



Shu-Te University
College of Informatics
Graduate School of Information Management

Master

Impact of Service Quality on Standard ISO/IEC 17025
Implement Process of Test Laboratories in Vietnam

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June 2011

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A Thesis
Submitted to the
Graduate School of Information Management
College of Informatics
Shu-Te University
In Partial Fulfillment of the Requirements
For the Degree of
Master of Science in
Information Management

June 2011

Shu-Te University Authorization Document of Thesis

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Thesis Title: Impact of Service Quality on Standard ISO/IEC 17025 Implement Process of Test Laboratories in Vietnam

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Impact of Service Quality on Standard ISO/IEC 17025 Implement
Process of Test Laboratories in Vietnam

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Abstract

Standard ISO/IEC 17025 has been applied in many Testing laboratories in Vietnam as well as in Laboratories worldwide for the past years. This study aimed at assessing the impact of implementation to ISO/IEC 17025 in testing laboratories in Vietnam.

Thus, the very aim of this study is to investigate the impact of ISO/IEC 17025 application on testing performance, or simply stated, how the application of ISO/IEC 17025 can influence the internal staff and the company's partner as well as external customers about the company's identity, customers' satisfaction and their loyalty to the company.

One of the key factors leading to the success implementation of Standard ISO/IEC 17025 is the internal human resources, equipment. Thus, the very aim of this study is to investigate the impact of Standard ISO/IEC 17025 application on testing performance, or simply stated, how the application of Standard ISO/IEC 17025 can influence the internal staff and the company's partner as well as external customers about the company's identity, customers' satisfaction and their loyalty to the company. Besides, the thesis closely looks into the impact of Standard ISO/IEC 17025 on the testing performance of testing service, especially with a focus on the service quality of implementation. In this thesis, a sample model has been developed and suggested by conducting a survey questionnaires on employees, among 120 Testing laboratories in Vietnam, and their employees performing tests.

Keywords: Impact, Service quality, Test Laboratories ISO/ IEC 17025 Standard, QMS, leadership, Employee participation, process control and improvement

Abbreviations

ISO International Organization for Standardization

WTO World Trade Organization

IEC Electro technical Commission

AALA American Association of Laboratory Accreditation

CAEAL Canadian Association for Environmental Analytical Laboratories

EA European co-operation for Accreditation

EU European Union

FAO Food and Agricultural Organization

GATT General Agreement on Tariffs and Trade

IAF International Accreditation Forum

IEC International Electro technical Commission

ILAC International Laboratory Accreditation Corporation

ISO International Organization for Standardization

NA Norwegian Accreditation

NATA National Association Testing Authorities

SWEDAC Swedish Board for Accreditation and Conformity Assessment

TAEC Technical Assistance to Enhance Competitiveness

Acknowledgment

During the conduct of my thesis, I would like to give my warmly thank to Advisors : Dr. Hsing-Ya Chang and Dr. Nguyen Huu Chau. The advisors help me with detailed guidance and instruction so that I can complete my research. I would like to take this opportunity to express my gratitude to all those who have helped and support me during my MIS course and study.

First of all, I would like to express my deepest gratitude to my advisor, Prof. Hsing-Ya Chang and Dr. Nguyen Huu Chau for their generous guidance and patience to me during the period of my thesis writing. Their inspiring advices are extremely essential and valuable for me to finish my thesis. All of them are really knowledgeable, professional and nice to me anytime, any situation. I feel very lucky and deeply appreciate them to give me this opportunity of being their student, friend.

I would also like to show my sincere gratitude to all the professors as well as faculty members in Department of Information Management for being my friends, my Supporters during the time I studied in Vietnam with their instructions.

Special thanks to my lovely Family, friends, my colleagues who working at QUATEST1, officers who helped me so much to finalize the questionnaires, giving good suggestions and advices for my thesis.

**Bui Thi Huong
Shu-Te University
2011, June**

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Chapter 1 Introduction

This chapter gives an overview of the importance of service quality on ISO/IEC 17025 implement process of test Laboratories in Vietnam and explains the need to implement a management system according to the ISO/IEC 17025 standard. The aim of this research has been defined, as well as the structure of the remaining chapters.

The International Organization for Standardization (ISO) and the International Electro technical Commission (IEC) are two standard setting bodies working together to develop international standards. ISO/IEC 17025, General Requirements for the Competence of Testing and Calibration Laboratories, is one among the standards developed jointly by these institutions applicable only to testing and calibration laboratories, to assess their competence.

1.1 Research Background

ISO/IEC17025 Standard "General Requirements for the Competence of Testing and Calibration Laboratories" is the result of cooperation between International Organization for Standardization (ISO) and International Electro technical Commission(IEC) was published in ISO on December, 1999. Standard ISO/ IEC 17025 include 15 clauses for management (as ISO 9001:2008). ISO/IEC 17025 is "Management system" refers to the organization's structure for managing its processes - or activities - that transform inputs of resources into a product or service which meet the organization's objectives, such as satisfying the customer's quality requirements, complying with regulations, or meeting environmental objectives.

ISO 9001 is a generic management standard that can be applied to any business enterprise, public administration, or government department.

Growth in the use of quality management standard generally has increased the need to ensure that laboratories can operate to a quality management system that is seen as compliant with ISO 9001 as well as demonstrating technical competency. Therefore, ISO



17025 was written to incorporate all the ISO 9001 requirements that are relevant to the scope of testing and calibration services as well as specifying the technical requirements for technical competence.

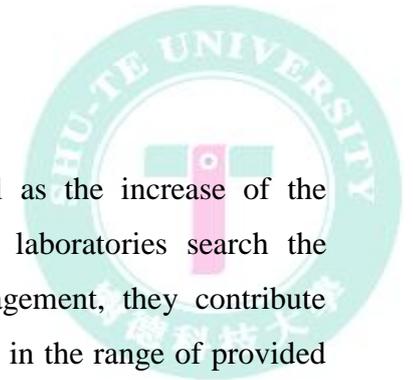
Testing and calibration laboratories that comply with ISO 17025 will also operate in accordance with ISO 9001.

For laboratories, understanding measurement uncertainty is key. Laboratories carry out testing, calibration or both. Testing relies upon a measurement system using calibrated equipment to determine characteristics in relation to a target. Measurement uncertainty is quantified as the observed process variance attributed to the measuring system. The measuring system is the combined effort of controls, resources, information and material used to assign values to measured characteristics.

A measuring system is part of an organizations overall management system, and for laboratories, the measuring system is often the most significant part of that system. Laboratories develop, implement and continually improve their process-based management systems to ensure they understand, quantify, control and continually improve the quality delivered by their measuring processes.

ISO/IEC 17025 has been developed and agreed as the international laboratory management system standard. This standard recognizes the importance of how competent individuals contribute to controlling measurement uncertainty through their interaction with measuring equipment. ISO/IEC 17025 provides a framework of good management practices for laboratories performing testing and calibration, but conforming to the standard does not guarantee operational excellence. The best laboratories in the world not only seek accreditation to ISO/IEC 17025, they also develop their process-based management systems to ensure continual process improvement.

One of the factors deciding about the competitive advantage of the research laboratories on the market is the quality of the delivered services, which influences directly on the success of these organizations (T. Karkoszka, D. Szewieczek, 20 (2007) 539-542, (M.Skovic 19(2006) 96-102; (J.Michalska 21(2007) 91-94; T.Karkoszka 1/3(2007) 306-319.



Qualitative demands, sharply rising competition as well as the increase of the expectations concerning the technical competences make the laboratories search the different solutions in the range of the improvement of management, they contribute significantly to seek for the new ways of confirming the abilities in the range of provided services, as well (B. Krupinska, D. Szewieczek, L.A. Dobrzanski 28/12 (2007) 751-756; (T. Karkoszka, 24 (2007) 207-210; (M. Dudek-Burlikowska 20 (2007) 531-534; (L.A. Dobrzański 24 (2007) 223-226.

ISO/IEC 17025 specifies the general requirements for the competence to carry out tests and/or calibrations, including sampling. It covers testing and calibration performed using standard methods, non-standard methods, and laboratory-developed methods.

It is applicable to all organizations performing tests and/or calibrations. These include, for example, first-, second- and third-party laboratories, and laboratories where testing and/or calibration forms part of inspection and product certification.

ISO/IEC 17025 is applicable to all laboratories regardless of the number of personnel or the extent of the scope of testing and/or calibration activities. When a laboratory does not undertake one or more of the activities covered by ISO/IEC 17025, such as sampling and the design/development of new methods, the requirements of those clauses do not apply.

ISO/IEC 17025 is for use by laboratories in developing their management system for quality, administrative and technical operations. Laboratory customers, regulatory authorities and accreditation bodies may also use it in confirming or recognizing the competence of laboratories. ISO/IEC 17025 is not intended to be used as the basis for certification of laboratories.

Compliance with regulatory and safety requirements on the operation of laboratories is not covered by ISO/IEC 17025.

1.2 Statement of Problem

This study aimed to understand more about the impact of ISO/IEC 17025 practices are factors: support from the leadership, the relationship people in the QUATEST1, improve and control processes, ISO/IEC 17025 impact on Testing service are: quality service.



Therefore, this study was developed from previous studies and additional research into the practice of ISO/IEC 17025, but in the field of testing service. This study considered the hypothesis based on a sample of retail companies operating in the field of testing in Vietnam

1.3 Research Motive

In recent years, the demand for applying quality management system is necessary for Testing laboratories in Vietnam according to standard ISO/IEC 17025.

Having access to more contracts for testing and/or calibration. Some public and private organizations only give contracts to accredited laboratories. Implementation QMS will also help to get more contracts from organizations that don't mandate accreditation, but do give preference to accredited laboratories in competitive situations.

Improved national and global reputation and image of the laboratory.

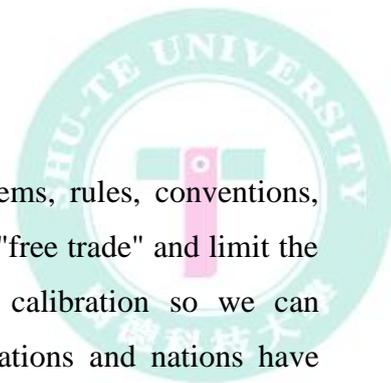
Continually improving data quality and laboratory effectiveness.

Having a basis for most other quality systems related to laboratories, such as Good Manufacturing Practices and Good Laboratory Practices.

Aim: "A Certification/ testing, and inspection certificates are accepted worldwide" should strive to become the testing laboratories and calibration are recognized as capable as a cent ISO/IEC17025 inevitable direction for the organization.

The application of ISO/IEC17025 standard will help the organization to have the opportunity to focus all resources for capacity building, confirming the reliability of results measurement/testing. Results of measurements/testing laboratories and calibration has been recognized by the State to recognize the legality of Article 16 of Chapter III of Decree 179/2004/ND-CP issued by Government in last date 21/10/2004: "Test results, expertise, quality certification of products, goods and quality management systems of organizations testing, inspection and certification of the corresponding priority used as legal documents in management activities, product quality, domestic goods and trade relations with foreign countries.

Over the last 20 years Vietnam has changed its economic system in the direction of openness and integration, to actively attract investment and increase exports. To regulate the "flow" AFTA and actively in the "background ground" WTO, Vietnam needs to



understand and skillfully apply "rules", which are specific systems, rules, conventions, international agreements, in order to exploit the positive effect of "free trade" and limit the negative effects. This encompasses activities in testing and calibration so we can participate in a forum where all people irrespective of organizations and nations have rights and obligations in equal measure.

With the main market share of quality service, our organization's strategies are ensuring service quality to hold the customer and develop the market to make competitive advantages.

Therefore, we have innovated and applied Quality Management System in our Testing fields according to ISO17025. This research is carried out with the aim of assessing the effect of implementing ISO17025 on service quality in the activity of the company and finishing my own course.

This study will also be helpful to assess the views of employees involved in the management system based on ISO/IEC 17025. Therefore, findings are expected to contribute towards improving staff motivation and the management system.

Furthermore, this research will identify potential obstacles to the implementation and maintenance of implementation to ISO/IEC 17025. Recommendations will be proposed to address these constraints.

1.4 Research Purpose

In brief, through extensive literature review, important role for successful ISO/IEC 17025 practices impact performance of Laboratories and services, many studies have found the impact of ISO/IEC 17025 practices in services sector but no studies investigating the impact of ISO/IEC 17025 practices in the field of Testing services in Vietnam, so the purpose of this study was concluded as follows:

- Assessing the impact of ISO/IEC 17025 practices on service quality in the field of Testing in Labs in Vietnam.
- Assessing the impact of ISO/IEC 17025 practices on service quality in testing field in particular: the factor test Leadership, Staff's participation, Process Control and Improvement impact on service quality in the Laboratories in Vietnam.

Questions:



What are the impacts of implementing ISO/IEC 17025 successfully in Testing Labs?
Why have laboratories sought implementation to ISO/IEC 17025?

1.5 Thesis structure

Chapter I is a study about issues related to the impact of Quality service on Standard ISO/IEC 17025 related to research context. The keywords about Standard ISO 17025 have been defined in chapter II. Chapter III is focused on research methods and research framework for the study. The analysis of survey data and results are presented in chapter IV. Conclusions related to research findings, progress, limitations and future work are presented in chapter V. References are given in Chapter VI.

This chapter has introduced the impact on quality service of ISO/IEC 17025. The significance of the study and the research questions has been outlined. The next chapter will address in-depth research on relevant literatures on impact of quality of service resulting from ISO/IEC 17025. Data will be analyzed by using SPSS software.

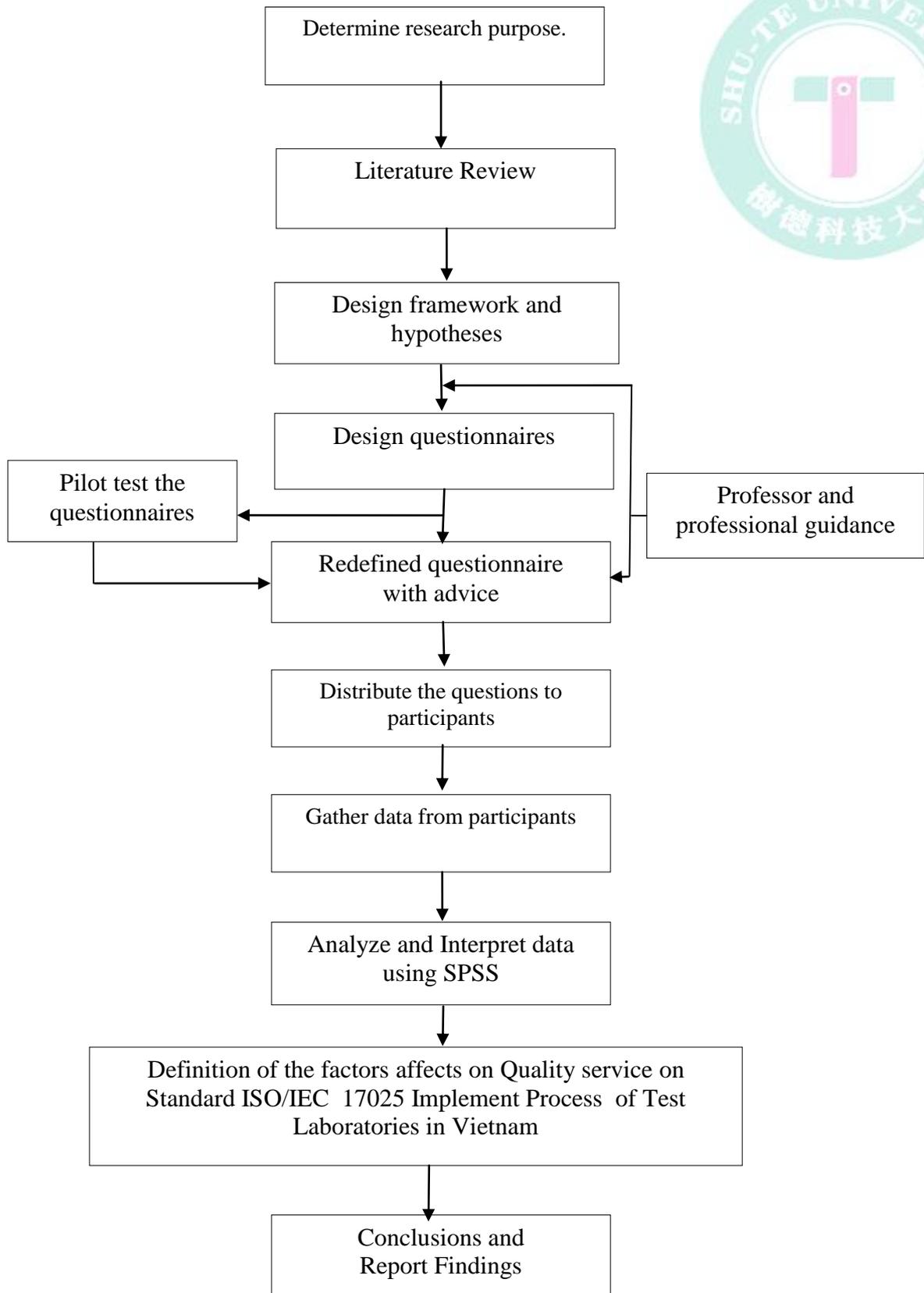


Figure 1. Thesis structure



Chapter 2 Literature Review

In the chapter 1 we have given the general introduction about this research. In this chapter, we will introduce concepts as well as definitions of through the results of the researchers well-known in the world. This chapter includes the following parts:

1. Overview of Quality Management System
2. ISO 17025 Success Factors
3. Main Benefits of Correctly Implemented ISO/IEC 17025
4. History and status of ISO/IEC 17025
5. Definition of Quality Management System
6. The role of implementing ISO/IEC 17025 in Testing laboratories
7. The key factors of implementing ISO/IEC 17025.

2.1 Overview of Quality Management System

ISO 17025 is one of the most popular quality standards for all laboratories; whether or not they do business with international customers.

ISO/IEC 17025 is the global quality standard for testing and calibration laboratories. It is the basis for accreditation from an accreditation body. The current release was published in 2005.

There are two main clauses in ISO/IEC 17025 – Management Requirements and Technical Requirements. Management requirements are related to the operation and effectiveness of the quality management system within the laboratory, and this clause has similar requirements to ISO 9001. Technical requirements address the competence of staff; testing methodology; equipment and quality; and reporting of test and calibration results.

In 1891, British physicist Lord Kelvin wrote, “When you can measure what you are speaking about, and express it in numbers, you know something about it.” Mikel Harry, a noted Six Sigma authority, extends this thought as, “We don't know what we don't know; we can't act on what we don't know; we won't know until we search; we won't search for what we don't question; we don't question what we don't measure”. Both imply that if you



failed to quantify the results of what you were doing, in a way, it means that you might not understand what you were really doing.

Hence, organizations that are unable to track their processes, their products, or their raw materials are unable to fully manage their businesses.

All other quality initiatives (eg. ISO 9001, QS-9001, TS-16949, Six Sigma, TQM, DOE, QFD, etc.) depend on reliable measurements, comparisons, and recommendations based on International Standards.

ISO 17025 controls all aspects of how laboratories conduct their business (ie. who, what, when, where, how, how much, & why) of measurement, testing, certifying, recommending, & reporting.

ISO/IEC 17025 has been developed and agreed as the international laboratory quality management system standard. This standard recognizes the importance of how competent individuals contribute to controlling measurement uncertainty through their interaction with measuring equipment. ISO/IEC 17025 provides a framework of good quality management practices for laboratories performing testing and calibration, but conforming to the standard does not guarantee operational excellence. The best laboratories in the world not only seek accreditation to ISO/IEC 17025, they also develop their process-based management systems to ensure continual process improvement.

ISO International Competition is one of the common law of market economy. Depending on the specific conditions of enterprises using the "weapons" of competition such as quality, price, delivery time, services and sales promotion activities as a basis for survival and development.

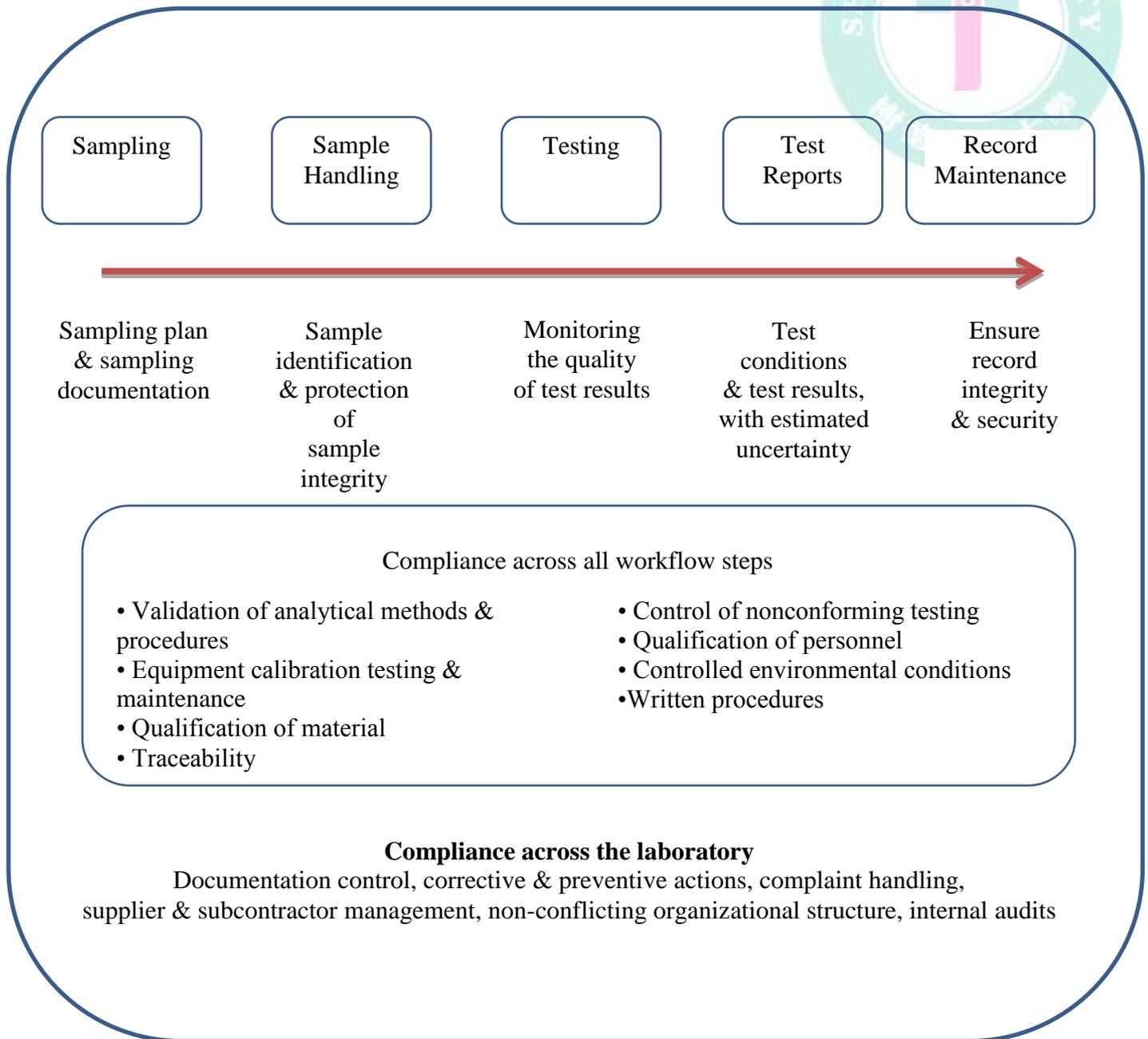


Figure 2. ISO/IEC 17025 Requirements for Testing Laboratories



2.2 ISO 17025 Success Factors

Research into what makes a ISO 17025 implementation a success has revealed 11 Critical Success Factors. They are, in order of importance:

Top management leadership & commitment

A simple, comprehensive implementation plan

Training & support for everyone involved or affected by the implementation project

Buy-in and voluntary support & commitment from a critical mass of people (>1 person, building to 25% of employees)

Early successes that clearly prove that ISO 17025 will benefit customers, suppliers, management, and especially workers.

Adequate resources and time to achieve all that needs to be done

Rapid and effective communication, feedback, and recognition on efforts made, results achieved, and work to be done.

Expert, pre-experienced advise, coaching, cheerleading, pre-warnings, and technical expertise on ISO 17025 implementation.

Auditing, training, and remedial assistance to achieve consistent compliance to minimum requirements.

Dress-rehearsal audit, final fixes, then formal Registration Audit by Accredited Registrar

Continuous assessment, improvement, and re-registration of systems.

Another advantage of PN-EN ISO/IEC 17025:2005 standard is similarity to the structure and requirements of PN-EN ISO 9001:2001 standard, that's why point 1.6 includes the statement: "If research and standardizing laboratories fulfill the requirements of PN-EN ISO/IEC 17025:2005 standard then research are made in the management system being also compatible with the rules of ISO 9001 standard". The statement is so important because possessing by the laboratory the certificate of conformity with PN-EN ISO 9001:2001 standard is not equivalent with having the accreditation certificate and it doesn't confirm the competences of laboratory (PN-EN ISO 9001:2001 Warsaw, 2001); PN-EN ISO/IEC 17025:2005 Warsaw, 2005).



The main advantage of PN-EN ISO/IEC 17025:2005 standard is its readability and clearly specified requirements classified into two groups - requirements connected with management system and technical requirements (Switzerland; pp 1–26).

2.3 Main Benefits of Correctly Implemented ISO/IEC 17025:

Implementing ISO/IEC 17025 has benefits for laboratories, but the work and costs involved should be considered before proceeding (Mr. Andrew Glum, Director of Special Products and Quality Manager, Madge Tech, Inc., USA, about the ISO 17025 Accreditation Package).

Implementing ISO/IEC 17025 as part of laboratory quality initiatives provides both laboratory and business benefits such as:

- Having access to more contracts for testing and/or calibration. Some public and private organizations only give contracts to accredited laboratories. Accreditation will also help to get more contracts from organizations that don't mandate accreditation, but do give preference to accredited laboratories in competitive situations.
- Improved national and global reputation and image of the laboratory.
- Continually improving data quality and laboratory effectiveness.
- Having a basis for most other quality systems related to laboratories, such as Good Manufacturing Practices and Good Laboratory Practices.

Analytical testing laboratories seeking ISO/IEC 17025 will be impacted in multiple areas. The main difference between good analytical practices and formal accreditation is the amount of documentation to be developed. There is no doubt that any good analytical laboratory uses qualified analysts, checks the performance of equipment used for testing, and validates analytical methods. However, many times the outcome of the tests is not fully documented. ISO/IEC 17025 accreditation requires formal documented environment – ‘what is not documented is a rumor,’ and is viewed by assessors as ‘not being done.’

The overall impact of accreditation on an analytical laboratory can be best illustrated by looking at the whole sample/data workflow. Figure 1 shows a typical laboratory workflow of samples and test data, together with ISO/IEC 17025 requirement.



2.4 History and status of ISO/IEC 17025

Prior to the issuing of ISO 17025:1999 there was no internationally accepted standard for laboratory quality systems that could provide a globally accepted basis for accreditation. Laboratories play an important role in company quality systems. The ISO/IEC 17025 can be used as a standard to develop and establish a quality system for a laboratory and also for assessment by laboratory clients or third parties. The standard can also be used as a criterion for laboratory accreditation. Working according to global standards is especially important for laboratories to ensure validity and global comparability of test and calibration results. One of the goals of using global standards is to reduce the number of tests required in national and international trading.

The first edition of the “International Standard General Requirements for the Competence of Testing and Calibration Laboratories” was produced as a result of extensive experience in implementing ISO/IEC Guide 25 and EN 45001; it replaced these earlier standards in 1999. This standard contains all the requirements that testing and calibration laboratories have to meet if they wish to demonstrate that they operate a quality management system, are technically competent, and are able to generate technically valid results.

Management requirements in the first edition refer to ISO 9001:1994 and ISO 9002:1994. These standards have been superseded by ISO 9001:2000, which made an update of ISO/IEC 17025 necessary. In the second edition of ISO/IEC 17025, released in 2005, clauses were amended or added only when considered necessary in the light of ISO 9001:2000

Testing and calibration laboratories that comply with ISO/IEC 17025 will therefore also operate in accordance with ISO 9001.

Accreditation bodies that recognize the competence of testing and calibration laboratories use ISO/IEC 17025 as the basis for their accreditation.

ISO/IEC 17025 is divided into five clauses, two annexes, and one bibliography section:

Clause 1: Scope



The standard covers the technical activities of a laboratory as well as the management and organizational aspects to perform the technical activities in a competent way.

Clause 2: Normative References

Clause 3: Terms and Definitions

Clause 4: Management Requirements

Most of the requirements are similar to those specified in the ISO Standard 9001:2000.

Clause 5: Technical Requirements

Most of the requirements come from the ISO Guide 25 which preceded ISO 17025.

Annex A: Cross References to ISO 9001:2000

Annex B: Guidelines for Establishing Applications for Specific Fields Bibliography

The most important clauses are clause 4 and 5, describing management and technical requirements. In addition to official requirements, these clauses also include notes with further explanations and recommendations

2.5 Definition of Quality Management System

2.5.1 Quality

Degree to which a set of inherent characteristics fulfils requirements

NOTE 1 - The term "quality" can be used with adjectives such as poor, good or excellent.

NOTE 2 - "Inherent", as opposed to "assigned", means existing in something, especially as a permanent characteristic.(ISO 9000:2007).

2.5.2 Customer satisfaction

Customer's perception of the degree to which the customer's requirements have been fulfilled

NOTE 1 - Customer complaints are a common indicator of low customer satisfaction but their absence does not necessarily imply high customer satisfaction.

NOTE 2 - Even when customer requirements have been agreed with the customer and fulfilled, this does not necessarily ensure high customer satisfaction.

2.5.3 System

Set of interrelated or interacting elements.



2.5.4 Management System to establish policy and objectives and to achieve those objectives.

NOTE - A management system of an organization can include different management systems, such as a quality management system, a financial management system or an environmental management system.

2.5.5 Quality management system

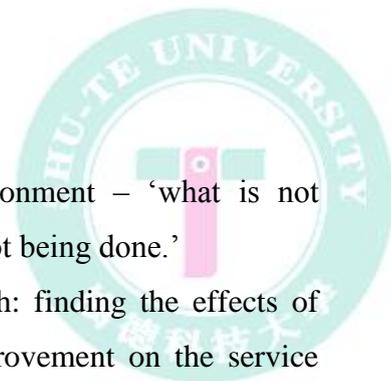
Management system to direct and control an organization with regard to quality. A system by which an organization aims to reduce and eventually eliminate nonconformance to specifications, standards, and customer expectations in the most cost effective and efficient manner.

2.6 The Role of implementing ISO/IEC 17025 in Testing Laboratories

Implementing ISO/IEC 17025 has benefits for laboratories, but the work and costs involved should be considered before proceeding.

Implementing ISO/IEC 17025 as part of laboratory quality initiatives provides both laboratory and business benefits such as:

- Having access to more contracts for testing and/or calibration. Some public and private organizations only give contracts to accredited laboratories. Accreditation will also help to get more contracts from organizations that don't mandate accreditation, but do give preference to accredited laboratories in competitive situations.
- Improved national and global reputation and image of the laboratory.
- Continually improving data quality and laboratory effectiveness.
- Having a basis for most other quality systems related to laboratories, such as Good Manufacturing Practices and Good Laboratory Practices.
- Analytical testing laboratories seeking ISO/IEC 17025 will be impacted in multiple areas. The main difference between good analytical practices and formal accreditation is the amount of documentation to be developed. There is no doubt that any good analytical laboratory uses qualified analysts, checks the performance of equipment used for testing, and validates analytical methods. However, many times the outcome of the tests is not fully documented. ISO/IEC



17025 accreditation requires formal documented environment – ‘what is not documented is a rumor,’ and is viewed by assessors as ‘not being done.’

With the research mentioned-above, the purpose of this research: finding the effects of factors: leadership, employee participation, control process improvement on the service quality and business activity of the ISO/IEC 17025 and practice company.

The devices that are used in evaluating, executing ISO/IEC 17025 in Testing Laboratories in Vietnam and PDCA cycle of (W Edwards Deming, MIT 1989) (Kaizen, Masaaki Imai, McGraw-Hill, 1986).`The Team Handbook', (Peter R. Scholtes, Joiner Assoc, 1988).

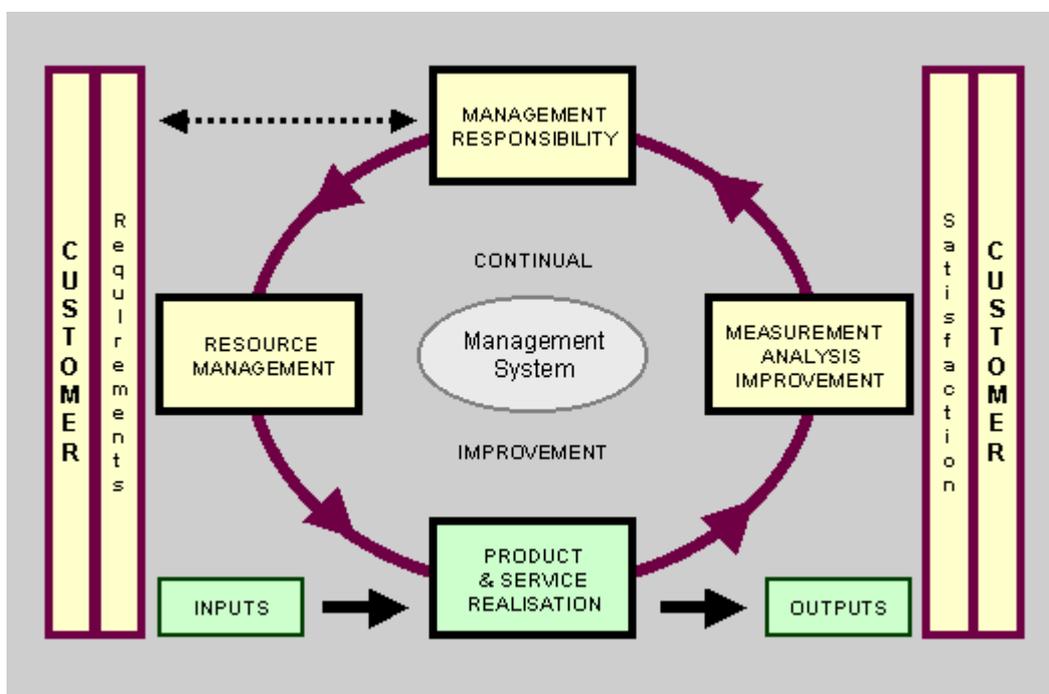


Figure 3. Preview PCDA Cycle (Dming MIT 1989).

2.7 The key factors of implementing ISO/IEC 17025

2.7.1 Leadership

This is an important factor for Vietnam's laboratories in establishing the quality management system in accordance with the requirements of ISO / IEC 17025.

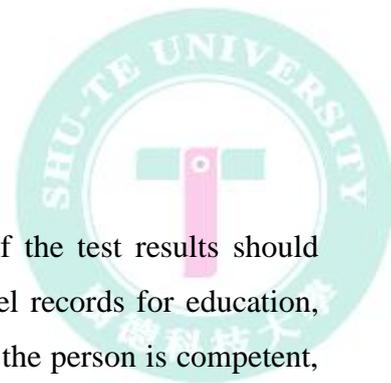


If leaders of the laboratories do not see benefits from the application of quality management system standard ISO/ IEC 17025, the management will not create conditions for investment and operation and evaluation Quality laboratory.

Thanks to the assessment and recognition of the quality of the laboratory has established a routine scientific work, discipline, unity and synchronization. All activities of the Laboratories are documented in the Quality Management System, is headed for approval and reviewed annually. Management standards also help the management to reduce laboratory time incident handling work assignments clearly and specifically through the job description.

When leaders are aware of the need to develop and apply quality management system and improving the technical capacity to meet the requirements of ISO/ IEC 17025, the management will conduct the review meeting of leaders to control review the annual quality objectives and quality policy has been built to suit the realities and requirements of standards and accreditation reviews. When the laboratory leaders realize the importance and benefits of the assessment and recognition, leadership laboratories will facilitate maximum of resources (funds for investment in equipment and environmental conditions schools, human resources ...) to help laboratories improve operational efficiency testing, quality assurance test results that provide laboratories for customers.

The selection of personnel required to have expertise related to the calibration test, testers were trained to understand the ISO/IEC17025 well as how to do internal audits to find the suitability of required standards of testing and calibration, training and knowledge of evaluation of uncertainty of measurement, operation of equipment and perform tests. For external resources (Outsource) when using the organization itself must be held Outsource also conducted capacity assessment. One of the selection criteria is the leading outsource outsource VILAS also recognized criteria test and calibration standards or through the building by the organization itself. Besides the management structure, organization also needs to appoint positions such as management and technical management, quality management and the deputy to take charge when needed replacing.



2.7.2 Staff's participation

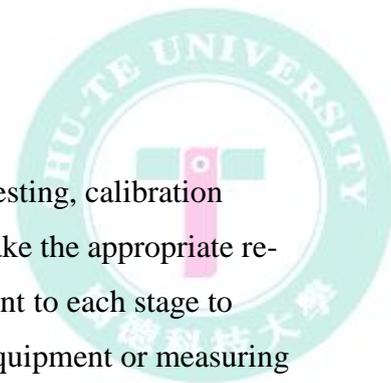
All personnel who have a direct effect on the validity of the test results should demonstrate their competence to perform specific tasks. Personnel records for education, training, technical knowledge and experience should indicate that the person is competent, as defined in their job descriptions. The laboratory should evaluate the competence of all personnel and ensure that training is kept up-to date. Personnel are also required to contribute to meet the quality policy statement and the quality objectives of the management system.

The important factor of the management systems integration success is the commitment of all workers in the organization. The present enterprises couldn't function without knowledge by the workers of the management system principles and requirements of individual norms.

The necessary condition is the individual and group ability of the workers to finding the ways of achieving improvement and progress in the organization activity. The quality of the integrated management system concerns to article, information, service, process, knowledge, management, life, but it has to take into account the indispensability of changes and courage to theirs implementation (G. Paliska, 25/1 (2007) 79-82).

2.7.3 Technology support:

Information used in the unit including documents, catalog, database software or device driver software, user manual in the work of testing and calibration. The exchange of information internal/external should be built into the specific provisions for the security, storage monitoring data base (eg baseline comparison, data recorded during testing calibration), the test results and calibration to avoid loss or change data in the process of doing or transferred to other goods. The construction of goals and plans of the organization of work activities related to testing and calibration needed done so as to ensure consistency as well as convey to all content test members.



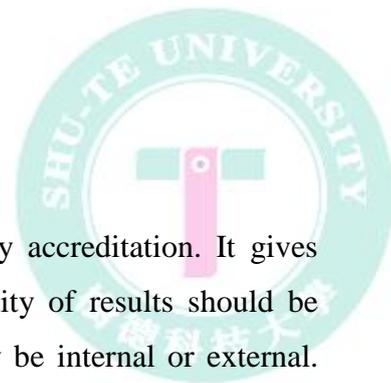
Equipment must conform to the purposes and methods of testing, calibration methods, appropriate sensitivity to achieve detection limits and make the appropriate re-iteration of results. Equipment must be well maintained and efficient to each stage to always have proof of their stability. Employees understand what equipment or measuring something. The substitution of reagents or errors in the operation process of implementation methods can affect the final result.

Several other issues also need to consider attention to the device:

- The installation of equipment and methods to control them during use.
- The control and driver software for the device.
- The work environment of the device.
- Shipping and portable equipment maintenance.
- Calibration, calibration and check between two calibrations.
- The use of overload.
- Control parameters were set and edit them.
- Control and user training.
- Develop and apply the correction factor if necessary.
- Request achieved after repair of equipment failures.

Resource: Internet - Vietnam Standards, Metrology and Quality.

Major obstacles encountered, during implementation and maintenance of implementation, by the laboratories were: lack of suppliers of calibrated equipment, non-existence of accredited metrology laboratories for calibration of equipment, and unavailability of proficiency testing providers. Moreover, despite more responsibilities, employees claimed that implementation did not benefit them financially. In addition, the majority agreed that there was a lack of communication from management. But yet they were satisfied to work in an accredited laboratory and has improved the level of employees satisfaction. The most pressing ones being that calibration laboratories should be implementation to ISO/IEC 17025 at the earliest as well as driven campaigns by Government to boost national awareness on the economic and social benefits of accreditation.



2.7.4 Process control and Improvement

Quality control is of paramount importance in laboratory accreditation. It gives confidence in the work performed by the laboratory. The validity of results should be rigorously monitored through quality control checks, which may be internal or external. Internal quality control usually is done using statistical techniques to detect trend in the results. External quality control is done either through proficiency testing programme or inter-laboratory comparison to compare results obtained by the laboratory. According to ILAC-P9 (2005), proficiency testing and inter-laboratory comparison are defined as:

- Proficiency testing is the determination of the calibration or testing performance of a laboratory or the testing performance of an inspection body by means of inter-laboratory comparison.
- Inter-laboratory comparison is the organization, performance and evaluation of calibrations/tests on the same or similar calibrations/tests items by two or more laboratories in accordance with predetermined conditions.

In many Vietnamese companies are also weak in using information systems and have not recognized yet the role of statistical process control in quality management. Analyzing information and using statistical process control also need support from the company's local area network. But few Vietnamese companies, so far, can afford investing into both information technology and human resources to operate and effectively exploit such networks (Loan, 2004). Hua et al. (2000) reported similar conditions in Shanghai's manufacturing firms: top management commitment was considered of highest importance while but people management was at the lowest level. However, as these three elements have been found to support the firms' innovation performance, Vietnamese companies need to learn how to deploy those tools more effectively.

The modern organization directed to the quality is one which is able to create the knowledge. According to Japanese approach creating the knowledge is not only "processing" of objective information, it is also creating the new knowledge being based on reaching to latent and often of very subjective observations of employees, their intuitive beliefs and premonitions and making these reflections available to the entire company so that it is possible to verify them and to use. A man is always the source of the new



knowledge (M. Dudek-Burlikowska 18/1-2 (2006) 435-438);
21/1(2007) 91-94); K. Ishikawa,1982).

J. Michalska,

2.7.5 Service quality

According to the requirement concerning the client's service, laboratory should owe internal procedures guaranteeing proper cooperation not only in the aspect of fulfilling their requirements but also - in the aspect of capability to monitor the research commissioned to the laboratory. Laboratory is also obliged to estimate the clients' satisfaction; any positive as well as negative information from the clients should be analyzed by laboratory to prevent repeating the same incompatibilities in the future and - what is the most important - to improve the system and services offered by the laboratory (Service to the customer) (PN-EN ISO/IEC 17025:2005 Warsaw, 2005).

You face a special challenge: Meet customer needs while remaining economically competitive. Automated processes can make an impact, but services are still labor-intensive. There can be no substitute for high-quality personal interaction between service employees and customers

Use quality practices to:

- Understand and improve operational processes.
- Identify problems quickly and systematically.
- Establish valid and reliable service performance measures.
- Measure customer satisfaction and other performance outcomes.

2.7.6 Performance

Laboratory implementation QMS ensures that laboratories perform their work correctly and to appropriate standards. It provides them with a benchmark for maintaining that competence. In addition to commercial testing and calibration services, manufacturing organizations may use laboratory accreditation to ensure the testing of their products by their own in-house laboratories is being done correctly.

Testing of products and materials can be expensive and time consuming, even when they are done correctly the first time. If not done correctly, then the cost and time involved in re-testing can be even higher if the product has failed to meet specifications or expectations. Not only costs go up, but reputation as a supplier or manufacturer can go



down. Thus, a product tested in a particular country by an accredited laboratory minimizes the chances of retesting and reducing chances of additional financial burden and time delays.

Performance is *focused behavior* or *purposeful work* (Rudman, 1998, p. 205). That is, jobs exist to achieve specific and defined results (outputs) and people are employed so that organizations can achieve those results. This is performed by accomplishing tasks.

Gilbert (1998) said that performance has two aspects — behavior being the means and its consequence being the end.

Managing performance has the dual purpose of 1) arranging situations (environment) so that employees can do their best and 2) growing the employees by educating, enlightening, and appreciating them. Its purpose is to achieve specific and defined results from people so that the organization can achieve its goals and objectives.

It is much easier to fix situations by making structural changes to the organization, rather than trying to fix or change people. These include such means as changing reporting relationships, enlarging the job, improving a process, or opening lines of communication.

Once performance barriers have been removed, employees can be educated, enlightened, and appreciated. This assumption is based on the premise that most employees try to do their best. They prefer harmony over conflict, action over inaction, and productivity over delays (Farson, Crichton, 1996). We often refuse to believe this as most studies on human behavior are performed on people when they are not at their best, such as in school, clinics, or prison. Thus, most studies on human behavior are performed in the process of trying to reform people.



Chapter 3 Research methodology

In chapter 3, will provide the research framework; give out the factors affecting to the service quality on standrad ISO/IEC 17025 implement process of test laboratories in Hanoi - Vietnam. Following are the hypothesis and variables measured to demonstrate and evaluate the importance of this hypothesis affects affect service quality in test laboratories. Sampling method, data collection and research methods will be discussed in this chapter as the premise for the next chapter to synthesize and analyze data.

3.1 Research Hypotheses and Framework

The purpose of this study is find out what factors affect service quality. Specifically, this study focuses and assessing the impact of ISO/IEC 17025 practices on service quality in testing field in particular: the factor test Leadership, Staff's participation, Process Control and Improvement impact on service quality in the Laboratories in Vietnam. According to the literature review, this study builds a research framework as shown in Figure 4.

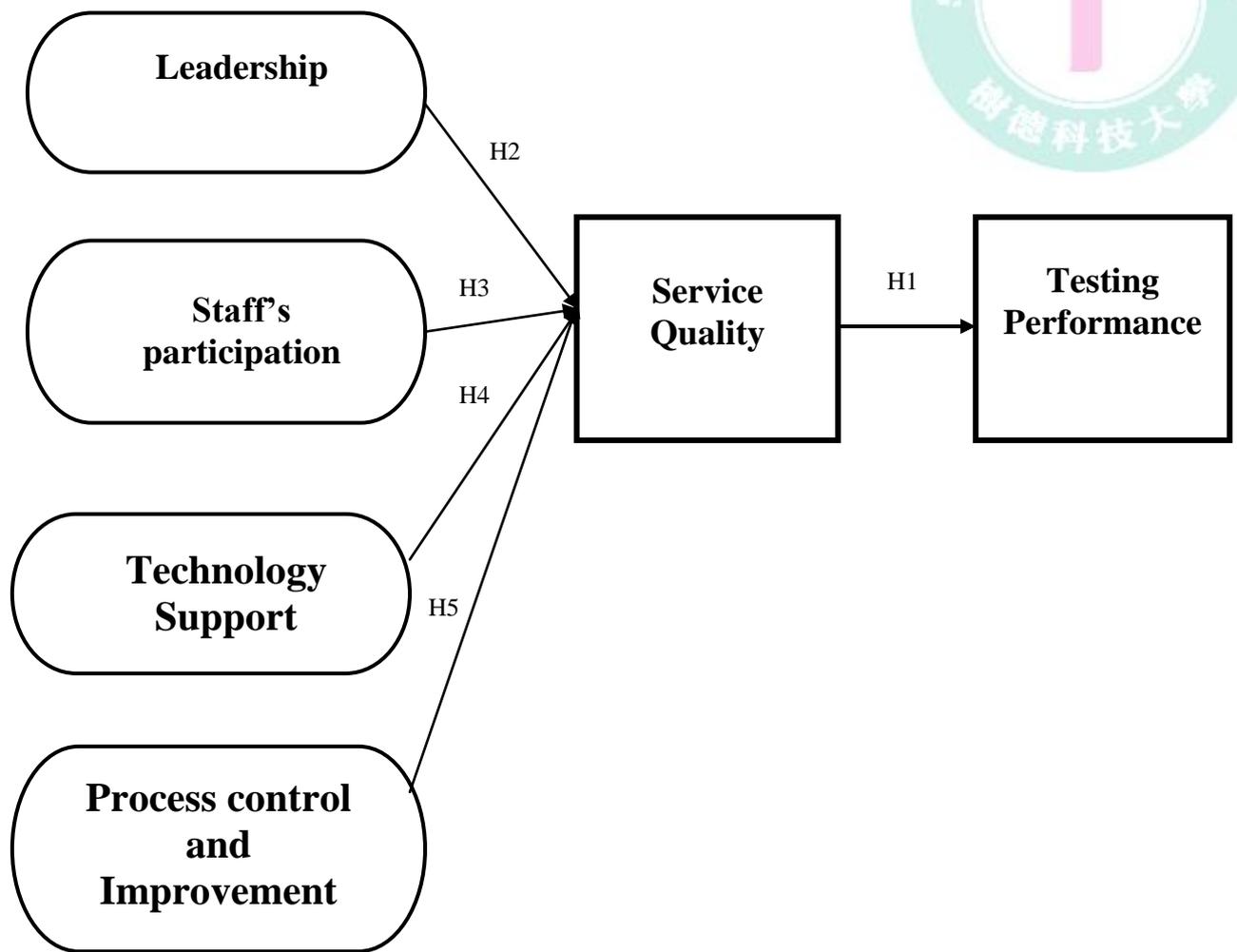


Figure 4. Research Model



3.2 Research Hypotheses

Based on the literature review, the following hypotheses have been developed for this study:

H1: Service quality poses positive impacts on testing performance

H2: Leadership poses positive impacts on service quality

H3: Staff's participation poses positive impacts on service quality

H4: Technology support poses positive impacts on service quality

H5: Process control and Improvement poses positive impacts on service quality

3.3. Operational Measurement of the Research Constructs

There are five variables concerned in this study: **Leadership, staff participation, Technology support, Process control and Improvement, Testing performance.** This sector will discuss the operational measurement approaches to those constructs.

Table 1. Items of Perceptions about ISO/IEC 17025

Variable	Measures	Questions
Leadership	LS1	Highest managing position (The person who takes charge of profit of the company) has responsibility for the result of quality
	LS2	Top management learns quality-related concepts and skills.
	LS3	Top management strongly encourages employee involvement in quality management activities.
	LS4	Top management empowers employees to solve quality problems.
	LS5	Top management arranges adequate resources for employee education and training.
	LS6	Top management discusses many quality-related issues in top management meetings.
	LS7	Top management pursues long-term business success.
	LS8	Top managers support the process of quality improvement
Staff's participation	SP1	Level of staff's responsibility for output without mistakes during their operation
	SP2	The level of participation in decisions related to staff's quality
	SP3	Increase in personnel confidence performing tests
	SP4	Imposes a discipline on laboratory staff to maintain the standard of accreditation
Technology Support	TS1	The exchange of information internal/ external regulations have been written for the security, storage monitoring data base.
	TS2	The construction of goals and work plans to implement activities related to testing can be done to ensure consistency as well as transmit the content to all testers.
Process control and Improvement	PI1	Level of performing maintenance of equipment
	PI2	The level of the process are clear guidelines for staff
	PI3	The level of compliance in the process of staff in organization

Table 2. Items of Perceptions about service quality

Variable	Measures	Questions
Service Quality	SQ1	Considerable decrease in the complaint of customers about service's quality.
	SQ2	Considerable increase in the availability of the service.
	SQ3	The accuracy of the test result
	SQ4	Considerable increase in the speed of customers support services.
	SQ5	Considerable increase in the availability of the service.

Table 3. Items of Perceptions about Performance

Variable	Measures	Questions
Testing Performance	PE1	Provide better control of laboratory operation
	PE2	Improves service quality
	PE3	Remains competitive
	PE4	Increase in profitability
	PE5	Enhances the organization's image
	PE6	An effective marketing tool for your organization
	PE7	Bring transfer of technology to your organization
	PE8	Increase in productivity
	PE9	Feedback from customer for improvement

3.4 Data Collection

3.4.1 Measurement Scale

One form of measurement commonly used in quantitative research is a Likert scale. It consists of five popular level from 1 to 5 to assess to what extent the respondents. Therefore, the questionnaire has been designed from a "completely dissatisfied" and 5 is "completely satisfied".

5 point Likert scale was used to set variables directly impact satisfaction - customer attitudes and the staff of the Center's services. Satisfaction levels will be represented on a scale from 1 to 5 as follows:

1=Strongly disagree; 2=Disagree; 3=Neutral; 4= Agree; 5=Strongly Agree

estimated sample size $n = 120$. Sample size depends on the estimation method used in specific studies. According to some studies, the representation of the number of selected samples would be appropriate if the survey sample size was five samples for an estimate.

Models surveyed in the essays included seven factors independent variables with 31 observations. Therefore, the number of samples needed is $31 \times 5 = 155$ samples from above. So the number of samples used in the survey is $n = 130$ should be representative of the sample are secured to the survey.

3.4.2 Data analysis

The research selects the Organizations operating in Testing service in Hanoi - Vietnam. A survey questionnaire was developed to obtain feedbacks on their opinions on different variables from the employees of companies providing Testing services, 130 questions were sent through the mail, of which 99 responses were received and 31 of them were incomplete. Therefore, the number of remaining sample to analyze were 99 ones.

The structure of this study is divided into 6 elements: (1) Leadership, (2) Staff's Participation, (3) Technology support, (4) Processes control and improvement, (5) Service quality, (6) Performance. After data collection has finished, the researcher used SPSS 15.0 software for the analysis of data collected.

Once the questionnaires are sent back, the following analysis will be performed and the results will be presented in the next chapter.

3.4.2.1 Descriptive Statistics

The detail description of the respondents' personal data, such as sex, age, mission years, current position at your Organization, diploma and so on will be analyzed. Every construct of the data will be analyzed in percentage, frequency distribution in order to know the sample distribution.

3.4.2.2 Factor Analysis

Factor analysis is a technical used to identify factors that statistically explain the variation and co-variation among measures. Factor loading of an item must be greater than 0.5. Eigenvalue needs to be greater than 1; the difference between two eigenvalue needs to be greater than 0.3.

3.4.2.3 Reliability Analysis

Reliability applies to a measure when alike results are obtained over time and across situation. Open minded defined, reliability is the degree to which measures are free from error and therefore yield consistent results. Usually reliability is measured by Cronbach's α ; if it is greater than 0.7, then it means that there exists high degree of reliability, if less than 0.5, then it means that the reliability is relatively low, and this coefficient needs to be deleted.

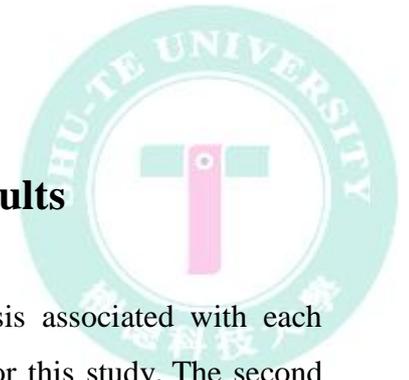
3.4.2.4 Regression Analysis

The purpose of regression analysis is to create a simple equation, in order to analyze the relationship between dependent variables and independent variable. The hypotheses in this study can also be tested by this method.



Table 4. Measurement of items

Factors	No of Items
Leadership	8
Staff's participation	4
Technology support	2
Process control and improvement	3
Service quality	5
Performance	9



Chapter 4 Data analysis and Results

This chapter presents the research results of the analysis associated with each research hypothesis. The first section describes data collection for this study. The second part describes the characteristics of the sample. The third section reviews the reliability and validity of the questionnaire. Under construction analysis, the variables were tested. To test this hypothesis, SPSS 15.0 was employed to help us analyze collected data.

4.1 Descriptive Statistics Analysis of sample demographics

For data collected from the survey the first phase descriptive analysis was used to capture the characteristics of the sample as Testing laboratories in Hanoi. The characteristics of the sample are described in Table 4. Study save information collected by 120 people working in Testing Laboratories in Vietnam in the number of respondents accounted for 51.5% with 48 male and 51 female accounted for 48.5% of the total samples collected. Moreover, the statistic shows that current position of our samples mostly are managers and staff which account for 48.5%, 35.4% of total samples have university degree and Master meaning that the human source in the Testing Laboratories in Hanoi - Vietnam are high-quality human resources, the Master is 58.6% and University is 32.3%

Also from the descriptive statistics of these samples, we can see that most of our respondents have mission years at Organization majority is from 5 – 10 more 54.5% with 89 respondents and below 1 years, 1 - 5 years, 5-10 year are 17.2%, 28.3% and 54.5% respectively

Table 5. Characteristics of Sample Demographics

Measure	Item	Frequency	Percentage
Gender	Male	48	48.5%
	Female	51	51.5%
Current Position at your	Leader	16	16.2%
	Manager	48	48.5%
Organization	Staff	35	35.4%
Mission years:	Below 01 year	17	17.2%
	1-5 years	28	28.3%
	5-10 years	54	54.5%
Diploma	University	32	32.3%
	Engineer	9	9.1%
	Master	58	58.6%

4.2. Reliability Analysis of Research Variables

To test the reliability of the items measuring the constructs, to ensure that the measurement scale we designed for our questionnaire are highly representative of each variable, the Cronbach's α is used. The reliability of the measurement for the six constructs is measured, including leadership, Employee participation, process control and improvement, quality service, and performance. Constructs with Cronbach's α below 0.7 will be deleted.

Cronbach's α is to test whether the measures are free from error. Throughout the test we find out that all of the Cronbach's α are greater than 0.7, meaning that the constructs have high reliability. The result is shown in the Table 5.

Table 6. Reliability Test

Factors	Cronbach's Alpha	No of Items
Leadership	.729	8
Staff's participation	.781	4
Technology support	.726	2
Process control and improvement	.713	3
Service quality	.808	5
Performance	.786	9

4.3 Factor Analysis

Factor analysis can be used to identify the structure of relationships among respondents (or items) by examining the correlations between the respondents (or items). With the factor analysis, we can identify the separate dimensions of the structure and then determine the extent to which each variable is explained by each dimension. When define specified variables, we can do summarization and data reduction.

First, in order to assess construct validity and identify the unique dimensions of each construct, factor analysis with VARIMAX rotation was employed. In other words, it should demonstrate relatively high correlations between items of the same construct (convergent validity) and low correlations between items of constructs that are expected to differ (discriminate validity).

Table 6 shows the results of the VARIMAX rotation on the original 31 items constrained to six factors.

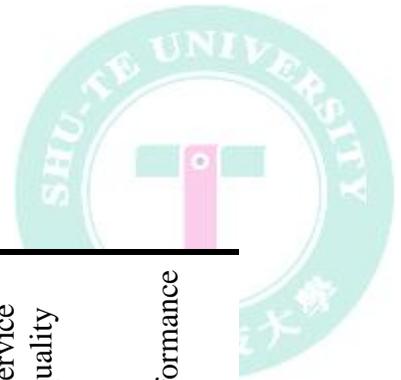


Table 7. Factors loading

Items/factor	Leadership	Staff participant	Technology support	Process control and improvement	Service quality	Performance
LS1	.504					
LS2	.642					
LS3	.643					
LS4	.681					
LS5	.566					
LS6	.678					
LS7	.687					
LS8	.619					
SP1		.799				
SP2		.838				
SP3		.852				
SP4		.740				
TS1			.613			
TS2			.627			
PI1				.744		
PI2				.625		
PI3				.553		
QS1					.809	
QS2					.530	
QS3					.663	
QS4					.629	
QS5					.656	
PE1						.870
PE2						.825
PE3						.692
PE4						.864
PE5						.813
PE6						.704
PE7						.540
PE8						.854
PE9						.629

Extraction Method: Principal Component Analysis.



Rotation Method: Varimax with Kaiser Normalization.

a Rotation converged in 10 iterations.

4.4 Regression Analysis

4.4.1. Linear Regression Analysis for H1 : Service quality poses positive impacts on testing performance

Table 8. Linear Regression Analysis for Testing H1

Construct	Unstandardized Coefficients β	Standardized Coefficients β	t value	R ²	Adjust R ²	F value
(Constant)	16.738		7.289			
Service Quality	1.002	.650***	8.414	.422	.416	70.795***

Dependent variable: *Testing performance*.

*** P <0,001, ** p <0,01, * p <0.05, + p <0,1

From the table 8, we can see that there was a good fit (R² .422; = F = 70.795, p = 0.000). And at significance level 0.05, hypothesis H1 proved to be true, namely:

H1: Service quality poses positive impacts on testing performance

The Model is: $PE = 0.650 QS$

4.4.2. Linear Regression Analysis for Testing H2, H3, H4, H5

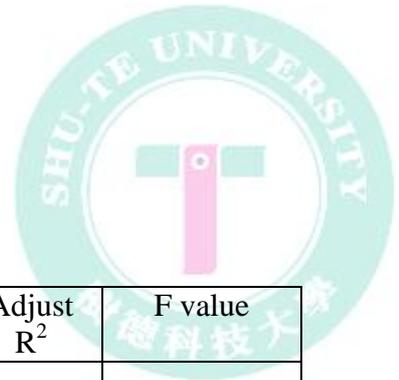


Table 9. Linear Regression Analysis for Testing H2, H3, H4, H5

Construct	Unstandardized Coefficients	Standardized Coefficients	t value	R ²	Adjust R ²	F value
(Constant)	.124		.080	.727	.715	62.497***
Leadership	.179	.202**	3.252			
Employee participation	.335	.309**	2.711			
Technology support	.626	.311***	4.528			
Process control and Improvement	.312	.216*	2.024			

Dependent variable: Service Quality

*** P <0,001, ** p <0,01, * p <0.05, + p <0,1

From the table 9, we can see that there was a good fit (R²=.727, F = 62.497, p = 0,000). And at significance level 0,05, hypothesis H2, H3, H4, H5 proved to be true, namely:

H2: Leadership poses positive impacts on service quality

H3: Staff's participation poses positive impacts on service quality

H4: Technology support poses positive impacts on service quality

H5: Process control and Improvement poses positive impacts on service quality

The Model is: QS = 0.202 LS + 0.309 SP + 0.311 TS + 0.216 PI

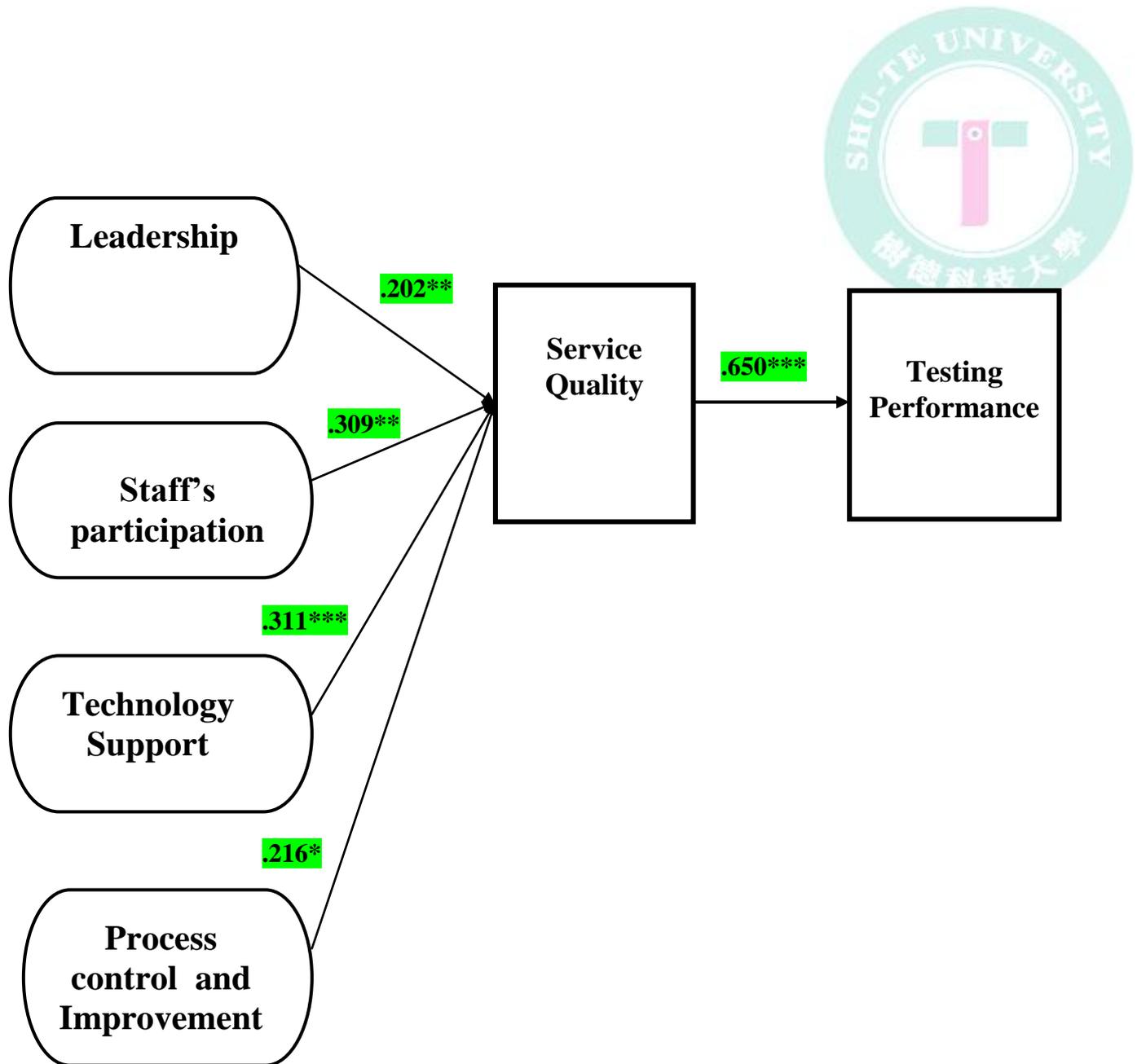


Figure 5. Research Framework for the Impact of ISO/IEC 17025 on Testing service of the Testing Laboratories in Vietnam



Chapter 5 Conclusion

5.1 Findings and Contribution

The aim of this research is to study how the process of managing quality thoroughly in the Testing Laboratories in Hanoi - Vietnam affects the quality of the service. In the information systems, when the researchers study the impacts of application of ISO/IEC 17025 in Testing Laboratories, most of them find out that application of ISO/IEC 17025 is successful when the high-ranking managers take part in the whole process and take control the human resource, encourage and support employees to take part in the process and control the process as well as improve the result as expected. In the range of this research, the impacts of leaderships, employee participation, process control and improvement affects the telecommunication quality. The hypothesis given to study which is shown in the following table.

Table 10. Research Hypotheses and Results

Research Hypotheses	Results
H1: Service quality poses positive impacts on business performance.	Supported
H2: Leadership poses positive impacts on Quality service	Supported
H3: Employee participation poses positive impacts on Quality service	Supported
H4: Technology support poses positive impacts on Quality service	Supported
H5: Process control and Improvement poses positive impacts on service quality	Supported

The study also points out that top managers must always be those who take charge of quality and result of assignment in the company and the participation of all the departments' managers in the company and support it so as to assure the service to be stable and sustainable. The study also points out the importance of that fact that all members of the companies participate in the quality program of the company. Employees need to be trained in term of



quality and must be rewarded for their efforts. In the process of producing telecommunication products and services, the performance of the company depends much on the quality of the service, so the manufacture in the company really affects the quality of the services, including from the computer room clearance, equipment maintenance, automating the process, clear procedures, product testing, etc. to replying calls, or bills, all of which affect the performance of the company.

5.2 Contributions for research.

This research is only expected to help the readers have a clearer view about the impacts of the ISO/IEC 17025 application in Testing Laboratories in Vietnam that has never been studied by any other researches before. In addition, nowadays with the development and integration of Vietnam to the more and more competitive market economy, the service quality positively affects the manufacture and performance of the Testing Laboratories in Vietnam.

The research also supply the readers with better understanding about the impact of management, participation of employees, controlling process and innovation affect the service quality of ISO/IEC 17025 in field of testing in Vietnam.

The final objective of the study was to investigate potential barriers during implementation of ISO/IEC 17025 in testing laboratories. Findings showed that problems faced by laboratories were specific to Vietnam. However, it is worth noting that staff was willing to work according to ISO/IEC 17025, otherwise this would have been the major obstacle on implementing the management system. Implementation involves a cost of quality borne by the laboratories. It can be concluded that there are no barriers as such to seek accreditation, as the added value of accreditation far outweighs the necessary investment in human resources, finances and time.

Most employees mentioned that there was no effective communication from management. Communication is vital in any organization. It helps to disseminate information on the effectiveness of the system, on the importance of meeting customer requirements and for continual improvement of the system.

5.3 Limitation

Like other research, this one cannot avoid limitations during the process of studying. Due to the time limited, so I could not research more detail about my thesis.



Firstly, this research only studies the Testing laboratories in Hanoi – Vietnam

Secondly, this research does not mention the number of successful accredited testing laboratories in Vietnam

Thirdly, this research only mentions six factors in Testing Labs applying ISO/IEC 17025, which are: Leadership, Staff's participation, Technology support, Process control and improvement, Service quality, Performance, then it doesn't assess thoroughly the impacts of sufficient ISO/IEC 17025 application in Testing Laboratories.

Fourthly, this research only chooses telecommunication enterprises in Vietnam which is on its way to reform the economy from system of subsidies to the market economy. Then, these companies are highly affected by the old thinking then the managers inherit both two periods of Vietnam. As a result, the research shouldn't be applied to other foreign companies though they are in the same area with Vietnam and share many things in common in term of culture.

5.4 Future Research Suggestions

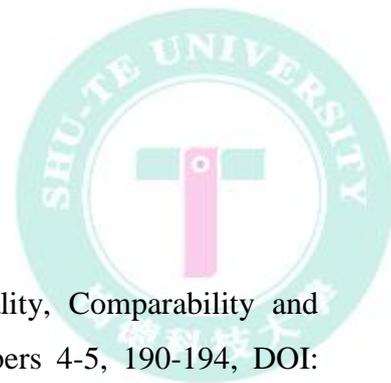
This research proposes that further research will help solving limitations of its.

Firstly, a copied of this research is more useful if it is studied in a larger scope which covers from 200 up to 500 Testing Laboratories in Vietnam.

Secondly, the further research needs to study all the impacts of applying ISO/IEC 17025 on the service quality in Testing laboratories in the whole of Vietnam.

Thirdly, other factors such as environment, society, culture (politic institutions, national culture, etc.) along with this research will offer us with the acknowledgement of impacts of implementing ISO/IEC 17025 on the performance of service quality.

Further research would be necessary to assess the views of laboratories' customers on the value of implementation. An analysis of customer satisfaction could demonstrate the success of accredited laboratories. This study focused on the impact of accreditation to ISO/IEC 17025 on testing laboratories in Vietnam. A larger sample population, including calibration laboratories, could be surveyed in the future for an in-depth analysis of the associated cost of accreditation

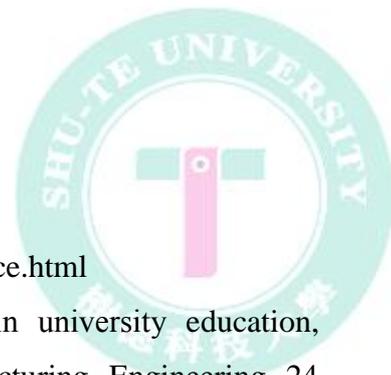


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Appendix

Questionnaires Survey Quality Management System ISO/IEC 17025

Dear Sir/Madam,

As part of my MBA programme with the Shu-Te University - Information Management Department, I am currently conducting a research thesis on "*Impact of Service Quality on Standard ISO/IEC 17025 Implement Process of Test Laboratories in Viet nam*"

I would be grateful if you kindly fill in the questionnaire below. Please rest assured that all information gathered during the survey will be treated in confidence.

Thank you for your valuable participation.

Ms. Bui Thi Huong

Which level of your satisfaction at the following statement of Organization? The level will be represented in the scale from 1 to 5.

1=Strongly Disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

Note: you only tick into each question

I/ PART I: ABOUT THE QUALITY MANAGEMENT SYSTEM ISO/IEC 17025

1. Leadership

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
LS1	Highest managing position (The person who takes charge of profit of the company) has responsibility for the result of quality					
LS2	Top management learns quality-related concepts and skills.					
LS3	Top management strongly encourages employee involvement in quality management activities.					
LS4	Top management empowers employees to solve quality problems.					
LS5	Top management arranges adequate resources for employee education and					



	training.					
LS6	Top management discusses many quality-related issues in top management meetings.					
LS7	Top management pursues long-term business success.					
LS8	Top managers support the process of quality improvement					

2. Staff's participation

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
SP1	Level of staff's responsibility for output without mistakes during their operation					
SP2	The level of participation in decisions related to staff's quality					
SP3	Increase in personnel confidence performing tests					
SP4	Imposes a discipline on laboratory staff to maintain the standard of accreditation					

3. Technology support

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TS1	The exchange of information internal/external regulations has been written for the security, storage monitoring data base.					
TS2	The construction of goals and work plans to implement activities related to testing can be done to ensure consistency as well as transmit the content to all testers.					

4. Process control and improvement

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
PI1	Level of performing maintenance of equipment					
PI2	The level of the process are clear					



	guidelines for staff					
PI3	The level of compliance in the process of staff in organization					
PI4	Improved competitiveness in market					

5. Service quality

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
SQ1	Considerable decrease in the complaint of customers about service's quality.					
SQ2	Considerable increase in the availability of the service.					
SQ3	Improved competitiveness in market					
SQ4	Considerable increase in the speed of customers supports services.					
SQ5	Considerable increase in the availability of the service.					

6. Performance

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
PE1	Provide better control of laboratory operation					
PE2	Improves service quality					
PE3	Remains competitive					
PE4	Increase in profitability					
PE5	Enhances the organization's image					
PE6	An effective marketing tool for your organization					
PE7	Bring transfer of technology to your organization					
PE8	Increase in productivity					
PE9	Feedback from customer for improvement					



PARTII: GERNARAL INFORMATION

This section covers some of your private information. Please kindly tick the following information in the squares.

1. Sex:

Male Female

2. Mission years:

Below 1 year 1-5 years 5-10 years

3. Current Position at your Organization

Leader Manager Staff

4. Diploma

University Master Engineer

For any information, please contact: Bui Thi Huong
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E-mail: huong_qm@yahoo.com

Thank you for your cooperation