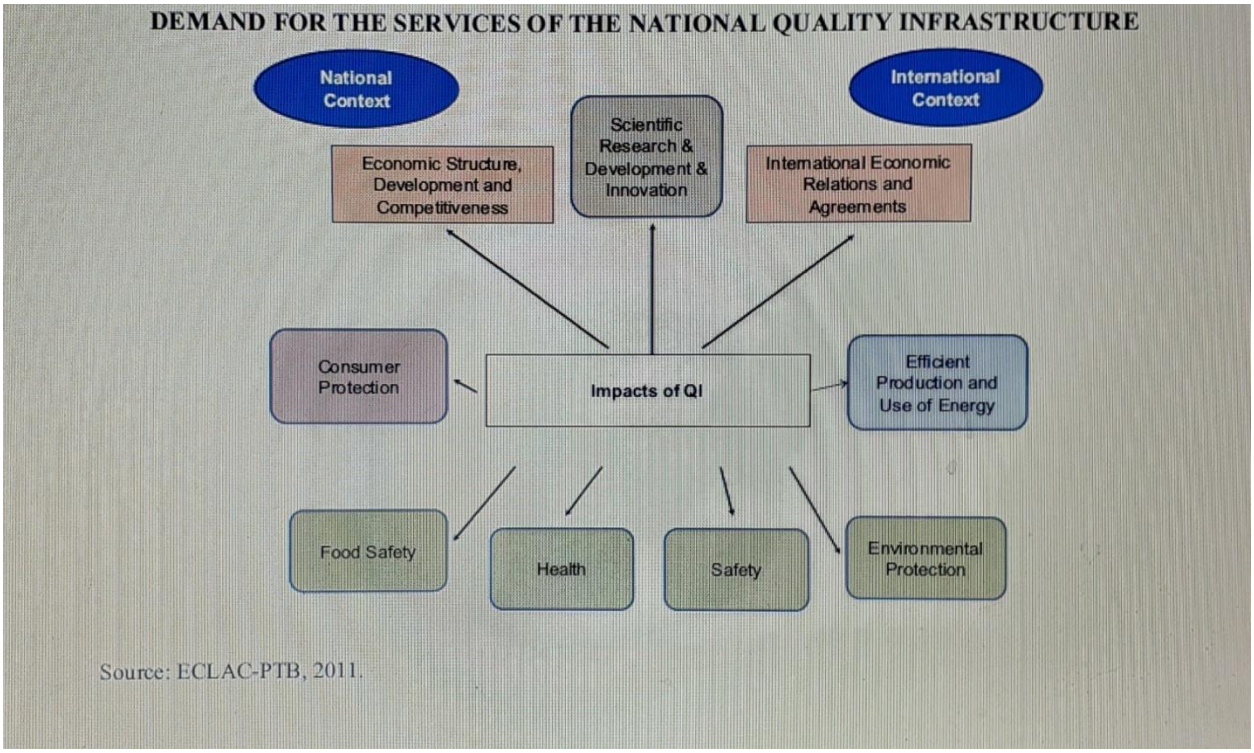
2.3 The Economic, Social and Environmental Impact of the QI

The demand for QI services according to (Gonclaves J. et al 2011) arises from many fields of economic and social development, consumer and environmental protection. Food safety, drinking water, efficient energy use, the realization of commercial transactions in the internal and external market, technological innovation, consumer protection on fraud related with weight, volume and quality, and from products and substances that hazardous to health cannot be achieved without measurements, standards and technical regulations. (See Figure1 below)

Thus, the positive or negative, direct or indirect impact of the QI, its various components, and the interrelationship between them, must play a leading role in productive, economic and social development concepts and policies.

2.3.1 Impact of NQI

According to Singh K.et.al (2018) Quality infrastructure (QI) ensures both user quality expectations and regulatory requirements are met. When coherent and aligned with international requirements, QI contributes to national competitiveness, economic growth, and the well-being of a country's citizens. Understanding the development of a country's QI and the public and private institutions that create it, offers a strong foundation for understanding how to do business there.



- Figure 1– Demand for the services of NQI

  Source -Measuring the Impacts of Quality Infrastructure, in Latin America: Experiences, achievements and limitations. By Jorge Gonclaves, Karl-Christian Gothner and Sebastian Rovira (2015) Santiago, Chile. Translated from Latin ECLAC-PTB, 2011

The Figure has indicated the impacts of quality infrastructure demand at national and international levels. At national context the QI has an impact on economic structure, development and competitiveness and at international context the QI has an impact on international economic relations and agreements. In addition, when properly implemented the QI has an impact on food safety, health, safety, environmental protection, scientific research & development & innovation and efficient production & use of energy.

Quality Infrastructures in Different countries have a little bit difference in frame work as shown below while the works of QI remain cohered and implemented in an enabling way. Here are some examples showing relationships among elements of NQIs.

Markos F. (2018) indicates that there was no observable conflict within the NQI institutions in Ethiopia due to proper implementation of the NQI structure and have a clear mandate, hierarchy and responsibilities among the NQI institutions.

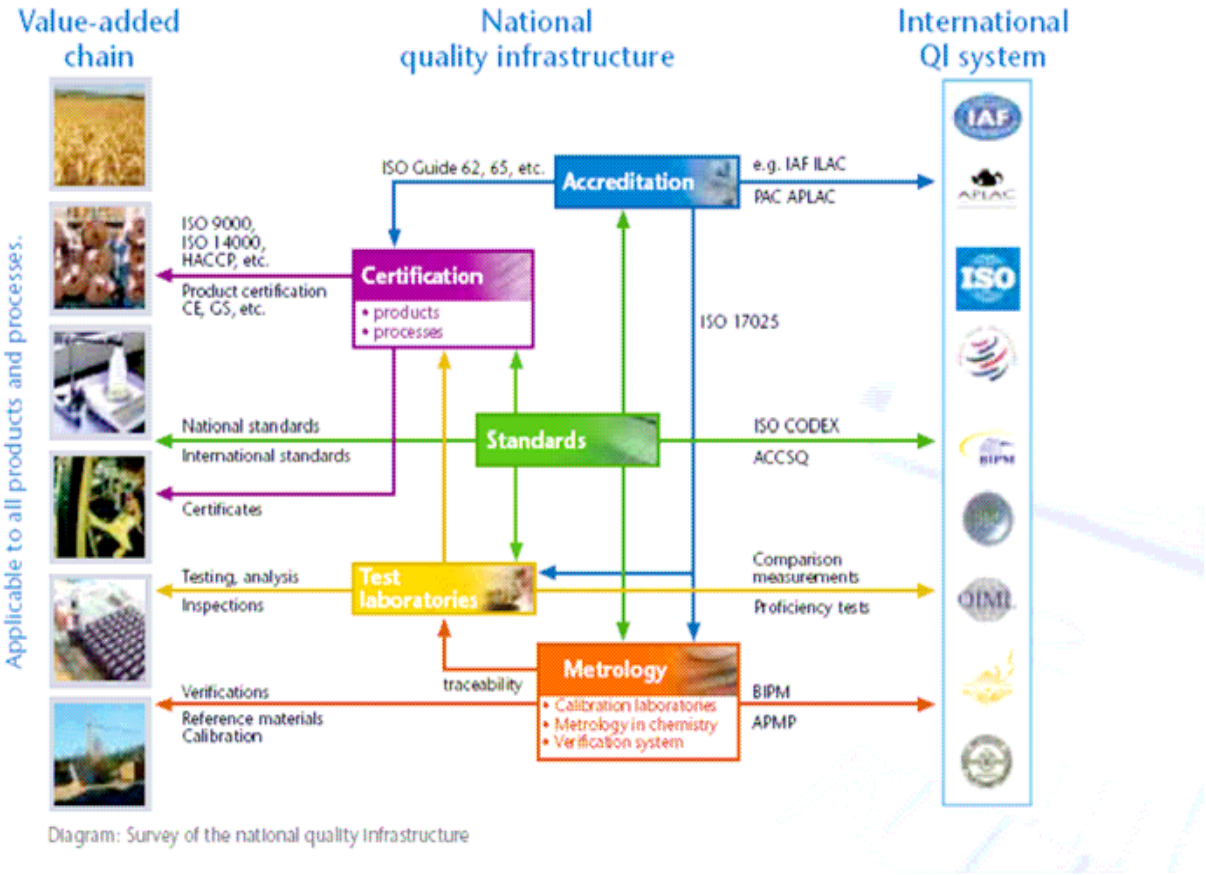


Figure 2: Interaction of NQI, Thailand, PTB 2006

Source: Quality Infrastructure - A Vital Aspect of Business Environment for Enterprise Development: A Case of Thai Fresh Fruit and Vegetables Industry Bangkok, Thailand 2006.

Figure 2 was studied in Thailand by the cooperation of PTB-GTZ with Thai-German programme for enterprise competitiveness in 2006. Here the final value added chain of products and services are received from the interaction of the NQIs. The NQIs have also an international cooperation with international QI system.

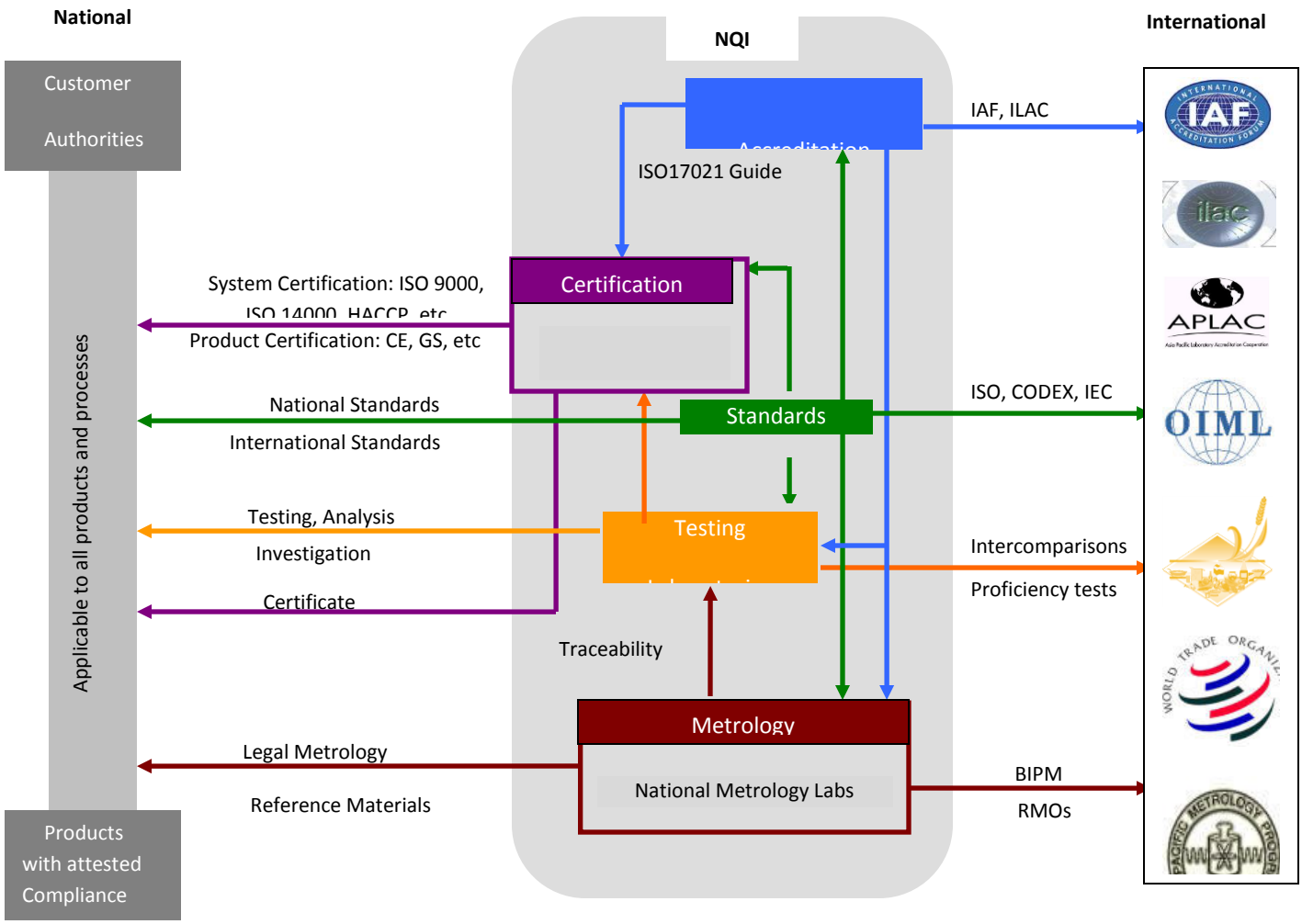


Figure 3: ecbp 2009

Source: Final Draft Strategy for the Implementation of National Quality Infrastructure (NQI) in Ethiopia, Engineering Capacity Building Program (ecbp) Feb 2009.

The diagram above indicated the NQI services and their international cooperation with their respective international organizations to harmonize the scientific languages behind the standard and to break the barriers to trade. The authorities for technical regulations and the consumers are also indicated.

2.4 Roles of National Quality Infrastructure in Innovation

2.4.1 QI and Innovation

Innovation has many aspects that makes defining it difficult, but indispensable task, apart from other important dimensions to innovation, here we focus mainly on technological change According to the definition of the Oslo manual technological innovations "comprise implemented technologically new products and processes and significant technological improvements in the products and processes" which "involves a series of scientific, technological, organizational, Financial and commercial activities" (OECD, 2005:31)

A. Standards and Innovation

Standard is a main innovation transferring tooled since new inventions has to be standardized before they are ready made for global market. Blind and Guach (2009) argue that developments of innovative products solely driven by science and technology pushes are running in to the problem of being of little relevance and of being not accepted by customers and consumers.

According to the Blind and Guach (2009), German researchers in nanotechnology perceived that the procedures in formal standardization process did not correspond to the dynamics in their emerging technology and that there was a discrepancy between the large public investments in nanotechnology research and the rather delayed standardization activities in the field compared to other countries like the USA, the UK and China.

B. Metrology and Innovation

Metrology which is defined as science of measurement above is an important part of technology Transferring subject and has significant role in the process of invention in the first place. The provision of measurement standards is considered as having as inductive nature by Gregersen (1992) an argument that finds support in the analysis by Swann (1999, p.36), according to whom: "Publicly funded measurement systems encourage the sorts of innovation by outsiders that disrupts this stability and familiarity. So while measurement completes for part of the innovation budget, it must be seen as a complementary activity to innovation. Without necessary measurement techniques, there can be no success in innovation."

C. Conformity Assessment and Innovation

Conformity Assessment has testing and inspection Procedures or standard methods used to test or inspect samples. These methods and procedures use modern equipment, chemical reagents and modern measuring instruments. Thus Conformity assessment has a role in Technology Transfer and usage The European Commission study (EC, 2009) also provided a number of examples for the use of certification and labelling schemes as market pull instruments for promoting innovation.

D. Accreditation and Innovation

Latest empirical research provides evidence that becoming a signatory of mutual recognition agreements is beneficial for a countries trade performance. Blind and Magnelsdorf (2012) show in gravity model of international trade that signatories of a mutual recognition arrangement for ISO 9001 quality management certification trade more with each other than countries which are not signatories of the agreement. The Agreement is negotiated under the umbrella of the International Accreditation Forum (IAF) or International Laboratory Accreditation Cooperation (ILAC).

The basic objectives of establishing and implementing effective and efficient NQI are: support the development of Ethiopian Industry, comply with other development strategies, enable Ethiopian products get acceptance throughout the globe in the export markets, support authorities in implementing effective TR or mandatory standards, helps to solve consumers' issues related to protection in terms of Quality, safety and price and address the quest to be a member of WTO

ESA	ENMI	ECAE	ENAO
Standards development	Calibration	Laboratory Testing	Accreditation
Training & consultancy	Keeping traceability	Inspection	Mutual Recognition Arrangement (MRA)
Technology Transfer	Maintenance of scientific equipment	Certification/registration	
Participation in ISO/IEC	Participation in BIPM, OIML	Training	Participation in & membership in ILAC/IAF, AFRAC
	Training and capacity Building	Technology transfer	
	Technology Transfer	Participation in ISO CASCO	

Table 2.1 NQI activities condensed

2.5 Current Status of the Ethiopian National Quality Infrastructure.

The following duties, responsibilities and performances of the NQIs are taken from the reports and websites of the institutions.

2.5.1 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 it.

Ethiopian standards agency has three core business areas which mainly focus on the

- Standard and scheme development/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:

- To lead and coordinate national standardization.
- To confirm and publish the national Ethiopian Standards;
- To promote the implementation of standards;
- To Promote Ethiopian Standard Mark and authorize its use;
- To represent Ethiopia in the International Standards Organization and work in collaboration with other foreign national standard bodies;
- To establishes National Enquiry Point and deliver services on Standardization, Conformity Assessment Guidelines and Technical Regulation;
- 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 center, 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.

2.5.2 National Metrology Institute of Ethiopia

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.

National Metrology Institute of Ethiopia (NMIE) has four core Directorates. Namely:

- Scientific Metrology
- Industrial Metrology
- Scientific equipment training & consultancy

- Scientific equipment repair & maintenance service

Scientific Metrology

Scientific metrology has six metrology teams under it. Namely: Mass, Pressure, Dimensional, Temperature, Ionization radiation, Chemical and Electric metrologies team. The Mass, Pressure, Temperature, and Electric metrologies are accredited from the German accreditation body, DAkks based on DIN EN ISO/IEC 17025:2005.

Industrial Metrology

This directorate has four teams. Volume, Balance calibration team, temperature and chemical calibration team, dimensional calibration team, electric, time and frequency calibration team. Volume and balance are accredited from DAkks.

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 14 Ethiopian National Measurement Standards and Certified Reference Materials (CRM). It also provides calibration, training and consultancy services in the areas of metrology and scientific equipment.

NMIE performs calibration and training and consultancy activities head quartered in Addis Ababa. Also for accessibility purpose NMIE has branches laboratories at Desie, Jimma, Bahirdar, Hawassa 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.

NMIE has collaboration with international organization for legal metrology (OIML), bureau of weights and measure (BIPM) and Korea Research Institute Standard Science (KRISS) for metrology related technology transfer and usage as made an agreement between NMIE and KRISS.

The legal metrology part which was in the QSAE before 2009 is now under ministry bureau of regional and federal government although there are many complaints about their poor service giving.

2.5.3 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 Trade and Industry. 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 eight branches in Ethiopia and one representative office in the port city of Djibouti.

ECAE has three directorates namely inspection directorate**,** testing laboratory directorate, **and** certification directorate.

Inspection – This directorate has two teams: namely product inspection and service inspection.

Product inspection–consists of different types of products like foods, agricultural products, electrical materials, reinforcement bars, chemical products, textile and leather products, construction materials etc…

ECAE provides independent third-party and internationally accredited inspection services on the following areas based on ISO/IEC 17020:2012.Under product inspection services ECAE

performs an accredited inspection for agricultural products categorically named as: Oil seeds, Pulses and Cereals.

Service/ in-service inspection-The service/in-service inspection team rarely functions in building installation and lifts.

Inspections can be done preproduction, during production, after Production or factory evaluation/

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 standard or agreed parameters or requirements.

Testing Laboratory-

ECAE has 6 operating testing laboratories in Addis Ababa (also a head quarter) namely:

1. Chemical –purified water, detergent soaps, edible oils, alcohols and beverages etc
2. Electrical– lamps, batteries, electrical cables and wires, solar appliances etc
3. Mechanical – reinforcement bars, GCSS, HDPE pipes, Concrete Blocks etc
4. Microbiology– foods, alcohols and beverages, swabs, etc
5. textile and Leather laboratory-Textile fabric, paper, pulp, paper board, paper products, and leather, etc
6. Radiation laboratory- food items, agricultural products, safety materials, etc

Certification Directorate- has three teams

1. **Product certification** – applies for factories products based on their standard schemes
2. **System certification** – applies certification based on their respective international standards such as ISO 9001: 2015 , ISO 22000: 2004, ISO 14001: 2015, etc
3. **Persons certification** – applies for persons competence based on the respective procedure ECAE has an agreement to 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 Inspection, laboratory testing and certification services in Ethiopia, at the head quarter in Addis Ababa and in eight branches namely Adama, Mekelle, Dessie, Hawassa, Diredawa, Bahidar, Gonder, Humera and representative office in Port of Djibouti and Port of Sudan for similar import inspection works.

2.5.4 Ethiopian National Accreditation Office

Established by the Council of Ministers regulation No. 279/201,The Ethiopian National Accreditation Office (ENAO) is a governmental institute that is aiming to give formal recognition of competence for laboratories of various kinds, certification bodies, inspection bodies, proficiency scheme providers and good laboratory practice test facilities to carry out specific tasks.

ENAO offers accreditation services on a national basis, and international basis when needed, enabling MoST (now MOTI) to reach globally accepted Mutual Recognition Arrangements (MRA) on the validity of certificates/reports issued by their Laboratories, Inspection Bodies, Certification Bodies and other related services.

ENAO applies these services to accredit CABs against the following standards: within the borders of the Federal Democratic Republic of Ethiopia so far

- ISO/IEC 17020, General criteria for the operation of various types of bodies performing inspection.
- ISO/IEC 17021,Conformity assessment -- Requirements for bodies providing audit and certification of management systems
- ISO/IEC 17025, General requirements for the competence of testing and calibration laboratories.
- ISO 15189, Medical laboratories -- Particular requirements for quality and competence.

ENAO’s accreditation for CABs has to pass across these five stages:

Application and document review, Pre-assessments, Initial Assessment, Surveillance Assessment and re-assessments

ENAO at the same time has to be a member of the International Laboratory Accreditation Co-operation (ILAC) and the International Accreditation Forum (IAF). And other regional

accreditation body such as Africa Regional Accreditation Cooperation (AFRAC) and has to be pearly evaluated against ISO/IE 17011. By Mutual Recognition Arrangement/Agreement (MRA/MLA) all the facilities accredited by peer members will be accepted across globe solving the Technical Barriers to Trade (TBT) which is also important for WTO agreement.

2.6 Private NQI service Providers Requiring Laboratory Management Systems

Of course Quality can't be assured only by governmental Institutions but also it needs a collaboration of stake holders and other private NQI institutions together with consumer protection associations.

There are Private companies providing NQI services majorly in the area of conformity assessment namely Inspection and Testing, Certification.

Testing Laboratory

Some of the laboratories are accredited for processes and procedures adopted in line with ISO/IEC 17025:2005.

Private NQI providers in Ethiopia (laboratory)

Item no	Company name	CAB service type
1	Bless laboratory	Testing, Inspection, Certification
2	Addis International Catering	Testing
3	JIJE Analytical Testing Service Laboratory	Testing
4	Bureau Veritas	Testing, Inspection
5	Metro-Alliance	Calibration
6	Winner Mechanical	Calibration
7	AssertEthiopia Management Certification Plc	Certification and auditor training

Table 2.2 private NQI providers (laboratory)

Source -Secondary data from- "Needs Assessment for Industry and Private NQI Service Providers (Reference No. ET-MOST-105555-CS-CQS)"

Inspection

Those who are working in inspection services are expected to implement ISI/IEC 17025:2012 for the management system and be accredited by ENAO for their specific procedures or methods of inspection so that their result will be accepted throughout the globe.

Table private NQI providers in Ethiopia (Inspection)

Name of company	Value Chain	Testing	Certification	Inspection	Calibration
A Y Noble	Oil Seeds and Legumes				
AEKM Agro Industry	Cereals				
Afrostar Inspection	Oil Seeds and Legumes				
Global Inspection Survey Agency	Oil Seeds, Cereals, and Legumes				
International United Surveyors PLC	Cargo				
Life Agro and Consultancy	Coffee				
QITS Inspection	Oil Seeds, Legumes and Spices				
TACI Inspection PLC	Oil Seeds and Legumes				

Table2.3 private NQI providers in (Inspection)

Source -Secondary data from- "Needs Assessment for Industry and Private NQI Service Providers (Reference No. ET-MOST-105555-CS-CQS)"

Certification

In the area of Certification these companies listed below are function in system certification. For product certification Bless laboratories also participate in that area.

Table private NQI providers in Ethiopia (Certification mainly system)

Item no	Company name	CAB type
1	DQS	Certification (system)
2	ISOQAR	Certification (system)
3	Bless laboratories	Certification (product)

Table 2.4private NQI providers in (Certification mainly system)

Source -Secondary data from- "Needs Assessment for Industry and Private NQI Service Providers (Reference No. ET-MOST-105555-CS-CQS)"

Chapter Three: Research Design and Methodology

This chapter deals with Research Design, Research Method, Sources of Data, Sample size and Sampling Technic, Instruments of Data Collection, Procedures of Data Collection, Method of Data Analysis and the Ethical Considerations employed for the study.

3.1.Research Design

(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 is collected and analyzed. Therefore in this study has detailed descriptions of the essential considerations in designing the research project which encompass the research method, sources of data, sample size and sampling technic, instruments of data collection, procedures of data collection, method of data analysis and the ethical considerations.

This study adopted mixed research design with explanatory type; meaning that both qualitative and quantitative research approach were used. As De Silva (2010, P. 23) explained, "Mixed methods provide the opportunity for presenting a greater diversity of divergent views." From such point view, using a combination of quantitative and qualitative methods of analysis also reduces the limitation of each approach or helps to get more reliable data. In addition, De Silva indicates that "It is advantageous to use mixed research for analysis as together the data analyses from the two methods are juxtaposed and generated complementary insights that together create a bigger picture." Therefore, it was very relevant to use mixed research method for the present study.

3.2.Research Method

In this study a descriptive survey method was 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 methodis 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.(Creswell& Plano

Clark, 2011). More specifically, cross sectional descriptive survey method isemployed for it is a method used to collect data only once at time.

3.3.Sources of Data

Both qualitative and quantitative data type were used and primary and secondary source of data is also employed. The primary data was collected from NQI Ethiopia experts, factory's and regulatory offices related to the issues of national quality infrastructure in Ethiopia; collected through questionnaires and interview, while the secondary data was collected from different documents, reports and other relevant sources of the administration and other institutions working in that research area.

3.4 Sample Size and Sampling Technique

3.4.1. Sample Size

Sample Size refers to the number of items to be selected from the universe to constitute a sample. According to Kothari(2004), determining sample size is a very important issue because samples that are too large consumes a lot of time, resource and money, while a sample that istoo small may lead to inaccurate result and conclusions. Given a staffs members of ECAE=68, NMIE=48, ESA=40 &ENAO=14.From the NQI Ethiopia offices the researcher uses the simplified formula of Yamane (1967), which was given by the formula: $\boldsymbol{n = \frac{N}{(1+N(e))2}}$and calculated for each institution as can be seen on the table below.

Where: n= Sample Size

N= the population size

e= the level of Precision, which is a 95% Confidence Interval

In the study, the target populations are populations of the NQI Ethiopia staff members. Accordingly,

n=N/1+N (0.05)2

n=x

Using this simplified formula sample of 151 participants will be selected.

Table 3.1 Population sampling frame and number of Respondents from NQI

No.	Organization	Total Experts	Management Experts	Total number	Selected Department for sampling the experts	Total sampling using proportionate
1	ECAE	57	11	68	Inspection, Testing& Certification direc.	58
2	NMIE	32	16	48	Industrial& Scientific Metrology directorate	43
3	ESA	24	16	40	Standard preparation & Training	36
4	ENAO	8	6	14	Accreditation directorate for inspection & Testing teams	14
	Total	165	56	221		151

Table 3.1 NQI population sampling

Based on this technique, the sample size taken was one hundred fifty one 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).

These NQI institutions give service to different customers in the areas of standardization, training and consultancy services, calibration, testing, inspection and certification in their core services.These NQI institutions have customers for the services they deliver. The customers can get services from the NQI institutions repeatedly. Manufacturing companies for example use standards from ESA, calibrates their machines in NMIE & their products be tested, inspected

&certified by ECAE. To avoid repetition of customer registration data base of the NQI institutions about two hundred different companies are getting direct services. For this research some institutions are selected due to their frequent &diverse services requests. Institutions EFMHACA, MoTI and Metal and steel sheet Industry found in Addis Ababa and outside of the capital 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 populationseventy five sampleswere 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 3.2: Population, sampling frame and number of respondents from the selected Industry

No.	Organization	Selected Department	Total number of management & experts related to Quality activities	Total sampling using stratified sampling techniques
1	MoTI	Import & export Direc	29	27
2	EFMHACA	Food Quality assessment direct	24	22
3	Metal&steel sheet Factory	Production & laboratory	28	26
	Total		81	75

Table 3.2 Industry population sampling

3.4.2. Sampling Technique

The study area NQI ethiopia is purposively selected based on the fact that the office is the one who is delegated to overview and implement national quality infrastructure activities in collaboration with factories and regulatory bodies in Ethiopia. So, the researcher believes that conducting this research assessment in the mentioned office is very important and a good starting point for researchers.

To determine the appropriate sample participant for the research, purposive sampling technique was employed since the research contents required expertise and professionalism related to the national quality infrastructure in Ethiopia. Purposive sampling involves identification and selection of individuals or groups of individuals that are proficient and well-informed with a phenomenon of interest (Creswell, J. W., & Plano Clark, V. L., 2011). So the participants are selected randomly from the core processes in the NQI institutions directly working in Testing, Inspection, Certification, Calibration, Accreditation, Standard development and Trainings. The Industry was selected from core processes in the inspection and regulation, manufacturing and quality control areas.

3.5 Instruments of Data Collection

In this research these three methods of data collection namely questionnaire, personal interview and document review were used. These three methods of data collection enabled the generation of quality data that provides both qualitative and quantitative data types and were carefully examined. Questionnaires, interviews and direct observations are the most important means of data collection tools as indicated by (Drew, 1980) and (Kothari, 1985). 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. 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. In addition the calculated means are interpreted as;
Above 4= strongly agree, 3.6 to 4.00 = Agree/good, 3.00 to 3.5= Average/medium, 2.00 to 3.00 = Disagree/poor and below 2.00 it is interpreted as strongly disagree/very poor. The information obtained from the questionnaires are summarized and discussed in the following manner

Questionnaire

Questionnaires were distributed to those experts who were selected from both the NQIs and Industries. The questionnaire has three parts and was given to both categories of the respondents. The language used for interview was Amharic and English, but the questionnaire was prepared in English. Officials and senior management staff from both NQIs and industries were interviewed for around 20 minutes besides the questionnaire. For conducting the interview the researcher has arranged the time and finally the interview was conducted.

Interview

A structured interview were administered to the selected sample respondents from the NQI Ethiopia, factories heads and regulatory offices, to address the services provided by NQI and impact of NQI for economic development of the country in relation to the challenges and possible recommended solutions.

Document Review

Document review was conducted to get more data on the national quality infrastructure and economic development of Ethiopia. Documents from both regulatory offices and NQI Ethiopia, such as rapid assessment, project document, and reports were reviewed. Documents were reviewed only those that have importance for the researcher to support the collected data.

3.6 Procedure of Data collection

The data gathering instruments were edited after checking and conducting test for reliability and the pilot test before the data were collected by the researcher.The researcher made readyfor respondents for the research the individuals and groups whose opinion might seek on specific issues.Interviewing and questionnaires were the two main data collection methods used in this survey research.From a total of 226 questionnaires that were distributed to both the NQIs andindustry respondents in and outside of Addis Ababa, a total of 172 questionnaires were collected. This was 76.1% of the questionnaires distributed. Finally, the data was also collected using participant observation using checklists.

3.7 Methods of Data Analysis

The systematically collected data is analyzed using both qualitative and quantitative methods, according to the nature of the collected data: Descriptive statistics such as mean, percentage, frequencies, and standard deviations isused for quantitative data using statistical package for thesocial science (SPSS) version 21. To suit for analyzing quantitative data is put in a table.

In additiontwo tailed t-test inferential statistical method is used to analyze & see if there is a difference between the two groups of respondents before the two types of data are triangulated for conclusions.

3.8 Ethical Consideration

Both on the Questionnaire and Interview, the researcher informed the respondents that the information collected from them was not 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. They are also informed that the information given by them was used only for the purpose of this research and no name is mentioned here for the protection of their rights and well-being.

Chapter Four: Results and Discussion

This chapter deals with the analysis of data and discuss on the findings of the study in relation to the impacts of National Quality Infrastructure in Ethiopian Economic Development. The findings of the study are analyzed based on the specific objectives and hypotheses of the study. In this chapter respondent's profile, the quantitative data first had been organized and put into tables to suit for analysis. Later data were analyzed usingdescriptive statistical methods like mean, standard deviation and percentages and be calculated suing statistical package for the social sciences (SPSS) version 21.

Moreover, the qualitative data was transcribed and then coded and put into categories and discussed. In addition two tailed t -test as an inferential statistical method was used to analyze whether there was idea difference between the two groups of respondents or not. Finally the two types of data were triangulated to give summaries, conclusions and recommendations.

4.1 Demographic Characteristics of the Respondents

This subsection in general describes the general demographic characteristics of the respondents and study variables. There was a target for a total 226 respondents, 151 from NQI and 75 from Industry. But Due to the Pandemic Disease of Corona Virus (COVID-19) most of the questionnaire was distributed via email. So those who responded were of 108 from NQI and 64 from industry. Respondentstotaled 172 out of which 108 participants were from the NQI institution and 64 participants were from the industry and Sex wise (male=144, female=28) persons participated in the study.

Table 4.1.1, table 4.1.2 and Table 4.1.3 below shows the profile of the respondents from NQIinstitutions and from selected industries getting services from NQI institutions respectively in terms of sex, educational level, position and years of experience in their current working positions in their respective organization as well as their total work experiences.

Item/variable	Category	Frequency	Percent	cumulative
Type of respondents	**NQI**	**108**	**62.8**	
	Industry	**64**	**37.2**	
	Total	**172**	**100**	
gender	**Male**	**144**	**83.7**	
	Female	**28**	**16.3**	
	Total	**172**	**100**	
Level of Educational	**Diploma (10+2)**	**9**	**5.2**	
	Degree	**148**	**86.0**	
	2nddeg& above	**15**	**8.7**	
	Total	**172**	**100**	
Position in their org.	**Officer/expert**	**128**	**74.4**	**74.4**
	Chief Officer/expert	**28**	**16.3**	**90.7**
	Supervisor /QM	**14**	**8.1**	**98.8**
	DG/DDG	**2**	**1.2**	**100**
	Total	**172**	**100**	
Location work area	**Addis Ababa**	**121**	**70.3**	
	Outside Addis	**51**	**29.7**	
	Total	**172**	**100.00**	
Experience in the org	**0-5**	**143**	**83.1**	**83.1**
	6-10	**23**	**13.4**	**96.5**
	11-15	**5**	**2.9**	**99.4**
	Above 15	**1**	**0.6**	**100**
	Total	**172**	**100**	

Table 4.1 total NQI and Industry profile of Respondents

Source: Data collected by the researcher through Questionnaire, 2020

The respondents were from different areas of the country which are benefitting and delivering services throughout the country. Respondents totaled 172 out of which 108 participants were from the NQI institution and 64 participants were from the industry participated in this study. Out of the 172 respondents were male 144 (83.7%), female 28 (16.3%). From this finding, it could be deduced that female participation is below expected which in turn could affect the performance of both in the NQI institutions and in the Industry.The location of the work area of the respondents was 121 (70.3%) of them in Addis Ababa while 51 (29.7%) were outside of Addis Ababa. This was helpful to see the accessibility of NQI outside the capital city. The position of the respondents in their organization was Officer/Expert 128 (74.4%), Chief

Officer/Chief Expert 28 (16.3%), Supervisor /QM 14 (18.1%) while Director General or deputy Director Generalwere 2 (1.2%). The educational background was Diploma 9 (5.2%), Degree 148 (86%) while those with Second Degree and above were 15 (8.7%). The experience of the respondents in the organization in years was 0-5 years 143 (83.1%), 6-10 years 23 (13.4%), 11-15 years 5(2.9%) and above 15 years 1 (0.6%). This indicates that there is more Degree holders (86%) at the same time are not staying in the organization for more than 10 years i.e. only 4.5% of the respondents were more than 10 years in the NQI and in the industry. It can be seen that 51 out of 172 respondents were outside of Addis Ababa which is 29.7% to include the see the respondents view in Ethiopia as a general.

Table 4.1.1 NQI profile of Respondents

Item/variable	Category	Frequency	Percent	
gender	**Male**	**87**	**80.6**	
	Female	**21**	**19.4**	
	Total	**108**	**100**	
Level of Educational	**Diploma (10+2)**			
	Degree	**101**	**93.5**	
	2nddeg& above	**7**	**6.5**	
	Total	**108**	**100**	
Position in their org.	**Officer/expert**	**76**	**70.4**	**70.4**
	Chief Officer/expert	**24**	**22.2**	**92.6**
	Supervisor /QM	**6**	**5.6**	**98.1**
	DG/DDG	**2**	**1.9**	**100**
	Total	**108**	**100**	
Location	**Addis Ababa**	**92**	**85.5**	
	Outside Addis	**16**	**14.8**	
	Total	**108**	**100**	
Experience in the org	**0-5**	**85**	**78.7**	**78.8**
	6-10	**17**	**15.7**	**94.4**
	11-15	**5**	**4.6**	**99.1**
	Above 15	**1**	**0.9**	**100**
	Total	**108**	**100**	

Table 4.1.1 profile of NQI respondents

Source: Data collected by the researcher by a Questionnaire 2020

NQI respondents totaled 108 have participated in this study. Out of the 108 respondents were male 87 (80.6%), female 21 (19.4%). From this finding, it could be deduced that female participation in NQI institutions is below expected which in turn could affect the performance of the NQI institutions.The location of the work area of the respondents was 92 (85.5%) of them in Addis Ababa while 16 (14.8%) were outside of Addis Ababa.The position of the NQI respondents of in their organization was Officer/Expert 76 (70.4%), Chief Officer/Chief Expert 24 (22.2%), Supervisor /QM 6 (5.6%) while Director General or deputy Director General were 2 (1.9%). The educational background of the NQI respondents was Diploma no at all, Degree 101 (93.5%) while those with Second Degree and above were 7 (6.5%). The experience of the respondents in the organization in years was 0-5 years 85 (78.7%), 6-10 years 17 (15.7%), 11-15 years 5(4.6%) and above 15 years 1 (0.9%).This indicates there are more Degree holders (93.5%) than any other education level at the same time the respondents are not staying in the organization for more than 10 years i.e. only 5.5% of the respondents had more than 10 years stay in the NQIs.

Table 4.1.2: Industry profile of Respondents

Item/variable	Category	Frequency	Percent	
gender	**Male**	**57**	**89.1**	
	Female	**7**	**10.9**	
	Total	**64**	**100**	
Level of Educational	**Diploma (10+2)**	**9**	**14.1**	
	Degree	**47**	**73.4**	
	2nddeg& above	**8**	**12.5**	
	Total	**64**	**100**	
Position in their org.	**Officer/expert**	**53**	**90.6**	
	Chief Officer/expert	**3**	**4.7**	
	Supervisor /QM	**8**	**12.5**	
	DG/DDG	**-**	**-**	
	Total	**64**	**100**	
Location	**Addis Ababa**	**29**	**45.3**	
	Outside Addis	**35**	**54.7**	
	Total	**64**	**100**	
Experience in the org	**0-5**	**58**	**90.6**	
	6-10	**6**	**9.4**	
	11-15			
	Above 15			
	total	**64**	**100**	

Table 4.1.2 profile of Industry respondents

Source: Data collected by the researcher through Questionnaire, 2020

Industry respondents totaled 64 have participated in this study. Out of the 64 respondents were male 57 (89.1%), female 7 (10.9%). From this finding, it could be deduced that female participation in the Industry is below expected which in turn could affect the performance of theIndustry.The location of the work area of the respondents was 29 (45.3%) of them were in Addis Ababa while 35 (54.7%) were outside of Addis Ababa. The position of the Industry respondents in their organization was Officer/Expert 53 (90.6%), Chief Officer/Chief Expert 3 (4.7%), Supervisor /QM 8 (12.5%) while there was no respondent from Director General or deputy Director General. The educational background of the NQI respondents was Diploma 9 (14.1%), Degree 47 (73.4%) while those with Second Degree and above were 8 (12.5%).The experienceof the respondents in the organization in years was 0-5 years 58 (90.6%), 6-10 years 6 (9.4%), there was no respondent that have above 11years of stay in the industry. This indicates

there are more Degree holders (73.4%) than any other education level at the same time there was no respondent that stays in the industry for more than 11 years. This can show that the NQI has employees more likely to stay years than in the Industry.

Part Two - NQI Contributions to economic Development

Q2.1 NQIs Give awareness and training on Quality and standards

Item	Q2.1 NQIs Give awareness and training on Quality and standards		Very poor	poor	Medium	Good	Very good	Total	Mean	STDV.
I	NQI response	Freq	6	11	27	59	5	108	3.43	0.939
		%	5.6	10.2	25.0	54.6	4.6	100		
	Industry Response	Freq	12	7	17	28	0	64	2.95	1.147
		%	18.8	10.9	26.6	43.8		100		

Table 4.2.1 Response for Q2.1

Source: Data collected by the researcher through Questionnaire, 2020

We can see from table 4.2.1 is rated poor and very poor by 17 or (15.8%) of the NQI respondents and 19or (29.7%) of the Industry respondents.
27 or (25%) replied Of NQI and 17 or (26.6%) of the Industry are at an average level. 64 (59.2%) of NQIresponded good and very good, while Industry responded 28 or (43.8%) good and without very good. The overallaverage mean (3.43) result on awareness and training lies on medium or average. The standard deviation (0.939) is still acceptable meaning does not vary. This indicates that the level of awareness and training for both remains the same and responded similar as average.

Q2.2 NQI contributes to the economic development of Ethiopia

Item	Q2.2NQI contributes to the economic development of Ethiopia		Very poor	poor	Medium	Good	Very good	Total	Mean	STD V.
I	NQI response	Freq		6	14	84	4	108	3.8	.592
		%		5.6	13.0	77.8	3.7	100		
	Industry Response	Freq	4	5	11	32	12	64	3.67	1.070
		%	6.3	7.8	17.2	50.0	18.8	100		

Table 4.2.2 Response for Q2.2

Source: Data collected by the researcher through Questionnaire, 2020

From Table 4.2.2 for "NQI contributes to the economic development of Ethiopia" the responses by the NQIis rated 88 or (81.5) good and very good While by the industry is 44 or (68.8). Poor and very poor by 20 or (18.5%) by the NQI and 9 or (14.1) by the Industry was responded. While 14 or (13%) of the NQI and 11 or (17%) of industry respondents are on the medium or average.

The overall average mean (3.8) result lies on good. The standard deviation (0.592) is still acceptable meaning does not vary high from the mean.

Q2.3 NQI gives technical support and consultancy, calibration, testing and the implementation of standards;

Item	Q2.3NQI give technical support and consultancy, calibration, testing and the implementation of standards;		Very poor	poor	Medium	Good	Very good	Total	Mean	STDV.
I	NQI response	Freq	8	7	31	51	11	108	3.46	1.018
		%	7.4	6.5	28.7	47.2	10.2	100		
	Industry Response	Freq	7	17	3	33	4	64	3.16	1.211
		%	10.9	26.6	4.7	51.6	6.3	100		

Table 4.I Response for Q2.3

Source: Data collected by the researcher through Questionnaire, 2020

From the above Table 4.2.3 for "technical support and consultancy, calibration, testing and the implementation of standards" we can see theresponses by the NQI 62 or (57.4%) good and very good While by the industry is 37 or (57.9) which is more or less the same. While on the poor and very poor the industry response is 27 (37.5) which is more than that of NQI 13.9 or 15 respondents. 31 or (28.7%) for technical support by NQI responded on the average while only 3 or (4.7%) was responded by the Industry for Technical support.

Q2.4NQI encourages you to promote the use of technologies in the industry;

Item	Q2.4NQI encourage you to promote the use of technologies in the industry		Very poor	poor	Medium	Good	Very good	Total	Mean	STD V.
I	NQI response	Freq		5	22	77	4	108	3.74	0.602
		%		4.6	20.4	71.3	3.7	100		
	Industry Response	Freq	3	7	18	32	4	64	3.42	0.940
		%	4.7	10.9	28.1	50.0	6.3	100		

Table 4.2.4 Response for Q2.4

Source: Data collected by the researcher through Questionnaire, 2020

From Table 4.2.4for "NQI encourage you to promote the use of technologies in the industry" we can see theresponses by the NQI to be 81 or (75%) good and very good while by the industry is 36 or (56.3%) which is less than the NQI response. 5 or (4.6) respondents from NQI says poor encouragement to the use of technologies while 10 or (15.6%) from industry responded for poor and very poor promotion for technology transfer by NQI. 22 or (20.4%) for 'NQI encourage you to promote the use of technologies in the industry' by NQI responded on the average while only 18 or (28.1%) was responded by the Industry for the same technology encouragement question.

The mean shows that the promotion of the technologies is rated good(3.74) by the NQI and average (3.42) by the industry.

Q2.5 NQI support your industry in establishing your own test and calibration laboratories for comparison or internal quality

Item	Q2.5NQI support your industry in establishing your own test and calibration laboratories for comparison or internal quality		Very poor	poor	Medium	Good	Very good	Total	Mean	STD V.
I	NQI response	Freq		5	51	52		108	3.44	0.584
		%		4.6	47.2	48.1		100		
	Industry Response	Freq	5	7	25	24	3	64	3.20	0.979
		%	7.8	10.9	39.1	37.5	4.7	100		

Table 4.2.5 Response for Q2.5

Source: Data collected by the researcher through Questionnaire, 2020

From Table 4.2.5 for"NQI support your industry in establishing your own test and calibration laboratories for comparison or internal quality" The NQIs responded 52 or (48.1) responded good while the industry responded 27 or (42.2%) good and very good. 51 or (47.2) from NQI rated average about support on internal quality and calibration while the industry rated 25 or (39.1). we can see the responses by the NQI rated poor only 5 or (4.6) but that of industry to the

poor and very poor rating 12 or (18.8%) which four times greater dissatisfaction than that of the NQI. Both the NQI and the industry are rated Average or medium (3.44) and (3.20) respectively.

Q2.6NQIs activities enhanced firms produce quality products and services

Item	Q2.6 NQIs activities enhanced firms produce quality products and services		Very poor	poor	Medium	Good	Very good	Total	Mean	STD V.
I	NQI response	Freq			17	86	5	108	3.89	0.439
		%			15.7	79.6	4.6	100		
	Industry Response	Freq	3	8	16	29	8	64	3.48	1.023
		%	4.7	12.5	25.0	45.3	12.5	100		

Table 4.I Response for Q2.6

Source: Data collected by the researcher through Questionnaire, 2020

Responses fromTable 4.2.5 for"NQIs activities enhanced firms produce quality products and services" 86 or (79.6%) says good and 5 or (4.6%) while the Industry says 37 or (47.8%) good and very good which is still less than the NQIs. The NQIs do not say poor or very poor for the enhancement of NQI activities to firms to produce quality products and services while the industry responded 11 or (17.2%). Even On the medium the NQIs responded 17 or (15.7%) when the industry responded 16 or (25%). Here we can see that the NQI is rated good (3.89) but average (3.48) by the industry the activities of NQ to help firms produce quality products and services.

Q2.7 NQIs activities supported to enhance firm'ssafety and health

Item	Q2.7 NQIs activities supported to enhance firm'ssafety and health		Very poor	poor	Medium	Good	Very good	Total	Mean	STD V.
I	NQI response	Freq	7	12	22	61	6	108	3.44	0.988
		%	6.5	11.1	20.4	56.6	5.6	100		
	Industry Response	Freq	1	6	17	35	5	64	3.58	0.832
		%	1.6	9.4	26.6	54.7	7.8	100		

Table 4.2.7 Response for Q2.7

Source: Data collected by the researcher through Questionnaire, 2020

We can see From Table 4.2.7 “NQIs activities supported to enhance firm'ssafety and health”is rated poor and very poor by 19 or (17.68%) of the NQI respondents and 7or (10.9%) of the Industry respondents. 77 (62.2%) of NQI and 40 (62.56%)of the Industry responded good and very good. Whereasat the average level 22 (20.4%) of NQI responded medium support to enhance firms safety and health while the industry responded 17or (26.6%).

Q2.8 NQIs activities help firms to decreased environmental impact

Item	Q2. 8NQIs activities helps firms to decreased environmental impact		Very poor	Poor	Medium	Good	Very good	Total	Mean	STD V.
I	NQI response	Freq	5	21	20	58	4	108	3.32	0.984
		%	4.6	19.4	18.5	53.7	3.7	100		
	Industry Response	Freq	2	12	9	34	7	64	3.50	1.024
		%	3.1	18.8	14.1	53.1	10.9	100		

Table 4.2.8 Response for Q2.8

Source: Data collected by the researcher through Questionnaire, 2020

FromTable 4.2.8 for"NQIs activities helps firms to decreased environmental impact" The NQIs responded 62 or (57.4%) responded good and very good while the industry responded 41 or (64%) good and very good for decreased environmental impact. 26 or (19.4%) from NQI rated poor and very poor rating similarly the industry responded 14 or (21.9%). The average went in to 20 or (18.5%) from NQI and 9 or (14.1%) from industry for the reduced environmental impact.

Q2.9 Have you get market advantage by using NQIs services

Item	Q2. 9 Have you get market advantage by using NQIs services		Very poor	poor	Medium	Good	Very good	Total	Mean	STDV.
I	NQI response	Freq		5	13	69	21	108	3.98	0.710
		%		4.6	12.0	63.9	19.4	100		
	Industry Response	Freq	3	4	9	30	18	64	3.88	1.047
		%	4.7	6.3	14.1	46.9	28.1	100		

Table 4.2.9 Response for Q2.9

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.2.9 for"Have you get market advantage by using NQIs services" 90 or (83.3%) of the NQI says good and very good and 48 (76%) of the industry also said good and very good. The industry said poor and very poor market advantage due to NQI services by 7 (10.9%) while the NQI said poor advantage by5 or (4.6%). The average which says neither good nor bad are 12% by NQI and 9% by industry almost similar.

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 d/ce
2.1	NQI give awareness and training on quality and standards	NQI	108	3.43	.939	assumed	3.436	.066	2.935	170	.004	.473
		Industry	64	2.95	1.147	not assumed			2.790	112.571	.006	.473
2.2	NQI has contributes to the economic development of Ethiopia	NQI	108	3.80	.592	Assumed	.137	.711	.305	170	.761	.031
		Industry	64	3.77	.707	not assumed			.292	114.613	.771	.031
2.3	NQI give technical support and consultancy, calibration, testing and the implementation of standards	NQI	108	3.54	.662	Assumed	15.153	.000	-1.769	170	.079	-.166
		Industry	64	3.70	.460	not assumed			-1.935	165.556	.055	-.166
2.4	NQI encourage you to promote the use of technologies in the industry	NQI	108	3.74	.602	Assumed	.794	.374	.431	170	.667	.038
		Industry	64	3.70	.460	not assumed			.461	159.089	.646	.038
2.5	NQI support your industry in establishing your own test and calibration laboratories for comparison or internal quality control	NQI	108	3.44	.584	Assumed	3.771	.054	-.026	170	.979	-.002
		Industry	64	3.44	.500	not assumed			-.028	148.857	.978	-.002
2.6	NQIs activities enhanced firms produce quality products and services	NQI	108	3.89	.439	Assumed	8.980	.003	2.632	170	.009	.186
		Industry	64	3.70	.460	not assumed			2.601	127.494	.010	.186
2.7	NQIs activities supported to enhance firm's safety and health	NQI	108	3.70	.551	Assumed	.371	.543	.007	170	.994	.001
		Industry	64	3.70	.460	not assumed			.007	151.228	.994	.001
2.8	NQIs activities helps firms to decreased environmental impact	NQI	108	3.60	.723	Assumed	11.003	.001	-1.822	170	.070	-.195
		Industry	64	3.80	.596	not assumed			-1.914	152.500	.057	-.195
2.9	Have you get market advantage by using NQIs services	NQI	108	3.98	.710	Assumed	.001	.975	-3.177	170	.002	-.315
		Industry	64	4.30	.460	not assumed			-3.530	168.571	.001	-.315

Table 4.2.10: NQIs service contribution to the Economic Development (source: Independent sample test 2020)

In Table 4.2.10 we can see for item 2.9 (Have you get market advantage by using NQIs services) the Levene's test for equality of variances has p value of 0.975 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 0.002 which is less than 5% and we do reject the hypothesis of equality of means of the two groups. The two groups also showed that there is significant difference in the idea of getting market advantage by using NQIs services by the two groups. Thus from the analyses Table 4.2.9 it could be seen that the responses from both NQI institutions and industries showed for 'have you get market advantage by using NQIs services', majority(63.9%) of the NQI response is good while in the industry it was (46.9%) who said good.

NQI contributes to the economic development of Ethiopia the Levene's test for equality of variances has p value of 0.711 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 0.761 which is greater than 5% and we do not reject the hypothesis of equality of means of the two groups. The two groups also showed that there is no significant difference in the NQI's contribution to the economic development of Ethiopia by the two groups.

Thus from the analyses Table 4.2.10 it could be seen some responses from both NQI institutions and industries showed that six responses have no significant difference in the hypothesis of equality of means, while three responses have significant difference in the hypothesis of equality of means.

Q3.1NQIs lack sound and focused quality policy and strategy;

Item	Q3.1NQIs lack sound and focused quality policy and strategy		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STD V.
II	NQI response	Freq	5	40	50	13		108	2.66	0.751
		%	4.6	37.0	46.3	12.0		100		
	Industry Response	Freq	7	14	30	9	4	64	2.83	1.017
		%	10.9	21.9	46.9	14.1	6.3	100		

Table 4.3.1 Response for Q3.1

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.3.1 for"NQIs lack sound and focused quality policy and strategy" 90 or (83.3%) of the NQI said neutral and disagree likewise the industry. 13 (20.4%) of the industry agreed and strongly agreed on the lack of quality policy and strategy and 13 (12%) of the NQI agreed for that lack of poliy.4.6 and 10.9 strongly disagreedfor that lack of NQI policy by NQI respondents and industry respondents respectively.

Q3.2 Lack of regulatory capabilities,

Item	Q3.2 Lack of regulatory capabilities,		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STD V.
II	NQI response	Freq	3	13	41	42	9	108	3.38	0.904
		%	2.8	12.0	38.0	38.9	8.3	100		
	Industry Response	Freq	4	9	30	16	5	64	3.14	0.974
		%	6.3	14.1	46.9	25.0	7.8	100		

Table 4.3.2 Response for Q3.2

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.3.2 for'Lack of regulatory capabilities'41 or (38%) of the NQI said neutral and 30 (45.9%) of the industry are neutral about the lack of regulatory capabilities. 51 (47.2%) of the NQI agreed and strongly agreed on the lack regulatory capabilities and 21 (32.8%) of the industry also agreed and strongly agreed on the lack of lack of regulatory capabilities.16 (14.8%)of NQI disagree and strongly disagreed on lack of regulatory capabilities while 13 (20.3%) respondents from industry responded disagree and strongly disagree for the lack. Both NQI and industry are rated average (3.38) and (3.14) respectively.

Q3.3 Lack of implementation of standards

Item	Q3.3Lack of implementation of standards		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STD V.
II	NQI response	Freq	8	44	12	38	6	108	2.91	1.132
		%	7.4	40.7	11.1	35.2	5.6	100		
	Industry Response	Freq	6	12	12	28	6	64	3.25	1.155
		%	9.4	18.8	18.8	43.8	9.4	100		

Table 4.3.3 Response for Q3.3

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.3.3 for'Lack of implementation of standards' the NQI said agree and strongly agree 44 (40%) that the standards are not implemented while that of the industry 34 (43.2%) similarly said standards are not implemented on the ground. On the opposite 52 (40.7%) of NQI said standards are implemented when 18 (28.8%) of the industry responded about the implementations of the standards. On the averageor neutral 11.1% of NQI and 18.8 of industry responded neutral about the implementation of standards, here we can see that that the NQI disagreed (2.91) for lack of implementation of standards, the NQI remain average (3.25) however.

Q3.4 Lack of knowledge management

Item	Q3.4 Lack of knowledge management		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STD V.
II	NQI response	Freq	5	59	6	33	5	108	2.76	1.084
		%	4.6	54.6	5.6	30.6	4.6	100		
	Industry Response	Freq		32	9	23		64	2.86	0.924
		%		50.0	14.1	35.9		100		

Table 4.3.4 Response for Q3.4

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.3.4 for ‘4 Lack of knowledge management’ the NQI said agree and strongly agree 38 (35.2%) while the industry said 23 (25%) disagree on lack of knowledge management (KM) 64 (59.3%) of NQI disagree and strongly disagreed while 32 (50%) of the industry disagreed for lack of KM. 5.6% of NQI and 14.1 of industry remain neutral. The rated means remain disagree with the means 2.76 and 2.86 for NQI and industry respectively.

Q3.5 Lack of understanding of the importance of the NQI services by the firms,

Item	Q3.5 Lack of understanding of the importance of the NQI services by the firms,		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STD V.
II	NQI response	Freq	16	43	16	31	2	108	2.63	1.107
		%	14.8	39.8	14.8	28.7	1.9	100		
	Industry Response	Freq	5	15	13	27	4	64	3.16	1.101
		%	7.8	23.4	20.3	42.2	6.3	100		

Table 4.3.5 Response for Q3.5

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.3.5 for ‘Lack of understanding of the importance of the NQI services by the firms’ the NQI said disagree and strongly disagree 49 (39.8%) while the industry said 20 (23.4%) dis agree and strongly disagree on lack ofunderstanding of the importance of the NQI services by the firms. 33 (30.63%) of NQI agree and strongly agreed while 31 (48.5%) of the industry agreed for the lack of understanding of the importance of NQI services. 14.8% of NQI and20.3% of industry remain neutral. The rated means remain disagree with the means 2.63 and 3.13 which is neutral was rated for the industry.

Q3.6Weak coordination in the implementation of technical regulations among the regulatory agencies and NQI institutions

Item	Q3.6 Weak coordination in the implementation of technical regulations among the regulatory agencies and NQI institutions.		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STD V.
II	NQI response	Freq		13	21	29	45	108	3.98	1.050
		%		12.0	19.4	26.9	41.7	100		
	Industry Response	Freq	3	5	16	19	21	64	3.78	1.133
		%	4.7	7.8	25.0	29.7	32.8	100		

Table 4.3.6 Response for Q3.6

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.3.6 for 'Weak coordination in the implementation of technical regulations among the regulatory agencies and NQI institutions'the NQI said disagree and 13 (12.0%) while the industry said 8 (12.5%) dis agree and strongly disagree on weak coordination of regulatory bodies and NQI. 74 (68.6%) of NQI agree and strongly agreed while 40 (62.5%) of the industry agreed for weak coordination of regulatory and NQI. 19.4% of NQI and 25.0% of industry remain neutral. The rated means remain agree with the respective rated means 3.98 and 3.78of NQI and industry.

Q3.7 Lack of private NQI service providers

Item	Q3.7Lack of private NQI service providers		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STDV.
II	NQI response	Freq		16	16	76		108	3.56	0.740
		%		14.8	14.8	70.4		100		
	Industry Response	Freq	4	7	17	29	7	64	3.44	1.037
		%	6.3	10.9	26.6	45.3	10.9	100		

Table 4.3.7 Response for Q3.7

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.3.7 for 'Lack of private NQI service providers'the NQI said disagree and 16 (14.8%) while the industry said 11 (17.2%) dis agree and strongly disagree on lack of private NQI service providers. 76 (70.4%) of NQI agree while 36 (56.2%) of the industry agreed and strongly agreed for lack of private NQI service providers.14.8 ofNQI and 26.6% of industry remain neutral. The rated means for NQI is agree (3.56) on the lack and rated neutralas the means is 3.44industry.

Q3.8 Lack of consultation on NQI service development with industries

Item	Q3.8 Lack of consultation on NQI service development with industries		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STDV.
II	NQI response	Freq		9	22	77		108	3.63	0.635
		%		8.3	20.4	71.3		100		
	Industry Response	Freq	5	8	16	27	8	64	3.39	1.107
		%	7.8	12.5	25.0	42.2	12.5	100		

Table 4.3.8 Response for Q3.8

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.3.6 for 'Weak coordination in the implementation of technical regulations among the regulatory agencies and NQI institutions'the NQI said disagree and 13 (12.0%) while the industry said 8 (12.5%) dis agree and strongly disagree on weak coordination of regulatory bodies and NQI. 74 (68.6%) of NQI agree and strongly agreed while 40 (62.5%) of the industry agreed for weak coordination of regulatory and NQI. 19.4% of NQI and 25.0% of industry remain neutral. The rated means remain agree with the respective rated means 3.98 and 3.78 of NQI and industry

Q3.9 Lack of resources within the NQI framework

Item	Q3.9 Lack of resources within the NQI framework		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STD V.
II	NQI response	Freq	10	35	29	29	5	108	2.85	1.066
		%	9.3	32.4	26.9	26.9	4.6	100		
	Industry Response	Freq	5	13	20	18	8	64	3.17	1.135
		%	7.8	20.3	31.3	28.1	12.5	100		

Table 4.3.9 Response for Q3.9

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.3.9 for 'Lack of resources within the NQI framework- 45 (41.7%) of the NQI said disagree and strongly disagree while the industry responded 18 (28.1%). 26.9% of the NQI and 31.3% the industry are neutral on the lack of resources with in NQI. 34 (31.5%) of NQI agree and strongly agreed on lack of resources with in NQIwhile 26(40.6%) of the industry agreed and strongly agreed for lack of resources. The rated means for NQI (2.85) is disagree and average (3.17) is by theindustry.

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 d/ce
3.1	NQIs lack sound and focused quality policy and strategy	NQI	108	2.66	.751	assumed	18.625	.000	-.440	170	.660	-.046
		Industry	64	2.70	.460	not assumed			-.495	169.772	.621	-.046
3.2	Lack of regulatory capabilities,	NQI	108	3.39	.624	Assumed	16.183	.000	1.025	170	.307	.092
		Industry	64	3.30	.460	not assumed			1.106	161.863	.270	.092
3.3	Lack of implementation of standards,	NQI	108	2.79	1.051	assumed	12.744	.000	-3.908	170	.000	-.619
		Industry	64	3.41	.921	not assumed			-4.042	146.376	.000	-.619
3.4	Lack of knowledge management	NQI	108	2.76	1.084	Assumed	4.684	.032	-.618	170	.538	-.100
		Industry	64	2.86	.924	not assumed			-.643	149.280	.521	-.100
3.5	Lack of understanding of the importance of the NQI services by the firms,	NQI	108	2.83	.942	Assumed	1.427	.234	-3.887	170	.000	-.573
		Industry	64	3.41	.921	not assumed			-3.910	134.847	.000	-.573
3.6	Weak coordination in the implementation of technical regulations among the regulatory agencies and NQI institutions	NQI	108	3.98	1.050	Assumed	.082	.775	-2.682	170	.008	-.425
		Industry	64	4.41	.921	not assumed			-2.773	146.315	.006	-.425
3.7	Lack of private NQI service providers	NQI	108	3.56	.740	Assumed	2.477	.117	-.892	170	.374	-.101
		Industry	64	3.66	.672	not assumed			-.914	142.780	.362	-.101
3.8	Lack of consultation on NQI service development with industries	NQI	108	3.63	.635	Assumed	5.477	.020	-.808	170	.420	-.073
		Industry	64	3.70	.460	not assumed			-.875	163.096	.383	-.073
3.9	Lack of resources within the NQI framework	NQI	108	2.91	.860	Assumed	6.974	.009	-.473	170	.637	-.061
		Industry	64	2.97	.755	not assumed			-.489	146.147	.626	-.061

Table 4.3.10: Factors affecting the Development NQI in Ethiopia (source: Independent sample test 2020)

In Table 4.3.10 we can see for item 3.7 (Lack of private NQI service providers) the Levene's test for equality of variances has p value of 0.117 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 0.374 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 analyses Table 4.3.7it could be seen that the responses from both NQI institutions and industriesshowed that Lack of private NQI service providers is agree. Or based on the rated mean it is on Average.

Likewise here from the analyses Table 4.3.10 it could be seen some responses from both NQI institutions and industries showed that six responses have no significant difference in the hypothesis of equality of means, while three responses have significant difference in the hypothesis of equality of means between the two groups.

Q4.1There is enabling policy and legal framework for NQIs' to achieve their mission relating to standards and technical regulation;

Item	Q4.1There is enabling policy and legal framework for NQIs' to achieve their mission relating to standards and technical regulation		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STDV.
III	NQI response	Freq		16	28	64		108	3.44	0.740
		%		14.8	25.9	59.3		100		
	Industry Response	Freq	8	12	12	22	10	64	3.22	1.278
		%	12.5	18.8	18.8	34.4	15.5	100		

Table 4.4.1 Response for Q4.1

Source: Data collected by the researcher through Questionnaire, 2020

We can see from Table 4.4.1"There is enabling policy and legal framework for NQIs' to achieve their mission relating to standards and technical regulation"- 64 (59.3%) of NQI said agree while 32 (49.9%) of industry responded agree and strongly agree. 25.9% ofthe NQIrespondents and 18.8.7% of the Industry respondents said neutral.
16 (14.8) of NQI said agree and 20 (31.3%) of the Industry said disagree and strongly disagree for there is enabling policy for NQIs. The overallrated mean is average or neutral (3.44) for NQI and 3.22 for industry.

Q4.2NQI institutions better Collaboration to enhance their functions

Item	Q4.2 NQI institutions better Collaboration to enhance their functions		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STDV.
III	NQI response	Freq		45	9	50	4	108	3.12	1.011
		%		41.7	8.3	46.3	3.7	100		
	Industry Response	Freq	4	25	8	22	5	64	2.98	1.148
		%	6.3	39.1	12.5	34.4	7.8	100		

Table 4.4.2 Response for Q4.2

Source: Data collected by the researcher through Questionnaire, 2020

We can see from Table 4.4.2"NQI institutions better Collaboration to enhance their functions"- 45 (41.7%) of NQI said agree while 32 (49.9%) of industry responded agree and strongly agree. 8.3% ofthe NQIrespondents and 12.5% of the Industry respondents said neutral.
45 (41.7%) of NQI said disagree and 29 (45.3.3%) of the Industry said disagree and strongly disagree for the NQI Collaboration.

The overallrated mean is average or neutral (3.12) for NQI and 2.96 for industry which is dis agree.

Q4.3 NQI institutions giveTrainings regularly to increase competences to their personnel

Item	Q4.3NQI institutions give trainings regularly to increase competences to their personnel		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STDV.
III	NQI response	Freq		45	13	50		108	3.05	0.941
		%		41.7	12.0	46.3		100		
	Industry Response	Freq	1	25	4	25	9	64	3.25	1.168
		%	1.6	39.1	6.3	39.1	14.1	100		

Table 4.I Response for Q4.3

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.4.2 for "NQI institutions give trainings regularly to increase competences to their personnel" shows as–50 (46.3%) said agree while 34 (53.2%) of industry responded agree and strongly agree. 12.0% of the NQI respondents and 6.3% of the Industry respondents said neutral. 45 (41.7%) of NQI said disagree and 26 (40.7%) of the Industry said disagree and strongly disagree for the NQI Collaboration.

The overall rated mean is average or neutral (3.12) for NQI and 2.96 for industry which is dis agree.

Q4.4 Quality Awareness on the population raised

Item	Q4.4 Quality Awareness on the population raised		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STD V.
III	NQI response	Freq	9	19	37	35	8	108	3.13	1.060
		%	8.3	17.6	34.3	32.4	7.4	100		
	Industry Response	Freq	4	7	27	16	10	64	3.33	1.070
		%	6.3	10.9	42.2	25.0	15.6	100		

Table 4.4.4 Response for Q4.4

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.4.4 for "Quality Awareness on the population raised" shows as–43 (39.8%) said agree and strongly agree while 26(40.6%) of industry responded agree and strongly agree. 34.3% of the NQI respondents and 27% of the Industry respondents said neutral.
28 (25.9%) of NQI said disagree and strongly disagree while 11 (17.2%) of the Industry said disagree and strongly disagree for the awareness raised on the population.

The overall rated mean is average or neutral (3.13) for NQI and 3.33 for industry.

Q4.5Awareness on quality among enterprises raised

Item	Q4.5 Awareness on quality among enterprises raised		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STDV.
III	NQI response	Freq	7	20	16	58	7	108	3.35	1.062
		%	6.5	18.5	14.8	53.7	6.5	100		
	Industry Response	Freq	2	13	6	36	7	64	3.52	1.039
		%	3.1	20.3	9.4	56.3	10.9	100		

Table 4.4.5 Response for Q4.5

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.4.5 for "Awareness on quality among enterprises raised" shows as–65 (60.2%) said agree and strongly agree while 43(66.2%) of industry responded agree and strongly agree. 14.83% of the NQI respondents and 9.4% of the Industry respondents said neutral.
27 (25%) of NQI said disagree and strongly disagree while 15(23.4%) of the Industry said disagree and strongly disagree for the awareness raised on the population.

The overall rated mean is average or neutral (3.35) for NQI and 3.52 for industry which neutral..

Q4.6Quality institutions gaining international recognition

Item	Q4.6Quality institutions gaining international recognition		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STDV.
III	NQI response	Freq	7	15	23	56	7	108	3.38	1.021
		%	6.5	13.9	21.3	51.9	6.5	100		
	Industry Response	Freq	4	8	12	34	6	64	3.47	1.038
		%	6.3	12.5	18.8	53.1	9.4	100		

Table 4.4.6 Response for Q4.6

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.4.6 for "Quality institutions gaining international recognition" shows as– 63 (58.4%) said agree and strongly agree while 40 (62.5.2%) of industry responded agree and strongly agree. 23 (21.3%) of the NQI respondents and 12 (18.8%) of the Industry respondents said neutral.
The disagreement went on 22 (20.4%) NQI said disagree and strongly disagree while 12(18.84%) of the Industry said disagree and strongly disagree for NQIs getting international recognition.

The overall rated mean is average or neutral (3.35) for NQI and 3.52 for industry which neutral.

Q4.7Number of customers for NQI services is increased

Item	Q4.7Number of customers forNQI services is increased		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STD V.
III	NQI response	Freq	9	5	89	5		108	3.83	0.634
		%	8.3	4.6	82.4	4.6		100		
	Industry Response	Freq	2	4	9	43	6	64	3.73	0.84
		%	3.1	6.2	14.1	67.2	9.4	100		

Table 4.4.7 Response for Q4.7

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.4.7 for "Number of customers forNQI services is increased" shows as– 5 (4.6%) said agree and while 49 (76.6%) of industry responded agree and strongly agree.
89 (82.43%) of the NQI respondents and 9 (14.1%) of the Industry respondents said neutral.
The disagreement went on 14 (12.9%) NQI said disagree and strongly disagree while 6(9.4%) of the Industry said disagree and strongly disagree for NQIs number of customers increased.The overall rated mean is agree (3.83) for NQI and 3.73 for industry

Q4.8NQI Collaboration with other similar regional/ international Quality institutions increased

Item	Q4.8NQI Collaboration with other similar regional/ international Quality institutions increased		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STD V.
III	NQI response	Freq		15	25	68		108	3.49	0.730
		%		13.9	23.1	63.0		100		
	Industry Response	Freq	3	6	20	32	3	64	3.41	0.904
		%	4.7	9.4	31.3	50.0	4.7	100		

Table 4.4.8 Response for Q4.8

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.4.8 for "Collaboration with other similar regional/ international Quality institutions increased" shows as– 68 (63%) said agree and while 35 (54.7%) of industry responded agree and strongly agree.
25 (23.1%) of the NQI respondents and 20 (31.3%) of the Industry respondents said neutral.
The disagreement went on 15 (13.9%) NQI said disagree while 9(14.1%) of the Industry said disagree and strongly disagree for NQIs international collaboration increased. The overall rated mean is average (3.49) for NQI and 3.41 for industry.

Q4.9There is an increased access to quality infrastructure

Item	Q4.9There is an increased access to quality infrastructure		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Total	Mean	STD V.
III	NQI response	Freq		14	47	30	17	108	3.46	0.911
		%		13.0	43.5	27.8	15.7	100		
	Industry Response	Freq	9	10	28	8	9	64	2.97	1.195
		%	14.1	15.6	43.8	12.5	14.1	100		

Table 4.4.9 Response for Q4.9

Source: Data collected by the researcher through Questionnaire, 2020

Table 4.4.9 for "There is an increased access to quality infrastructure" shows as– 47 (43.5%) said agree and strongly agree while 17 (26.6%) of industry responded agree and strongly agree.

47 (43.5%) of the NQI respondents and 28 (43.8%) of the Industry respondents said neutral. The disagreement went on 14 (13.0%) NQI said disagree while 19(29.7%) of the Industry said disagree and strongly disagree for NQIs increased access to quality infrastructure.

The overall rated mean is average (3.46) for NQI and poor 2.97 for industry.

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 d/ce
4.1	There is enabling policy and legal framework for NQIs' to achieve their mission relating to standards and technical regulation	NQI	108	3.44	.740	assumed	.753	.387	2.209	170	.029	.257
		Industry	64	3.19	.732	not assumed			2.216	133.648	.028	.257
4.2	NQI institutions better Collaboration to enhance their functions	NQI	108	3.12	1.011	Assumed	4.811	.030	3.411	170	.001	.527
		Industry	64	2.59	.921	not assumed			3.494	142.392	.001	.527
4.3	NQI institutions give trainings regularly to increase competences to their personnel	NQI	108	3.05	.941	Assumed	.816	.368	3.073	170	.002	.453
		Industry	64	2.59	.921	not assumed			3.090	134.717	.002	.453
4.4	Quality Awareness on the population raised	NQI	108	3.19	.712	assumed	10.458	.001	-1.122	170	.263	-.112
		Industry	64	3.30	.460	not assumed			-1.248	168.665	.214	-.112
4.5	Awareness on quality among enterprises raised	NQI	108	3.60	.723	Assumed	2.258	.135	-1.037	170	.301	-.117
		Industry	64	3.72	.701	not assumed			-1.045	135.696	.298	-.117
4.6	Quality institutions gaining international recognition	NQI	108	3.56	.714	Assumed	32.475	.000	-2.553	170	.012	-.248
		Industry	64	3.81	.393	not assumed			-2.932	169.265	.004	-.248
4.7	Number of customers forNQI services is increased	NQI	108	3.83	.634	Assumed	36.814	.000	-2.101	170	.037	-.167
		Industry	64	4.00	.000	not assumed			-2.732	107.000	.007	-.167
4.8	NQI Collaboration with other similar regional/ international Quality institutions increased	NQI	108	3.49	.730	Assumed	23.152	.000	-2.093	170	.038	-.212
		Industry	64	3.70	.460	Not assumed			-2.339	169.290	.021	-.212
4.9	There is an increased access to quality infrastructure	NQI	108	3.46	.911	Assumed	.045	.832	-.926	170	.356	-.131
		Industry	64	3.59	.868	not assumed			-.938	137.639	.350	-.131

Table 4.4.10 Extent of NQI achievement (source: Independent sample test 2020)

In Table 4.4.10 we can see for item 4.9 (There is an increased access to quality infrastructure) the Levene's test for equality of variances has p value of 0.832 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 0.356 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 and from the analyses Table 4.4.9 it could be seen that the responses from both NQI institutions and industries for there is an increased access to quality infrastructure showed no significant difference between them and majority of both respondents either disagree or neutral on the response.

For (Number of customers for NQI services is increased) the Levene's test for equality of variances has p value of 0.000 which is less than 5%. Thus we do reject the equal variances assumed row and consequently, we refer to the result in the 'Equal variances not assumed' row. The p-value is 0.007 which is less than 5% and we do reject the hypothesis of equality of means of the two groups. The two groups also showed (table 4.4.7) that there is a significant difference in the response, majority of NQI are neutral while the Industry agreed in an increase of services in NQI, based on the rated mean and mean indicated that both respondents generally agree on the increment of customers.

Interview

20 management and senior technical persons were interviewed. Ten participants from NQI and ten participants from industry were selected to participate on the interview.Those selected both from National Quality Infrastructure Institutions and customer industries are those who directly participate on the quality Related areas.

All the NQI interviewee agreed about the positive impact NQI has on the economic development of the country while on the industry 10% complained that NQI especially on the regulated products is becoming an obstacle due to service delays. Of course 9 or 90% of the industry said that NQI although has to improve on service delivery has positive impact on their economy and generally on the country.Likewise all the 20 (100%) have agreed that there is no an intended negative impact of NQI except some of the time delays due to Certified Reference Materials (CRM) and Proficiency Testing (PT) in the NQI and the resulted delay on the industry for delaying delivery time to market.

8 or 80% the NQI interviewee responded NQI has the role in technology transfer and usage that standards has to lead the technology transfer since standardization comes just after innovation for market deliverability. Although standards are said to be "Locked technology', it has to encourage technology transfer as expected to be. The transfer of standard to technology to process technology then to testing technology and the metrological procedure to realize measurement to a prototype has to be led well. However; conformity assessment and metrology uses latest scientific equipment and standard procedure methods that help technology transfer and usage. In addition accreditation has by definition to know all these new technologies to formally recognize them. 3 or 30% of the industry said that NQI is not properly leading technology transfer and usage as simple as that there is not accessibility to standards outside the capital and enough training and consultation, as well as calibration and testing facilities. 7 or 70% of the industry agreed that the NQI is leading technology transfer and usage.

For the interviewee "What should NQI do to improve its services?" has discussed good points like comprehensive need assessment has to be made together with all the stake holders and the standards agency has to implement proactivelydespite the costs incurred was suggested. A well communicated and implemented standard and a capacitated and competent professional in the NQI can deliver good services to all the industry in collaboration with private NQIs and with all the stake holders. 5 or 50% of the Industry also suggested for coherence in the NQIs when performing regulation and conformity assessment services that they are fade up with repetitive audits by different regulatory bodies coming separately.

Half of the NQI suggested that the collaboration and coherence of NQI institutions need to be improved apart from the physical presence in the compound. The coherence should be institutional not depended on the relationships of the mangers leading the institutions. Half

(50%) of them agreed that NQI is going well and good. In addition all the NQI respondents said that there needs to be a grand Quality Policy as a nation which they reminded that it is underway.

Document Review

I have reviewed documents in 2009 and 2019 for comparison purpose including the manpower involved in NQI services.

	QSAE before 2010 (2009)	NQI after 2010 (2019)	Remark
ESA	• 7000 standards • No. of trainings is not known (NK) • No. of mandated is NK	• 12000 standards • Trainings NK • 256 standards Mandated	Subjected to exclusive test/inspection/certification by Confor. Assess Bodies
NMIE	• Calibration • scopes • accredited service	• Calibration • scopes • 4– accred service scientific, 2 industrial	Some are given to regional bureau but was not effective
ECAE	• Test • Inspection • Certification	• (24,170) services • Tests 15,541 • Inspections 7,603 • Certification 1,026 • Accredited service lab 38, inspection 3 scopes certification 13	The number of accreditation when counted with methods is more than this figure.
ENAO	Not known (NK)	• testing lab 29 with38 scopes • Inspection-12 with 35 scopes • Medical – 53 with 74 scopes • Calibration lab- 1 • Certification not yet	Was not even in team level during QSAE time some are now with drawn
Total	220	600+	increased later but there are

Personnel			turnover of employee

Table 4.4 Secondary data (Source 2019 ministry of Trade and Industry report on NQI)

Export of Fruits, Vegetables and Tannery

Items	QSAE (before 2010) (2009)	NQI/ after 2010 (2017)	Remark
Fruits and Vegetables	Not known	$546 million 119 exporters	*
Textile and garment	Not known	$ 74.68 million 210 manufacturers exporters	*
Honey	Not known	$ 1.42 million	• 62nd globally
Total Personnel	250	600+	

Table 4.5 (Source 2019 ministry of Trade and Industry report on NQI)

*Needs Assessment for Industry and Private NQI Service Providers (Reference No. ET-MOST-105555-CS-CQS

Import commodities 2020 (Source 2019/20 ministry of Trade and Industry annual import and export goods quality control directorate report)

		Inspection requests		Inspection Performance			
				Inspection work		Quality Parameters	
	Type of product	Insp no.	Mass (MT)	Completed	In progress	Fulfilled	Not Fulfilled
1	Food Items	3937	1193584.42	3937		3930	7
2	Fruits and Vegetables	43	2854.03	43		43	
3	Drinks (Beverages/Alcohols)	35	6625.472	35	0	35	0
4	Chemical Products	878	51507.709	878	0	873	5
5	Construction Materials	1891	772559.54	1891	0	1891	11
6	Electrical Materials	565	13673.719	565	0	565	6
7	Stationaries	348	27975.466	348	0	348	0
8	Solar energy materials	115	11649.776	115	0	109	6
9	Water pumps	84	5774.906	84	0	81	3
10	Fiber products and leather	115	3637.58	115	0	115	0
11	Other non-Ethi. Standards	2039	9899.8186	2039		2039	
11	**Total**	**10,285**	**2,099,742.44**	**8053**	**0**	**8015**	**38**

Table 4.6 Import commodities 2020

Export commodities 2020 (Source 2019/20 ministry of Trade and Industry import and export goods quality control directorate report)

		Inspection requests		Inspection Performance			
				Inspection work		Quality Parameters	
	Type of product	Insp no.	Mass (MT)	Completed	In progress	Fulfilled	Not Fulfilled
1	Oil seeds	2231	370568.43	2231		2231	
2	Cereals and pulses	1609	234681.43	1609		1609	
3	Factory products	142	12942.45	142		142	
4	Drinks (Beverages/Alcohols)	44	838.85	44		44	
5	Fruits and Vegetables	726	23688.375	726		726	
6	Textile Fabrics	17	738.39	17		17	
7	Hide and skin	10	291.19	10		10	
	Total	**4779**	**643,749.515**	**4779**		**4779**	

Table 4.7 Export commodities 2020

Table 4.6 and table 4.7 show the total imported and exported products respectively which are mandated to be regulated. In 2019/20 budget year a total of 2,099,742.44 metric tons (MT) of imported products are technically inspected and tested to make sure whether they comply for their quality parameters or not by 8053 completed inspection works. 38 inspections didn't comply the deserved parameters.

4779 inspections of mandated exported items of oil seeds, cereals and pulses, textiles and leather and fruits and vegetables are done for a total mass of 643,749.515 metric tons.

Chapter Five: Summary, Conclusions and Recommendations

This chapter includes the summary, the conclusion and the recommendations from the study.

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

5.1 Summary

The major findings of the study were to assess the impacts of NQI on Economic Development and factors affecting the impact of Ethiopian NQIs based on the summary of the analyzed NQIs and Industries data of the rated mean, the interview and from the document review.

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- All the NQI respondents in the interview responded NQI has positive impact when properly implemented while the 10% of the industry respondents have a complain due to the service delays and all agreed there is a time delay due to Certified Reference Materials (CRM) and Proficiency Testing (PT) in the NQI and the resulted delay on the industry for delaying delivery time to market

- From the data it is observed that there is an increase in number of requests in NQI services, number of employees in the area, emergence of the accreditation body (ENAO) as part of the NQI was evident.

- 8 or 80% the NQI interviewee responded NQI has the role in technology transfer and usage that standards has to lead the technology transfer since standardization comes just after innovation for market deliverability.

- Half (50%) of NQI interviewee agreed that NQI is going well and good. In addition all the NQI respondents said that there needs to be a grand Quality Policy as a nation which they reminded that it is underway.

- From the document review private NQI service providers are seen emerging but capacity building for the competency of services delivered and fulfillment of accreditation requirement is observed a way forward.

- Based on the rated mean the "NQI give awareness and training on quality and standards" the NQI responded medium or average while the industry responded poor. 56.3% of the industry responded very poor, poor and medium added up together while for the NQIs was 40.3%.

- 77.8% of NQI and 50% of Industry responded good for the NQIs contribution to the economic development of Ethiopia. Based on the rated mean also both respondents said 'good' for the contribution. Both the NQIs and the industry have agreed on the importance of NQI for the economic development.

- Both NQI and the Industry has rated medium/average based on the rated mean for "NQI give technical support and consultancy, calibration, testing and the implementation of standards"

- Based on the rated mean both NQI and Industry responded on average for the support by NQI establishing one's own test and calibration laboratories for comparison or internal quality systems.

- 'NQI activities help firms to decreased environmental impact' was responded at average by both the respondents of the NQI and the Industry.

- NQIs lack sound and focused quality policy and strategy- 46.3% of NQI and 46.9% of Industry responded neutral on 'NQIs lack sound and focused quality policy and strategy'. Both NQI and Industry also agreed that there is lack of focused quality policy and strategy also have agreed that the Quality policy is poor based on the rated mean. On the interview of the NQI managers, they indicated that the Quality policy as a nation is on draft process.

- 76.9% and 71.9% of NQI and Industry responded neutral and agree on 'Lack of regulatory capabilities'. This indicates a gap on the regulation part. Therefore there need to be a strong and capable regulatory body. The regulatory bodies are scattered in different ministries which makes it difficult to manage and do their responsibilities coherently.

- More than 50% of the respondents of both the NQI and the Industry are either neutral or agree on lack of implementation of standards. It is clear that the 12,000 standards that are in the catalogue of the Ethiopian Standards Agency are not is accessible throughout the

country. This is because standard Documents are to be sold while there are no branches for ESA.

- More than 60% of both NQI and Industry have agreed that there is Weak coordination in the implementation of technical regulations among the regulatory agencies and NQI institutions.

- Based on the rated mean the NQI agreed that there is 'lack of private NQI service providers' when the Industry is neutral about it.

- Both the NQI and the Industry has agreed on the Number of customers for NQI services is increased based on the rated mean. The interview of the managers from MoTI import and export goods quality control directorate has proved that there is 15-20% by mass every year which requests to have more NQI services for inspection, testing, calibration, standardization and technical regulation and accreditation services.

- Based on the rated mean 'NQI Collaboration with other similar regional/ international Quality institutions' was on average.

- Based on the overall rated mean for 'there is an increased access to quality infrastructure' the NQI responded on average while the industry said poor for the same question on the interview was added access to QI in the regions specifically was even worse to get the service.

Achievements of NQI

- They are clearly established with their own respective duties and responsibilities by a regulation numbers after benchmarks are seen from some other countries. The head offices (headquarters) of the Quality Institutions are in one compound.
- The NQIs have their own facility and staff members who are eager to learn and know more about NQI, and are taking trainings and academics both nationally and internationally.
- Based on the rated mean majority of both respondents said 'good' for the contribution of the NQIs. The NQI and the industry have agreed on the importance of NQI for the economic development.

5.2 Conclusion

This sub section deals with the conclusions that arise from the results of the data analyzed and empirical exploration conducted to know the impact of NQIs in Ethiopia. These conclusions have contributions in identifying, understanding and improving the current situation of the National Quality Infrastructure activities. From the results of the study obtained, the following can be concluded:

The output showed us that there is a need for awareness about quality and standards but not given as required especially in the industry respondents. Therefore, several awareness creation programs have to be arranged coherently by NQI institutions via main stream media, by printing media and digital media including the websites of the NQIs to improve the awareness about NQI services their roles, duties and responsibilities. The scope the NQI services, their head offices, branches and representative offices should be accessible and well known.

Majority of both the NQIs and the industry respondents have agreed on the importance of NQI for the economic development as well as for the safety of their health when they consume different types of products. On the interview it was observed also that there is a complaint and dissatisfaction by the accessibility of Testing Laboratories, Calibration, and Standard document availabilities by the industry. Therefore, NQIs have to be improved in service and expanded for accessibility.

The support by NQI for establishing one's own test and calibration laboratories for comparison or internal quality systems has to be increased. This support helps to fulfill accreditation requirement or certification criteria for manufacturers as part of internal system. It is through internal quality systems that NQI or Industry becomes strong with reputable performance. This shows that there need to be done more in the area of calibration and auditing for internal quality control.

The regulatory bodies lack capabilities ESA has well developed and adopted over 12,000 standards, these standards are in the shelf of ESA though. The Ethiopian Standards Agency did not make these standards available throughout the country. This is because standard Documents are to be sold and be controlled for revision purposes while there are no branches for ESA outside the capital Addis Ababa. So there should be cooperation in disseminating and implementing standards with responsible stakeholders in all the regions of the country with frequent follow ups for an update. Therefore this can be solved by using information communication technology (ICT) system so that standards can be sold through ESA's websites as the same time can be checked for the latest version via the websites. In regions the accessibility can be reached by opening or outsourcing the sale can be a short term solution until the ICT system is developed.

To regulate technical regulation, as it is seen in the study 76.9% and 71.9% of NQI and Industry responded neutral and agree on 'Lack of regulatory capabilities'. This indicates a gap on the

regulatory part. Therefore there need to be a strong and capable regulatory body. The regulatory bodies are scattered in different ministries which makes it difficult to manage and to do their responsibilities coherently. Often products are regulated and tested many times by different regulatory bodies leading to excessive cost and time delays.

The NQI institutions have to work in collaboration in all corners of the country among themselves and with the regulatory bodies. Therefore comprehensive Quality Policy frame work has to be prepared to gather the different regulatory bodies and NQI institutions work cooperatively in the long run. But for the short term there must be frequent discussions and workshops as who has to do what coherently.

The NQI will be successful when there are also private NQI providers. Based on the study it is seen that there is an agreement on 'lack of private NQI service providers' when the Industry is neutral about it. Therefore the private NQIs have to be increased both in quality services and in distribution of their scopes in different parts of the country since NQI services are usually done by subcontracts or out sourcing's for one another.

There is an increase in the kind and amount of demand of services in testing, calibration and standards. Both the NQI and the Industry has agreed on the Number of customers for NQI services is increased based on the rated mean. The interview of the managers from MoTI import and export goods quality control directorate has also proved that there is an annual increase of 15-20% of regulated products by mass every year, which demands to have more NQI services for inspection, testing, calibration, standardization and technical regulation and accreditation services.

The NQI as can be seen in Diagram 2 and 3 in chapter two has to participate with similar regional/ international quality institutions collaboration. This study revealed that 'NQI Collaboration with other similar regional/ international quality institution was on average indicating for more collaboration by NQIs for a better delivery of quality service regionally and globally,

Provided that the NQIs importance is agreed and the regulated products are increasing from year to year while there is poor or average access to QI based on the rated mean. Therefore more QI has to be extended in the country more specifically outside the capital.

NQIs have to collaborate to achieve Quality services so that the coherence of these institutions will have significant role on the overall economic development and wellbeing of the society.

5.3 Recommendations

The impact of NQI on economic Development as seen on the research is visible. The role of NQI in trade facilitation, customer increment, innovation as well as technology transfer and usage is important. So NQI is important and should be strengthened to answer the increasing demand for import and export products. NQI has to be done in collaboration with private NQI companies and the internal collaboration within NQI institutions should be strengthened, Like wise NQI institutions has to be increased outside the Capital city, Addis Ababa both in quality and quantity of service deliveries.

It is evident that the role of NQI institutions in the economic development, social responsibility innovation and technology transfer and usage is positive. In order to benefit from these NQI institutions, the NQIs need to understand that the level of their role and responsibility in the overall global trade partnership and how quality institution systems work internationally. Thus the NQIs require a clear policy and strategy and also a committed leadership to use competent professionals to apply their knowledge and skills.

To increase the competence of persons there must be several training and persons' certification facilities such as persons' certification team in ECAE and CoC (Certificate of Competence) issuing bodies to facilitate and demonstrate the appropriate qualification, training, skill and experience to do specific tasks competently. Here the NQIs have to cooperate with stakeholders to work jointly for the capability and competence of personnel.

The regulatory bodies lack capabilities moreover scattered in different ministries and bureaus leading to repetitive and costly work to regulate mandatory standards. Often products are regulated and tested many times by different regulatory bodies leading to excessive cost and time delays. Therefore there need to be an organized and capable regulatory body which can manage and lead the TR coherently.

The over 12,000 standards developed and adopted by ESA are well established, but the standards are not used and implemented as required to be. Although it is known that standards are controlled documents for an update and are sold, the Ethiopian Standards Agency has to make these standards available throughout the country by itself or in collaboration with either of the NQI institution branch offices who have access to the nearby beneficiaries.

The output of the study dictates that there should be a continuous public awareness program in the concepts of standards, quality, metrology and accreditation. Therefore, several awareness creation programs have to be arranged coherently by NQI institutions via main stream media, by printing media and digital media. Moreover the websites of the NQIs has to be improved. The NQI's services, their roles, duties and responsibilities, the scopes of their services, their head offices, branches and representative offices should be accessible and well known by different means of advertisement

The general concepts of the NQI will be successful when there are also competent and collaborated private NQI providers. Therefore the private NQIs have to be increased both in quality and scope of services and in accessible way of distribution. This will benefit all the NQI and Industry in all parts of the country since NQI services are usually done by subcontracts or out sourcing's of services for one another.

Generally like any other infrastructures (the road and telecom) the National Quality Infrastructure needs great attention to produce and deliver Quality products and services. These quality products and services are always subjected to comparisons with other countries products and services in the highly globalized world market to win the competition.

From this study, implications for future research works will be:

I) When it is clear and evident that the NQI are important for the wellbeing of the society and economic development of a country, social awareness is important as part of the NQI policy and strategy.
So how aware is the public on Quality and standard issues and how they select quality products and services one from the other must be studied. As I get information from the interview of the NQI institutions top management that there is no comprehensive general quality policy and strategy as a country so far, so in depth study is needed to make "quality policy and strategy as a nation".

II) There are over 12,000 standards in the Ethiopian Standards Agency but there is a limited understanding and usage of these standards and even accessibility to these standards. Here also needs to be studied about the dissemination of these standards for innovation and technology transfer. So, here needs to be studied as "Ethiopian standards and their practical implementation on the ground for market competitiveness and technology transfer".

III) The NQI is a broad discipline including standardization, metrology, conformity assessment and accreditation and of course an organized regulatory body. So it will be broad to study all together at the same time that it has to be studied fine for each institution. For example the "How conformity assessment body with laboratory testing, inspection and certification can help market competitiveness?" can be an area of a big focus for a study.

IV) Since most of the NQI are centered in the capital city, the accessibility of NQI services on the borders of Ethiopia becomes difficult at least against time until results are received from the capital. So for import and export purposes on the borders can be studied as "access of NQI on special trade corridors (dry ports) of the country" can be studied.

V) Since measurement is a big science which is important in every manufacturing and conformity assessment body with a wide range calibration scope services, this area need to have many qualified persons with abundant resources and facilities, branches, mobile calibration trucks …etc. to fill the demands raised from day to day economic activities. So here "number of calibration demands (requests) and the responses against scope and timely delivery" can be an area of interest for a study.

VI) Since all public demands cannot be addressed by governmental institutions only, the private sector has to participate in this area. So "the contribution and market share of indigenous private NQI institutions on the development of NQI" can be studied.

VII) Similar research as this study can be done with different specific "impacts on social, environmental" or "impact of NQI on import and export" or "on manufacturing industry" or "on Small and Medium sized Enterprises" etc…

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ANNEX-A

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

Dear Respondents:

This questionnaire is designed to collect information regarding to the **Impact of the Ethiopian National Quality Infrastructure institutions on the economic development of the country.** 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:
RewayMadeboManaTel:- +251 920722079 or E-mail;- rewaykumenahaftu@gmail.com
Thank you in advance for your cooperation and timely response!

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

1.1. Your Sex:

Male		Female	

1.2. Your Educational Status:

Diploma (10+2 or 12 Complete)		First Degree		Second Degree and above	

Other please specify _____

1.3 Your work type

NQIs		INDUSTRY	

1.4 Your work area

AA		Outside AA	

1.5. Which level are you belonging in your organization?

Officer/ Expert		Chief Officer/Expert		Quality Manager /Supervisor/		DG/DDG General manager/deputy		Others	

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

0-5		6-10		11-15		>15	

Part Two: Please indicate your answers by circling the number in the box.
To what extent do the services provided by NQIs contribute to Economic development of Ethiopia in general and performance of the industries and able to assist them in product and process quality?
The services provided here are rated as Very Poor = 1, Poor = 2, Neither Poor Nor Good = 3, Good = 4 and Very Good = 5. Please Circle against your rating.

No.	Statement	Rating				
2.1	NQI give awareness and training on quality and standards	1	2	3	4	5
2.2	NQI has contributes to the economic development of Ethiopia	1	2	3	4	5
2.3	NQI give technical support and consultancy, calibration, testing and the implementation of standards;	1	2	3	4	5
2.4	NQI encourage you to promote the use of technologies in the industry	1	2	3	4	5
2.5	NQI support your industry in establishing your own test and calibration laboratories for comparison or internal quality control	1	2	3	4	5
2.6	NQIs activities enhanced firms produce quality products and services	1	2	3	4	5
2.7	NQIs activities supported to enhance firm'ssafety and health	1	2	3	4	5
2.8	NQIs activities helps firms to decreased environmental impact	1	2	3	4	5
2.9	Have you get market advantage by using NQIs services	1	2	3	4	5

Part Three:

What are the factors affecting the development of NQIs in Ethiopia?

Please read each statement carefully and 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 = Neutral 4 = Agree 5 = Strongly Agree

No.	Statement	Rating				
3.1	NQIs lack sound and focused quality policy and strategy,	1	2	3	4	5
3.2	Lack of regulatory capabilities,	1	2	3	4	5
3.3	Lack of implementation of standards,	1	2	3	4	5
3.4	Lack of knowledge management,	1	2	3	4	5
3.5	Lack of understanding of the importance of the NQI services by the firms,	1	2	3	4	5
3.6	Weak coordination in the implementation of technical regulations among the regulatory agencies and NQI institutions.	1	2	3	4	5
3.7	Lack of private NQI service providers	1	2	3	4	5
3.8	Lack of consultation on NQI service development with industries	1	2	3	4	5
3.9	Lack of resources within the NQI framework,	1	2	3	4	5

4. To what extent do that the NQIs achieve their expected outcome?

Please rate the following statement according to 1-strongly disagree, 2-disagree, 3-slightly disagree, 4-agree, 5-strongly agree.

No.	Statement					
4.1	There is enabling policy and legal framework for NQIs' to achieve their mission relating to standards and technical regulation	1	2	3	4	5
4.2	NQI institutions better Collaboration to enhance their functions	1	2	3	4	5
4.3	NQI institutions give Trainings regularly to increase competences to their personnel	1	2	3	4	5
4.4	Quality Awareness on the population raised	1	2	3	4	5
4.5	Awareness on quality among enterprises raised	1	2	3	4	5
4.6	Quality institutions gaining international recognition	1	2	3	4	5
4.7	Number of customers for NQI services is increased	1	2	3	4	5
4.8	NQI Collaboration with other similar regional/ international Quality institutions increased	1	2	3	4	5
4.9	There is an increased access to quality infrastructure	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) Can we say NQI has positive impacts in Ethiopian Economy? How ?

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2) Have there been any unintended / negative impacts that can be attributed to the NQI?

---

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

---

4) What shouldNQI do to improve its service?
Which NQI institution needs to be improved specifically to address need of the industry?

---

5) Do NQI Institutions work in collaborationharmonically?

Thank you for giving your precious time!

ANNEX-C

Action Plan and Budget Allocation

Action Plan

Time Schedule for the research

The time schedule to conduct this research will be seen in detail in the following table.

No.	Activities	Nov	Dec	Remarks in month																							
				Jan				Feb				Mar				Apr				May				Jun			
1	Proposal Writing																										
2	Deadline for submitting final research proposal																										
3	Submitting data collection instruments																										
4	Data Collection																										
5	Writing analysis and interpretation of results, conclusions and recommendations																										
7	Submission 1st draft																										
8	Writing the final version of the research report																										
9	Submitting the final research paper																										
10	Thesis defense																										
11	Submitting final version of the paper																										

Budget

The budget for this study is fully to be covered by myself i.e. self-sponsored. So it is planned to minimize the cost as much as possible with total of 82,000 ETB. Also I have planned to hire two data collectors. The following table shows the Budget breakdown of the activities.

s.no	Activities	Cost in Birr	Remark
1	Stationary cost	4,000	
2	Secretarial cost	10,000	
3	Duplicating questionnaires	3,000	
4	Per-diems	15,000	
5	Training for data collectors	5,000	
6	Transportation& Hotel accommodation	30,000	Includes Air transport
7	Others	15,000	
Total		82,000	

ANNEX-D

```
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Q2.9_market Q3.1_policy Q3.2_regulatory Q3.3_standards_implem Q3.4_KM
Q3.5_Importance Q3.6_coordination Q3.7_private Q3.8_consultation
Q3.9_resources Q4.1_enable_policy Q4.2_inst_collabration Q4.3_Trainings
Q4.4_awared_population Q4.5_awared_enterprise Q4.6_recognition
Q4.7_no_of_customer Q4.8_peer_collaboration Q4.9_Access_NQI
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  /ORDER=ANALYSIS.
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Frequencies

Notes

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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data.

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	Elapsed Time	00:00:00.02

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	NQI give awareness and training on quality and standards	NQI has contributes to the economic development of Ethiopia	NQI give technical support and consultancy, calibration, testing and the implementation of standards;	NQI encourage you to promote the use of technologies in the industry	NQI support you industry in establishing you own test and calibration laboratories fo comparison or internal quality control

N	Valid	108	108	108	108	
	Missing	0	0	0	0	
Mean		3.43	3.80	3.46	3.74	3
Std. Deviation		.939	.592	1.018	.602	.

Frequency Table

NQI give awareness and training on quality and standards

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	6	5.6	5.6	5.6
	poor	11	10.2	10.2	15.7
	neither poor nor good	27	25.0	25.0	40.7
	good	59	54.6	54.6	95.4
	very good	5	4.6	4.6	100.0
	Total	108	100.0	100.0	

NQI has contributes to the economic development of Ethiopia

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	6	5.6	5.6	5.6
	neither poor nor good	14	13.0	13.0	18.5
	good	84	77.8	77.8	96.3
	very good	4	3.7	3.7	100.0
	Total	108	100.0	100.0	

NQI give technical support and consultancy, calibration, testing and the implementation of standards;

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	8	7.4	7.4	7.4
	poor	7	6.5	6.5	13.9
	neither poor nor good	31	28.7	28.7	42.6
	good	51	47.2	47.2	89.8
	very good	11	10.2	10.2	100.0
	Total	108	100.0	100.0	

NQI encourage you to promote the use of technologies in the industry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	5	4.6	4.6	4.6
	neither poor nor good	22	20.4	20.4	25.0
	good	77	71.3	71.3	96.3
	very good	4	3.7	3.7	100.0
	Total	108	100.0	100.0	

NQI support your industry in establishing your own test and calibration laboratories for comparison or internal quality control

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	5	4.6	4.6	4.6
	neither poor nor good	51	47.2	47.2	51.9
	good	52	48.1	48.1	100.0
	Total	108	100.0	100.0	

NQIs activities enhanced firms produce quality products and services

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	neither poor nor good	17	15.7	15.7	15.7
	good	86	79.6	79.6	95.4
	very good	5	4.6	4.6	100.0
	Total	108	100.0	100.0	

NQIs activities supported to enhance firm'ssafety and health

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	7	6.5	6.5	6.5
	poor	12	11.1	11.1	17.6
	neither poor nor good	22	20.4	20.4	38.0
	good	61	56.5	56.5	94.4
	very good	6	5.6	5.6	100.0
	Total	108	100.0	100.0	

NQIs activities helps firms to decreased environmental impact

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	5	4.6	4.6	4.6
	poor	21	19.4	19.4	24.1
	neither poor nor good	20	18.5	18.5	42.6
	good	58	53.7	53.7	96.3
	very good	4	3.7	3.7	100.0
	Total	108	100.0	100.0	

Have you get market advantage by using NQIs services

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	5	4.6	4.6	4.6
	neither poor nor good	13	12.0	12.0	16.7
	good	69	63.9	63.9	80.6
	very good	21	19.4	19.4	100.0
	Total	108	100.0	100.0	

NQIs lack sound and focused quality policy and strategy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	5	4.6	4.6	4.6
	disagree	40	37.0	37.0	41.7
	neutral	50	46.3	46.3	88.0
	Agree	13	12.0	12.0	100.0
	Total	108	100.0	100.0	

Lack of regulatory capabilities,

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	3	2.8	2.8	2.8
	disagree	13	12.0	12.0	14.8
	neutral	41	38.0	38.0	52.8
	Agree	42	38.9	38.9	91.7
	Strongly agree	9	8.3	8.3	100.0
	Total	108	100.0	100.0	

Lack of implementation of standards,

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	8	7.4	7.4	7.4
	disagree	44	40.7	40.7	48.1
	neutral	12	11.1	11.1	59.3
	Agree	38	35.2	35.2	94.4
	Strongly agree	6	5.6	5.6	100.0
	Total	108	100.0	100.0	

Lack of knowledge management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	5	4.6	4.6	4.6
	disagree	59	54.6	54.6	59.3
	neutral	6	5.6	5.6	64.8
	Agree	33	30.6	30.6	95.4
	Strongly agree	5	4.6	4.6	100.0
	Total	108	100.0	100.0	

Lack of understanding of the importance of the NQI services by the firms,

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	16	14.8	14.8	14.8
	disagree	43	39.8	39.8	54.6
	neutral	16	14.8	14.8	69.4
	Agree	31	28.7	28.7	98.1
	Strongly agree	2	1.9	1.9	100.0
	Total	108	100.0	100.0	

Weak coordination in the implementation of technical regulations among the regulatory agencies and NQI institutions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	13	12.0	12.0	12.0
	neutral	21	19.4	19.4	31.5
	Agree	29	26.9	26.9	58.3
	Strongly agree	45	41.7	41.7	100.0
	Total	108	100.0	100.0	

Lack of private NQI service providers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	16	14.8	14.8	14.8
	neutral	16	14.8	14.8	29.6
	Agree	76	70.4	70.4	100.0
	Total	108	100.0	100.0	

Lack of consultation on NQI service development with industries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	9	8.3	8.3	8.3
	neutral	22	20.4	20.4	28.7
	Agree	77	71.3	71.3	100.0
	Total	108	100.0	100.0	

Lack of resources within the NQI framework

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	10	9.3	9.3	9.3
	disagree	35	32.4	32.4	41.7
	neutral	29	26.9	26.9	68.5
	Agree	29	26.9	26.9	95.4
	Strongly agree	5	4.6	4.6	100.0
	Total	108	100.0	100.0	

There is enabling policy and legal framework for NQIs' to achieve their mission relating to standards and technical regulation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	16	14.8	14.8	14.8
	neutral	28	25.9	25.9	40.7
	Agree	64	59.3	59.3	100.0
	Total	108	100.0	100.0	

NQI institutions better Collaboration to enhance their functions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	45	41.7	41.7	41.7
	neutral	9	8.3	8.3	50.0
	Agree	50	46.3	46.3	96.3
	Strongly agree	4	3.7	3.7	100.0
	Total	108	100.0	100.0	

NQI institutions giveTrainings regularly to increase competences to their personnel

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	45	41.7	41.7	41.7
	neutral	13	12.0	12.0	53.7
	Agree	50	46.3	46.3	100.0
	Total	108	100.0	100.0	

Quality Awareness on the population raised

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	9	8.3	8.3	8.3
	disagree	19	17.6	17.6	25.9
	neutral	37	34.3	34.3	60.2
	Agree	35	32.4	32.4	92.6
	Strongly agree	8	7.4	7.4	100.0
	Total	108	100.0	100.0	

Awareness on quality among enterprises raised

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	7	6.5	6.5	6.5
	disagree	20	18.5	18.5	25.0
	neutral	16	14.8	14.8	39.8
	Agree	58	53.7	53.7	93.5
	Strongly agree	7	6.5	6.5	100.0
	Total	108	100.0	100.0	

Quality institutions gaining international recognition

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	7	6.5	6.5	6.5
	disagree	15	13.9	13.9	20.4
	neutral	23	21.3	21.3	41.7
	Agree	56	51.9	51.9	93.5
	Strongly agree	7	6.5	6.5	100.0
	Total	108	100.0	100.0	

Number of customers forNQI services is increased

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	9	8.3	8.3	8.3
	neutral	5	4.6	4.6	13.0
	Agree	89	82.4	82.4	95.4
	Strongly agree	5	4.6	4.6	100.0
	Total	108	100.0	100.0	

NQI Collaboration with other similar regional/ international Quality institutions increased

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	15	13.9	13.9	13.9
	neutral	25	23.1	23.1	37.0
	Agree	68	63.0	63.0	100.0
	Total	108	100.0	100.0	

There is an increased access to quality infrastructure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	14	13.0	13.0	13.0
	neutral	47	43.5	43.5	56.5
	Agree	30	27.8	27.8	84.3
	Strongly agree	17	15.7	15.7	100.0
	Total	108	100.0	100.0	

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Q2.9_market Q3.1_policy Q3.2_regulatory Q3.3_standards_implem Q3.4_KM
Q3.5_Importance Q3.6_coordination Q3.7_private Q3.8_consultation
Q3.9_resources Q4.1_enable_policy Q4.2_inst_collabration Q4.3_Trainings
Q4.4_awared_population Q4.5_awared_enterprise Q4.6_recognition
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Frequencies

Notes

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	NQI give awareness and training on quality and standards	NQI has contributes to the economic development of Ethiopia	NQI support your industry in establishing your own test and calibration laboratories for comparison or internal quality control	NQI give technical support and consultancy, calibration, testing and the implementation of standards;	NQI encourage y to promote the u of technologies the industry

N	Valid	64	64	64	64	
	Missing	0	0	0	0	
Mean		2.95	3.67	3.20	3.16	3
Std. Deviation		1.147	1.070	.979	1.211	.

Frequency Table

NQI give awareness and training on quality and standards

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	12	18.8	18.8	18.8
	poor	7	10.9	10.9	29.7
	neither poor nor good	17	26.6	26.6	56.3
	good	28	43.8	43.8	100.0
	Total	64	100.0	100.0	

NQI has contributes to the economic development of Ethiopia

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	4	6.3	6.3	6.3
	poor	5	7.8	7.8	14.1
	neither poor nor good	11	17.2	17.2	31.3
	good	32	50.0	50.0	81.3
	very good	12	18.8	18.8	100.0
	Total	64	100.0	100.0	

NQI support your industry in establishing your own test and calibration laboratories for comparison or internal quality control

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	5	7.8	7.8	7.8
	poor	7	10.9	10.9	18.8
	neither poor nor good	25	39.1	39.1	57.8
	good	24	37.5	37.5	95.3
	very good	3	4.7	4.7	100.0
	Total	64	100.0	100.0	

NQI give technical support and consultancy, calibration, testing and the implementation of standards;

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	7	10.9	10.9	10.9
	poor	17	26.6	26.6	37.5
	neither poor nor good	3	4.7	4.7	42.2
	good	33	51.6	51.6	93.8
	very good	4	6.3	6.3	100.0
	Total	64	100.0	100.0	

NQI encourage you to promote the use of technologies in the industry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	3	4.7	4.7	4.7
	poor	7	10.9	10.9	15.6
	neither poor nor good	18	28.1	28.1	43.8
	good	32	50.0	50.0	93.8
	very good	4	6.3	6.3	100.0
	Total	64	100.0	100.0	

NQIs activities enhanced firms produce quality products and services

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	3	4.7	4.7	4.7
	poor	8	12.5	12.5	17.2
	neither poor nor good	16	25.0	25.0	42.2
	good	29	45.3	45.3	87.5
	very good	8	12.5	12.5	100.0
	Total	64	100.0	100.0	

NQIs activities supported to enhance firm'ssafety and health

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	1	1.6	1.6	1.6
	poor	6	9.4	9.4	10.9
	neither poor nor good	17	26.6	26.6	37.5
	good	35	54.7	54.7	92.2
	very good	5	7.8	7.8	100.0
	Total	64	100.0	100.0	

NQIs activities helps firms to decreased environmental impact

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	2	3.1	3.1	3.1
	poor	12	18.8	18.8	21.9
	neither poor nor good	9	14.1	14.1	35.9
	good	34	53.1	53.1	89.1
	very good	7	10.9	10.9	100.0
	Total	64	100.0	100.0	

Have you get market advantage by using NQIs services

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	3	4.7	4.7	4.7
	poor	4	6.3	6.3	10.9
	neither poor nor good	9	14.1	14.1	25.0
	good	30	46.9	46.9	71.9
	very good	18	28.1	28.1	100.0
	Total	64	100.0	100.0	

NQIs lack sound and focused quality policy and strategy

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	7	10.9	10.9	10.9
	disagree	14	21.9	21.9	32.8
	neutral	30	46.9	46.9	79.7
	Agree	9	14.1	14.1	93.8
	Strongly agree	4	6.3	6.3	100.0
	Total	64	100.0	100.0	

Lack of regulatory capabilities,

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	4	6.3	6.3	6.3
	disagree	9	14.1	14.1	20.3
	neutral	30	46.9	46.9	67.2
	Agree	16	25.0	25.0	92.2
	Strongly agree	5	7.8	7.8	100.0
	Total	64	100.0	100.0	

Lack of implementation of standards,

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	6	9.4	9.4	9.4
	disagree	12	18.8	18.8	28.1
	neutral	12	18.8	18.8	46.9
	Agree	28	43.8	43.8	90.6
	Strongly agree	6	9.4	9.4	100.0
	Total	64	100.0	100.0	

Lack of knowledge management

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	disagree	32	50.0	50.0	50.0
	neutral	9	14.1	14.1	64.1
	Agree	23	35.9	35.9	100.0
	Total	64	100.0	100.0	

Lack of understanding of the importance of the NQI services by the firms,

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	5	7.8	7.8	7.8
	disagree	15	23.4	23.4	31.3
	neutral	13	20.3	20.3	51.6
	Agree	27	42.2	42.2	93.8
	Strongly agree	4	6.3	6.3	100.0
	Total	64	100.0	100.0	

Weak coordination in the implementation of technical regulations among the regulatory agencies and NQI institutions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	3	4.7	4.7	4.7
	disagree	5	7.8	7.8	12.5
	neutral	16	25.0	25.0	37.5
	Agree	19	29.7	29.7	67.2
	Strongly agree	21	32.8	32.8	100.0
	Total	64	100.0	100.0	

Lack of private NQI service providers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	4	6.3	6.3	6.3
	disagree	7	10.9	10.9	17.2
	neutral	17	26.6	26.6	43.8
	Agree	29	45.3	45.3	89.1
	Strongly agree	7	10.9	10.9	100.0
	Total	64	100.0	100.0	

Lack of consultation on NQI service development with industries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	5	7.8	7.8	7.8
	disagree	8	12.5	12.5	20.3
	neutral	16	25.0	25.0	45.3
	Agree	27	42.2	42.2	87.5
	Strongly agree	8	12.5	12.5	100.0
	Total	64	100.0	100.0	

Lack of resources within the NQI framework

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	5	7.8	7.8	7.8
	disagree	13	20.3	20.3	28.1
	neutral	20	31.3	31.3	59.4
	Agree	18	28.1	28.1	87.5
	Strongly agree	8	12.5	12.5	100.0
	Total	64	100.0	100.0	

There is enabling policy and legal framework for NQIs' to achieve their mission relating to standards and technical regulation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	8	12.5	12.5	12.5
	disagree	12	18.8	18.8	31.3
	neutral	12	18.8	18.8	50.0
	Agree	22	34.4	34.4	84.4
	Strongly agree	10	15.6	15.6	100.0
	Total	64	100.0	100.0	

NQI institutions better Collaboration to enhance their functions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	4	6.3	6.3	6.3
	disagree	25	39.1	39.1	45.3
	neutral	8	12.5	12.5	57.8
	Agree	22	34.4	34.4	92.2
	Strongly agree	5	7.8	7.8	100.0
	Total	64	100.0	100.0	

NQI institutions giveTrainings regularly to increase competences to their personnel

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	1	1.6	1.6	1.6
	disagree	25	39.1	39.1	40.6
	neutral	4	6.3	6.3	46.9
	Agree	25	39.1	39.1	85.9
	Strongly agree	9	14.1	14.1	100.0
	Total	64	100.0	100.0	

Quality Awareness on the population raised

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	4	6.3	6.3	6.3
	disagree	7	10.9	10.9	17.2
	neutral	27	42.2	42.2	59.4
	Agree	16	25.0	25.0	84.4
	Strongly agree	10	15.6	15.6	100.0
	Total	64	100.0	100.0	

Awareness on quality among enterprises raised

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	2	3.1	3.1	3.1
	disagree	13	20.3	20.3	23.4
	neutral	6	9.4	9.4	32.8
	Agree	36	56.3	56.3	89.1
	Strongly agree	7	10.9	10.9	100.0
	Total	64	100.0	100.0	

Quality institutions gaining international recognition

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	4	6.3	6.3	6.3
	disagree	8	12.5	12.5	18.8
	neutral	12	18.8	18.8	37.5
	Agree	34	53.1	53.1	90.6
	Strongly agree	6	9.4	9.4	100.0
	Total	64	100.0	100.0	

Number of customers forNQI services is increased

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	2	3.1	3.1	3.1
	disagree	4	6.3	6.3	9.4
	neutral	9	14.1	14.1	23.4
	Agree	43	67.2	67.2	90.6
	Strongly agree	6	9.4	9.4	100.0
	Total	64	100.0	100.0	

NQI Collaboration with other similar regional/ international Quality institutions increased

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	3	4.7	4.7	4.7
	disagree	6	9.4	9.4	14.1
	neutral	20	31.3	31.3	45.3
	Agree	32	50.0	50.0	95.3
	Strongly agree	3	4.7	4.7	100.0
	Total	64	100.0	100.0	

There is an increased access to quality infrastructure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	9	14.1	14.1	14.1
	disagree	10	15.6	15.6	29.7
	neutral	28	43.8	43.8	73.4
	Agree	8	12.5	12.5	85.9
	Strongly agree	9	14.1	14.1	100.0
	Total	64	100.0	100.0	

Frequencies

Notes

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Statistics

		Sex	Educational status	Work type	job position	service year in the organizatio	Work Area
N	Valid	108	108	108	108	108	108
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Frequency Table

Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	21	19.4	19.4	19.4
	Male	87	80.6	80.6	100.0
	Total	108	100.0	100.0	

Educational status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1st degree	101	93.5	93.5	93.5
	2nd degree and above	7	6.5	6.5	100.0
	Total	108	100.0	100.0	

Work type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NQI	108	100.0	100.0	100.0

job position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Officer/expert	76	70.4	70.4	70.4
	chief officer (chief expert)	24	22.2	22.2	92.6
	Superviser(QM)	6	5.6	5.6	98.1
	DG (DDG)	2	1.9	1.9	100.0
	Total	108	100.0	100.0	

service year in the organizatio

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5	85	78.7	78.7	78.7
	6-10	17	15.7	15.7	94.4
	11-15	5	4.6	4.6	99.1
	>15	1	.9	.9	100.0
	Total	108	100.0	100.0	

Work Area

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	AA	92	85.2	85.2	85.2
	Out side AA	16	14.8	14.8	100.0
	Total	108	100.0	100.0	

Source: Minstry of Trade (MoTI) Import and Export Quality control Authority

የኢንስፔክሽንሥራክንውን

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						የኢንስፔ. ስራ		የጥራትመስፈርት				
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5	የግንባታመሳሪያዎች		518352	1891	772559.54	1891	0	1891	11	1879	1256487.73	
6	የኤሌክትሪክዕቃዎች		47578	565	13673.719	565	0	565	6	565	69127.12	
7	የፅሕፈትመሳሪያዎች		18777	348	27975.466	348	0	348	0	348	42957.6	
8	የሶላርምርቶች		5787	115	11649.776	115	0	109	6	115	14195.6	
9	የዉሃፓምፕ		7471	84	5774.906	84	0	81	3	84	10368.96	
10	ክርእናየክርዉጤቶችእናቆዳ			115	3637.58	115	0	115	0	115	14195.6	
11	ሌሎችአስገዳጅደረጃየሌላቸው			2039	9899.8186	2039		2039		2039	246139.31	
11	ጠቅላላድምር	0	1955000	10,285	2,099,742.44	8053	0	8607	52	8032	2,252,818.58	145.07

ሰንጠረዥ 2.በወጪምርትጥራትቁጥጥርየተደረገዉየኢንስፔክሽንየስራክንዉን

ተቁ	የምርትዓይነት	እቅድ		የቀረበየኢንስፔ. ስራጥያቄ		የኢንስፔ. ክንውን				የተሰበሰበየኢንስፔ. እናየሕተመትአገልግሎትክፈያ		ክንውን በመቶኛ በሜ. ቶን
						የኢንስፔ. ስራ		የጥራትመስፈርት				
		ማመልከቻ	በሜ.ቶን	በቁጥር	በሜ.ቶን	የተጠናቀቀ	ያላጠናቀቀ	ያሟላ	ያላሟላ	ያጠናቀቀ	መጠንበብር	
1	የቅባትእህሎች		400628	2231	370568.43	2231		2231		2231	3419052.93	
2	ጥረጥሬ		280000	1609	234681.43	1609		1609		1609	1845702.58	
3	የፋብሪካምርቶች			142	12942.45	142		142		142	864.08	
4	መጠጥ (ለስላሳ/አልኮል)			44	838.85	44		44		44	3990.12	
5	አትክለትእናፍራፍሬ			726	23688.375	726		726		726	101694.11	
6	የጥጥፈትል			17	738.39	17		17		17	1012.31	
7	ቆዳእናሌጦ			10	291.19	10		10		10	400.68	
	ጠቅላላድምር			4779	643749.515	4779		4779		4779	5,372,716.81	