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"Navigating Global Quality in a New Era"



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**June 22, 2011 (Wednesday)      55th EOQ Congress**

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**CONCURRENT SESSIONS**  
**KEMPINSKI HOTEL CORVINUS**

**Wednesday 8:30 – 10:30**  
**Erzsébet tér 7-8, Budapest V.**

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**SALON BANDINI/MARZINO**

**Wednesday 11:00 – 12.30**

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## **16.1. ACCREDITATION AND SUSTAINABILITY**

**Session Chair:** *Thong Ngee Goh, University of Singapore, Singapore*

**11.20 Development of a Sustainable National Accreditation Body for Engineering and Technology Laboratories Accreditation in Libya**

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PhD researcher, School of Science and Technology, Nottingham Trent University. The researcher graduated from aviation college in 1996 followed by ten years' experience with Veba Oil Operations in Libya. Then he decided to further his studies in the UK at Nottingham Trent University and earned MSc in engineering management. He got a job with Petro Air Company as quality specialist in the Quality Department and now he is doing PhD study in the field of quality assurance and accreditation to establish a National Accreditation Body in order to accredit engineering laboratories according to ISO /IEC 17025 and ISO/IEC 17011.

# Investigating the factors affecting the development of a sustainable national accreditation body for engineering and technology laboratories accreditation in Libya.

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## Introduction

Accreditation of laboratories has been a subject of considerable interest because product quality guarantee has become one of the prime factors to be considered in the present time of highly competitive industrial activity. Accreditation is still a new issue for the laboratories in Libya. These laboratories need to establish a new strategy on accreditation focusing on the difficulties and barriers of implementation (Shibub, 2009).

Product quality is quickly becoming major factor in consumer choice. This is correct whether the purchaser is a person or a large company. Therefore, quality assurance has become one of the prime factors for consideration in order to achieve highly competitive industrial activity at the present time. Limited awareness among the public regarding the role and purpose of accreditation is a major constraint, one of several constraints for accreditation in the Arab region.

This study aiming to identifies the factors that affect the establishment of a sustainable national accreditation body that would provide accreditation services for engineering and technology's laboratories in Libya. This chapter gives an introduction to the subject area of the research that is presented in this thesis. It illustrates the importance of laboratories' accreditation and the factors that affect the establishment of laboratory accreditation.

This paper reviewing and presents the area of accreditation inengineering and technology's laboratories as a field of study from where a laboratories' accreditation process can be used as a basis to develop such accreditation programmes in other fields. It also provides a summary of the research by discussing the research objectives, the research contribution and it presents an outline of the research methodology and what will be done in the next two years.

The research questions that arise from the above title, which this research study will try to address, are:

Is Libya in need for a specific National Accreditation Body (NAB) model and who is need it?

- “If yes, what are the main attributes to be considered in developing NAB for Libya as a developing country, and is there a process for selecting the appropriate elements for its development putting in mind failure models in other developing countries?
- If no, what are the alternatives as most of the developing countries’ accreditation requirements and needs are done by the developed countries’ accreditation bodies such as the United Kingdom accreditation service (UKAS) and the German certification association (*Technischer Überwachungs-Verein, TUV*).

-What are the barriers and restrains and how can they been overcome?

-Which criteria are appropriate to the Libya’s condition, taking into account the failure model in Brazil and Zambia and the available data?

#### **Aim(s) of the investigation:**

- (1) Investigate the factors that affect the development of a National Accreditation Body (NAB) in Libya.
- (2) Develop a proposed implementation strategy to effectively introduce NAB into Libya.

#### **Objectives**

In order to achieve these research aims, the following research objectives have been established as being critical for success.

1. Understand the accreditation system requirements, philosophies and theories that are provided in ISO 17011 (Accreditation), table 1.
2. Build an understanding of implementation issues around the accreditation system.
3. Investigate the government’s current policy regarding accreditation.
4. Evaluate what is meant by National Accreditation Body, and the underlying concepts.
5. Analysing the Political, Economical, Social, Technological, Environmental and Legal factors that affect the implementation of accreditation framework for the Libyan quality management system, laboratories and products.
6. Establish the current state of quality initiatives in the Libyan laboratories and industries.
7. Identify the current level of knowledge regarding Accreditation within the Libyan

industry and laboratories.

8. Investigate barriers that affect implementation of an accreditation body in Libyan case studies.
9. Understand the common types of barriers affecting the implementation of ISO17011 standards (accreditation body) around the world (developing conceptual framework).
10. Drawing conclusions and making recommendations to the policy makers in the country.
11. Establish what is needed in terms of education and training at all levels in order to introduce NAB into the Libyan Laboratories, quality management and industry.
12. Data related to accreditation will be collected through field study in Libya.
13. Case studies, interviewing and questionnaire will be used to collect data related to number of customers requesting accreditation and awareness of people working in engineering laboratories to the term accreditation. These data will be collected from the Libyan Oil Institute and the Libyan Industrial Research Centre.
14. Interviewing the policy makers in the ministry of Finance and Planning and the Libyan National Centre for Standardisation and Metrology (LNCSM) about accreditation in general and their perception to introduce accreditation body in Libya to ease the acceptance of certification issued in Libya worldwide.

## **Background**

Accreditation is the procedure by which the competence of a laboratory to perform a specified range of tests or measurements is assured against national or international standards (Hibbert, 2007). Through accreditation, an approved external testing institution certifies that a laboratory possesses the ability to carry out certain analysis (Funk, et al, 2007). An accreditation body as explained in figure 1 is established primarily to provide its services to its local market and to operate accreditation as a non-profit distribution activity free from commercial motivation (Drnovsek, 2008). Bievre (2008) believes that, an accreditation wave is going over the world: “get accreditation or perish”.

Governments and industries depend on the results of a test laboratory to direct regulatory and corporate decisions, therefore the data must be accurate and reliable. Laboratory testing and calibration is essential in providing accurate output (i.e. measurements and results) to fit their intended use, giving that very important decisions are based on them (Squirrell, 2008).

Ideally, there should be a single accreditation system in which the responsible institution, the national accreditation institution is technically, operationally, and financially independent. Where accreditation functions are spread over several institutions, organisations incur additional costs because the requirements for accreditation typically vary across institutions. Most countries have a single national accreditation body responsible for all areas of accreditation (Guasch, 2007).

**Hiba! A hivatkozási forrás nem található.**

Figure 1 the relations between accreditation body, laboratories (conformity assessment provider) and suppliers, consumers.

### **Project proposal**

This proposal provides preliminary research on literature on quality management introduction and implementation in developing countries. As Libya is one of the developing countries in North Africa, previous research done in developing countries should help to understand the situation of implementing quality in these countries, and present research is required to identify the main factors or forces that drive or restrain the development of a National Accreditation Body in Libya.

Today because of the globalisation pressure from the World Trade Organisation (WTO), and opening the country to international competition, Libya as a country and Libyan companies and conformity assessment (Accreditation) providers specifically, are facing severe international competition. If something is not done soon to improve quality standards, industry will inevitably suffer (Youssef, 2006).

The primary objective of a national accreditation body is to enable organisations to attain

continuous performance improvement, maintain consistency, and achieve the desired level of business excellence. However, a major issue arises as to the application of the NABs in different cultural and operational backgrounds, and how to take account of additional complexities of social systems (Trompenaars, 1993).

The development of movement of products between countries necessitates the need to test products to qualify their standards and to trace the accreditability of test laboratories as shown in figure 2. Sidney (2003) believes that there has for many years been acceptance of the role that 3<sup>rd</sup> party accreditation plays in ensuring that competent measurements are made in testing and calibration laboratories.

This has led some Libyan organisations over the last decade to adopt and implement some of the quality initiatives, such as ISO 9000 quality management systems, while they are seeking guidance in assessing their organisational performance(Sayeh, 2006).

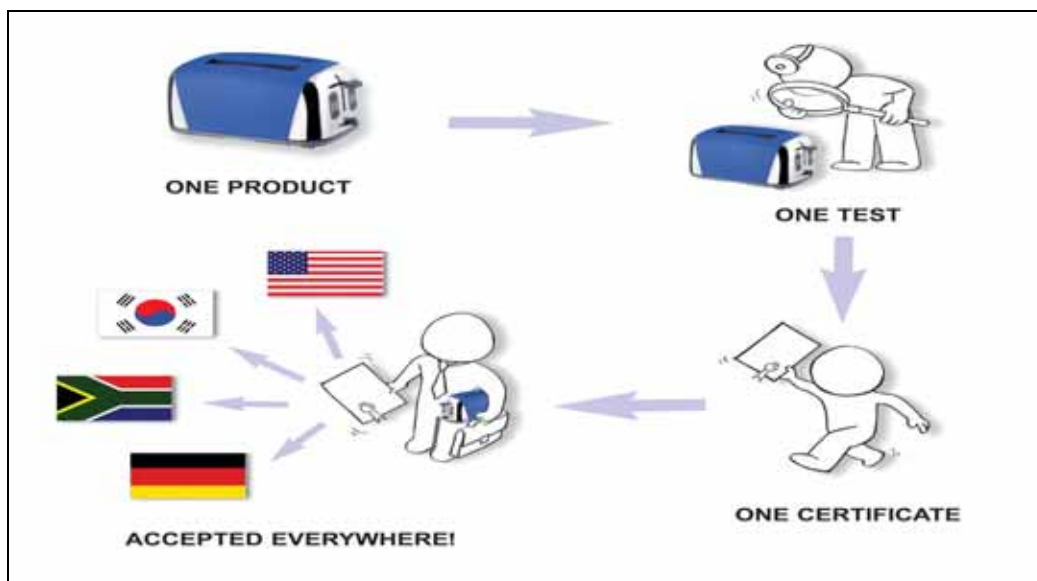


Figure 2 shows the process of international accreditation. Source (IEC, 2008).

A National Accreditation Body (NAB) is one of the most common organisations available today for assessing organisational performance, competence, and means by which countries at a national level promote quality awareness.

Libya does not have a National Accreditation Body but its industry, laboratories and quality registration system will need a guiding model or framework so as to give confidence to customers and also to provide a competitive advantage for the Libyan services and products in the international market. United Nations Industrial development programme (UNIDO,

2005) stated that Libyan laboratories and industrial research centres needed support and improvement in such areas as space management and in the placing of some equipment to meet the criteria and requirements of ISO/IEC 17025 (Laboratory accreditation) table 1.

	<b>Stand. #</b>	<b>Standardisation</b>
1.	ISO/IEC 17011:2004	General requirements for accreditation bodies accrediting conformity assessment bodies
2.	ISO/IEC 17025:2005	General requirements for the competence of testing and calibration laboratories
3.	ISO 15189:2007	Accreditation of Medical Laboratories
4.	ISO/IEC 17020:1998	Inspection Bodies
5.	ISO/IEC 17021:2006	Requirements for bodies providing audit and certification of management systems
6.	ISO/IEC 17024:2003	Certification program for individual persons
7.	ISO/IEC Guide 65:1996	Bodies operating product certification systems
8.	ISO/IEC 17040:2005	General requirements for peer assessment of conformity assessment bodies and accreditation bodies

Table 1 accreditation categories in different areas. This research focuses on numbers 1 and 2, National accreditation body and testing and calibration laboratories.

Although the development of such a framework can take account of the considerable progress made in other countries in developing their NAB, any Libyan model must take careful account of the precise nature of Libyan industry and Libyan environment as a developing country. Almost all of the development of NABs has taken place during the last 40 years or so, in the developed countries such as UK, USA and Germany. The American National Standards Institute (ANSI) has been doing accreditation since the early 1970s (Kelly and Asce, 2007).

There is a gap which currently exists between conformity assessment provider's current

status (laboratories testing and calibration, product testing, quality registration system), in Libya and ISO / IEC 17011 (accreditation body) requirements.

The contribution to the knowledge of this research is that it will to address the issue of accreditation for the Libyan engineering and technology enterprises, conformity assessment providers and to identify and investigate the factors that affect the establishment of National accreditation Body in Libya.

To date there is no empirical research done in the developing countries to investigate the factors or force that drive or retrain the development of a national accreditation body. Therefore empirical research is required to identify factors that affect the development of National Accreditation Body in Libya in the context of a country that has just opened its economy to foreign investment after enduring tough international sanctions over an extended period of time.

**The research methodology will include:**

1. A critical review of the concept of accreditation. A literature review will be conducted to provide an understanding of the complex meaning and application of Accreditation in Libya.
2. Building a framework for accreditation body to establish the accreditation process for the Libyan engineering laboratories using PESTEL analysis, Theory of Constraints, (TOC), key process indicators (KPI), critical success factors (CSFs) failure mode effects and critically analysis (FMECA), quality function deployment (QFD), Quality Management Systems (QMS) and other appropriate tools. A diagram shown in figure 3 explain the process that will be used to formulating the Libyan's accreditation framework.
3. By reviewing methodological research approaches, a framework for the implementation of the accreditation in Libya who is needs it (bottom) and who would regulate and administrate it (top) is to be developed.
4. This will then be reviewed and validated using both quantitative and qualitative research method and appropriate techniques such as case study analysis compared with literature, interviewing comparison of responses with literature and statistical analysis using histograms analysis, box plots and discourse interview analysis.
5. A case study approach will be adopted, which will attempt to offer a contextual



understanding of accreditation, by comparing and contrasting two different case studies in Libya to identify the factors that affect the development of a national accreditation body.

6. There will be two plans for collecting data (A and B). Plan (A) will use both qualitative and quantitative research methods in a field study in Libya between May, 16<sup>th</sup>, 2011 and July 15<sup>th</sup>, 2011.
7. Plan (B) is a standby plan in case no further data can be collected due to any reason. Data in plan (B) will be collected from the Libya national data system such as the national authority for Data, Libyan standardisation and metrology centre, ministry of finance and planning, General peoples committee, United Nations Industrial Development Organisation (UNIDO), United Nations Educational, Scientific and Cultural Organisation (UNESCO), the United Kingdom Accreditation Service (UKAS) and the American National Standard Institute (ANSI).

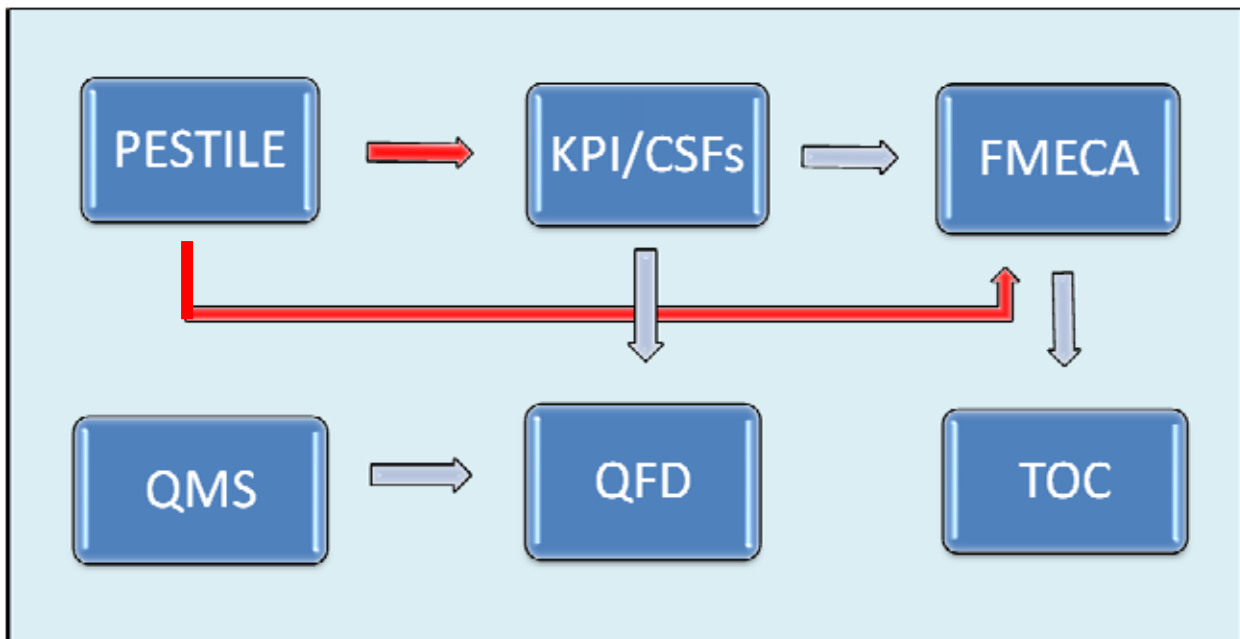


Figure 3 shows the process of tools used to build accreditation body

### **The reason for doing this research**

- There is no previous research done to see the factors that affecting on the development of a national accreditation body in the developing countries.
- Absence of an accreditation body in Libya. As a result both the BSI and the TUV doing the accreditation in Libya especially to the chemical and petroleum

laboratories that required by international customers.

- The opening of Libyan doors to international markets and the need to widen its markets so the Libyan products can reach international markets and eliminate unnecessary barriers or multiple tests.
- Example, Chinese products which overwhelming international markets (due to the role of the Chinese accreditation system).
- The importance of the supposed Libyan accreditation body and services that may offer to the African countries (possible location + cheaper prices compared with the European prices).
- The importance of accreditation to support the development of the Libyan economy after the lift of the UN sanctions.
- Examples of the accreditations bodies in Europe and Asia should be reviewed to know how the system is working in other countries and if there are deficiency.
- Oil and gas industry's certification in Libya.

### **Source of Data,**

Data will be collected through field study from four organisations in Libya. As a precaution to avoid any risk while collecting data for this research, there will be two plans (A and B) to insure that data are collected in the specified time to proceed to the next step of this research which is data analysis. The two plans are explained as the following:

### **Plan (A)**

The study will rely on the following sources:

1. A review of relevant published and unpublished literature on quality management and accreditation and the development of quality system in the West and other countries.
2. Both qualitative and quantitative research methods will be used to collect data from the following sources to obtain an understanding of the perceptions and decision-making processes of stakeholders in accreditation.
  - a. industrial research centre
  - b. Libyan National Centre for Standardisation and Metrology
  - c. Libyan oil Institute
  - d. Ministry of finance and planning
  - e. The Libyan embassy in London will issue a letter to the above organisations to

cooperate with the researcher.

3. Data relating to the quality and accreditation bodies will be collected and analysed.
4. A field study data collection will be organised to take place in Libya and a letters from both the University and the Libyan Embassy will be issued for the above mentioned organisations. The field study is scheduled to start by June, 3<sup>rd</sup>, 2011 and it should not last more than two months in Libya.
5. In case the above organisations for any reason refused to cooperate with the researcher in respect to collecting the required data then the researcher will select the plan (B) by the end of June, 2011.

### **PLAN (B)**

Establishing an empirical model by modelling a dependent variable (as in regression) such as types of laboratories accreditation, turnover per year, number of new initiatives (meetings) per year or number of standards produced per year for some countries such as the UK, China and United States that has an accreditation organisation against independent variables related to country such as gross domestic product, land area, population size, etc. This information is available through organisations such as UNESCO, UNIDO, UKAS and ANSI. Then the researcher will collect the same information for Libya, and then it will be possible to predict the proposed dependent variables for Libya. These data then can be formulated to establish a framework for accreditation body for engineering and technology laboratories taking in mind different tools as explained earlier will be used to test this framework.

### **Significance of the study**

It has been said that “Research can be considered as a voyage of discovery and whether anything is discovered or non-the essential feature is that it should make an original contribution to knowledge (Yin, 2003).

This study is significant because:

1. It will contribute to the understanding of the development of accreditation for conformity assessment providers in Libya by presenting an empirical and analytical study which will expand the literature in relation to accreditation.
2. It will introduce a framework for a national accreditation body in Libya.
3. It will raise awareness of the importance of accreditation in engineering and

technology laboratories and conformity assessment.

4. It will identify factors facilitating internationally acceptance of laboratories and product's tests that done in Libya.
5. It will analysis reasons beyond the failure of some accreditation models such as in Brazil and Zambia.

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