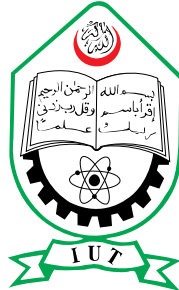


**MASTER OF SCIENCE IN TECHNICAL EDUCATION
(ELECTRICAL AND ELECTRONIC ENGINEERING)**



**A STUDY TO IDENTIFY THE PROBLEMS FACED BY SERVING
ELECTRICAL AND ELECTRONIC ENGINEERS IN SOMALIA**

By

MOHAMED ABDULLAHI WARSAME

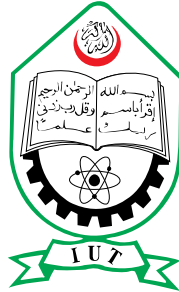
STD No.123608

M.Sc.T.E (EEE)

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ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
THE ORGANIZATION OF ISLAMIC COOPERATION (OIC)
DHAKA-BANGLADESH**

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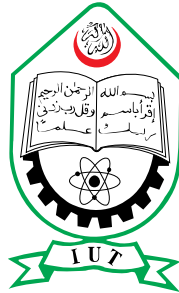
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**A Thesis Report Submitted in Partial Fulfillment of the Requirements for the
Degree of Master of Science in Technical Education with Specialization in
Electrical and Electronic Engineering**

By

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THE ORGANIZATION OF ISLAMIC COOPERATION (OIC)
DHAKA-BANGLADESH**

SEPTEMBER 2014

RECOMMENDATION OF THE BOARD OF EXAMINER

The thesis report titled “**A study to identify the problems faced by serving electrical and electronic engineers in somalia**” Submitted by **Mohamed Abdullahi Warsame**, Student No **123608** of academic year **2012-2014** has been found satisfactory and accepted as partial fulfillment of the requirement for the degree of Master of Science in Technical Education (MSc.TE) with Specialisation in Electrical and Electronic Engineering in September, 2014.

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This is to certify that the work presented in this thesis is the outcome of the investigation carried out by **Mohamed Abdullahi Warsame** under the supervision of **Professor Dr.Kushi Muhammad** in the department of Technical and Vocational Education (TVE), Islamic University of Technology (IUT), Gazipur, Bangladesh. It is hereby declared that this thesis/report or any part of it has not been submitted elsewhere for the award of any Degree or Diploma.

DR. KUSHI MUHAMMAD

Supervisor and Visiting Professor

Department of Technical and Vocational Education (TVE)

Islamic University of Technology (IUT)

Gazipur, Bangladesh

Mohamed Abdullahi Warsame

Student No.123608 Academic

Year: 2012-2014

DEDICATION

**DEDICATION TO MY BELOVED PARENTS AND ALL MY BROTHERS
AND SISTERS, MAY ALLAH REWARD YOU ALL ABUNDANTLY**

AKNOWLEDMGENT

First and foremost, I thank the almighty Allah for giving me wisdom, strength and healthy to enable me finish my course of Masters and thesis successfully, despite my trying times.

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M.A.W

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LIST OF ACRONYMS

EEE	Electrical and Electronic Engineering
OECD	Organization for Economic Co-operation and Development
GDP	Gross Domestic Product
WB	World Bank
UNDP	United Nations Development Programme
MDG	Millennium Development Goal
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Emergency Fund
NGO	Non-Governmental Organization
INGO	International Non-Governmental Organization
LNGO	Local Non-Governmental Organization
TFG	Transitional Federal Government
PAE	Primary Alternative Education
HEIs	Heritage Institute for Policy Studies
NFE	Non-Formal Education
GTZ	German Technical Cooperation
VTC	Vocational Training Centers
FLEC	Family Life Education Centers
EC	European Commission

ESC	Education Sector Committee
MOE	Ministry Of Education
PEER	Programme of Education for Emergencies Communication and Culture of Peace
IBTVET	Institute Based Technical Vocational Education and Training
IPs	Implementing Partners
EBTVET	Enterprise-Based Technical Vocational Education Training
LED	Local Economy Development
PERPS	Promotion of Economic Recovery Employment Creation and Support to Decentralization in Somalia
TDIM	Territorial Diagnosis and Institutional Mapping
PRER	Poverty Reduction and Economic Recovery
UNCTAD	United Nations Conference on Trade and Development
ROLSP	Rule of Law and Security Programme
DDR	Demobilization disarmament and Reintegration
SIDA	Swedish International Development Agency
CARE	Cooperative for Assistance and Relief Everywhere

ABSTRACT

Electricity is one of those discoveries that have changed the daily life of everybody on the planet. Electricity is the key component to modern technology and without it most of the things that we use everyday simply could not work, and would never have been created. Our mobile phones, our computers, the Internet, our heating systems, our televisions, and our light bulbs - nearly everything in the home would be completely different.

Telecommunication plays an important role in our life today. Generally telecommunication is the transmission of signal over a distance for purpose of sending information. By sharing information, human can get such a development today. Information is even considered to be one of standard criteria to assess life quality of a man. Life quality of a man is assessed according to the amount of information he get and means of approaching information.

So the currently working engineers in these two main industries (Electric, Telecommunication) faces lot of problems during their normal service. This present study aimed to identify various problems faced by serving electrical and electronic engineers in Somalia. The population of the study comprised of electrical and electronic engineers in four private companies in Somalia.

There were many public and private companies in the country. The questionnaires were used for gathering information regarding the opinions of electrical and electronic engineers about the problems faced by serving. The main findings of this study indicated that electrical and electronic engineers face number of problems in management and administration, working environment, promotion, working conditions and safety, benefits/fringes, financial facilities etc.

CHAPTER I

INTRODUCTION

1.1 Background

Since the Industrial revolution, all of the world economies have been interested in having sufficient energy sources. With the realization of the increasing importance of the energy consumption on the economic development, the subject of energy took a part in the development programs. Since energy is the most important input of the economic and social development “The analysis regarding the energy is generally carried out according to the energy sources. Depending on the utilization step of the energy sources, it could be called as primary and secondary. In this case, the primary energy sources are hard coal, oil, natural gas, water, wind and nuclear energy. On the other hand, the secondary energy sources are; electricity, coke and town gas that are the derivatives of those. In addition, the wood, animal waste and plant wastes are also known as energy source.” (Kepenek and Yentürk, 2007).

They argued that the "logic of industrialism" would create a new uniform type of human being – the so-called "industrial man" - and that the forces making for uniformity among different societies and human beings would only become stronger as nations became more industrialized. The more undeveloped nation-states were supposedly "behind" on a set of variables a priori defined as part of a modernization index, which was partly based on statistics on human capital development, particularly technical and scientific manpower, The systems of education that provided firms with manpower would also eventually converge since "industrialism requires an educational system functionally related to the skills and professions imperative to its technology" (Kerr et al 1960/1996).

It was taken for granted that nation-states with more engineers and scientists were also more developed, and a comparison among nation-states was used only in an illustrative manner to sustain this convergence assumption.

There has been a change in perspective from focusing on quantitative outputs and formal education systems towards qualitative and historical factors, such as educational philosophies and skills formation practices. It is not any longer assumed that contrasts among nations are of a temporary nature. Contemporary political scientists and sociologists more commonly assume

that capitalism may be organized in several ways. An influential group of scholars even see it as their key issue to identify the major factors behind the development of particular kinds of business systems (Maurice et al. 1980, Maurice 1986, Whitley 1992, Whitley and Kristensen 1996). The major question from such a perspective is not how many graduates, but in what way national models of work organization and skill formation correspond with education systems and professional configurations. Other scholars have put more emphasis on the historical role of the state, and political-cultural variables (Fligstein 1990, Fligstein and Freeland 1995, Burrage et al. 1990, Steinmo and Thelen 1992). Important issues have been state regulation, industrial elites and the relative timing of the educational and industrial revolutions. Curricular traditions and educational philosophies may also be important (Calori et al. 1997).

Each perspective has favored certain kinds of explanation for the various structural outcomes. The “industrial man” perspective looks to technology and business interests as the forces for change in educational systems. The business system argument puts a major emphasis on institutions for skill formation and industrial relations systems. The state and its relationship to formal education system may also be important, as the historical institutionalists and some culturalists may argue.

However electricity and telecommunication is very essential nowadays and most of the developed countries and developing countries they give more consideration that all the society must get 24-hours electricity and telecommunication so that the demand of both electrical engineers and electrical industries as well as electronic engineers and electronic industries will be very high to satisfy the demand of the society. This study aimed to bring together the findings and the key points from a review of a significant part of the available literature associated with problems faced by serving electrical and electronic engineers.

Identifying the fundamental problems may assist owners and managers of the company to overcome these problems and become successful company.

1.2 Role of electric energy in economic development

The direct influence of energy in economic growth still remains an interesting question among researchers. Unlike the role of energy in economic growth, studies have shown that there is a clear correlation between health and economic growth.

Energy is a crucial ingredient for economic development. As both agricultural and industrial activities increase, the demand for energy similarly increases. In the developing world provision of a greater access to energy has been suggested by some that will help grow their economies and improve the lives of the poor.

It has been argued that energy saving innovations “can end up causing even more energy to be used as the money saved is spent on other goods and services which themselves require energy in their production.” To produce energy services one uses energy. Therefore innovations that reduce the amount of energy required to produce a unit of energy services lowers the effective price of energy services which affects the income in a way that leads to an increase in demand for other goods and services and therefore the energy required to produce them.

Energy quality is the relative economic usefulness per heat equivalent unit of different fuels and electricity. Electricity is the highest quality energy source followed by natural gas, oil, coal, and wood and bio-fuels.

1.3 Role of telecommunication in economic development

Telecommunications industry is one of the world’s fastest growing industries, no matter which indicator is regarded. The sector has a dual function, it is both an important infrastructure for the overall economy and it is a very vital business on its own. Secondly technological development in particular the process of digitalization led to the convergence of the different types of media voice and sound picture movies. Data –different types of information can in a digitalized form follow in various ways to reach the user. Computer network and particularly the internet play an increasing role in communication due to this convergence the sector is often referred to as “information industry” or as “information and communication technology”

Various studies underline that technology and innovation in this sector will be the key drivers of increased growth performance in the future (e.g OECD 2000)

Economic development policies in the industrial countries increasingly include telecommunications as an essential component of the economic infrastructure. This realization

has been initiated by industry's demand for advanced telecommunications equipment for competitive reasons. The lesser developed countries have begun to recognize that inadequate telecommunications services will be a disincentive to new investment and place existing industry at a competitive disadvantage.

The primary economic benefit of improved telecommunications is improved efficiencies in other productive sectors. Over 80% of the telephones in the less developed countries are connected to businesses or to government agencies. Few domestic businesses and no international activities could operate competitively without modern telecommunications. The primary benefits include reduced transport costs, reduced transaction costs, improved marketing information and increased efficiency of industrial production. In all economic sectors-- agriculture, manufacturing and services--advanced telecommunications systems are becoming an integral part of business operations. The less developed countries must accelerate their application of telecommunications technology or fall further behind in economic competitiveness.

1.4 Statement of the Problem

The study aimed to find out the problems faced by serving electrical and electronic engineers in Somalia.

1.5 General Objective

The general objective of the study was to find out the problems faced by serving electrical and electronic engineers in Somalia

1.6 Specific Objectives

The specific objectives of the study were to find out the following problems:

- Induction Process
- Working environment
- Management and administration
- Professional development
- Promotion
- Working conditions and safety
- Other benefits/ Fringes

- Financial facilities
- Level of engineers competence

1.7 Significance of the study

The study will highlight the problems faced by in service electrical and electronic engineers and will be significant in the following aspects

- this study will help to find the problems faced by in service electrical and electronic engineers in Somalia
- It will help job seekers from electrical and electronic engineers to know about the problems faced by their seniors when they are in service so that they can visualize the problems and get prepared to cope with them.
- This study will also help the authority of the TVET and companies related to electrical and electronic engineers to become aware of the problems and seek the possible solutions.

1.8 Research Questions

The following research questions were formulated.

1. What were the problems faced by serving electrical and electronic engineers?
2. What were the possible solutions to reduce the problems faced by serving electrical and electronic engineers?

1.9 Delimitation

The study was delimited to the following four (04) private sector industries in Somalia. Two in electrical and two in electronics;

- Somali Energy Company
- Nugaal Electric Company
- Hormuud Telecommunication Company
- Nationlink Telecommunication Company

1.10 Assumptions

- The researcher assumed that all the electrical and electronic engineers are qualified and suitable for their positions.
- The researcher also assumed that most of the problems faced by in service electrical and electronic engineers in Somalia are similar at various places.
- The researcher also assumed that all the electrical and electronic engineers can express their problems without fear.

1.11 Definitions of Terms

Electricity

Electricity is a form of energy. Electricity is the flow of electrons. All matter is made up of atoms, and an atom has a center, called a nucleus. The nucleus contains positively charged particles called protons and uncharged particles called neutrons.

Electronic

Electronic means study of flow of electrons in electrical circuits.

Sustainable Energy

Sustainable energy is about using energy wisely and using energy generated from clean sources and clean technologies.

Renewable energy

generally defined as energy that comes from resources which are naturally replenished on a human timescale such as sunlight, wind, rain, tides, waves and geothermal heat.

Non Renewable Energy

Non-renewable resource (also known as a finite resource) a resource that does not renew itself at a sufficient rate for sustainable economic.

GDP

The gross domestic product (GDP) is one the primary indicators used to gauge the health of a country's economy. It represents the total dollar value of all goods and services produced over a specific time period - you can think of it as the size of the economy.

CHAPTER II

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter reviews the literature that relates to the problems faced by serving electrical and electronic engineers, the education system and development of technical and vocational education in Somalia.

2.2 Education system in Somalia

It is difficult to understand present situation of education in Somalia without knowing the history of this country in general and especially the history of education. With this in mind we will concentrate at first on a brief historical background of Somali education and then we will present the current situation regarding education in Somalia.

2.2.1 Present situation of education in Somalia

In early 1993, communities and teachers began to reopen schools (particularly in urban centres). Schools continue to operate on a sporadic basis but it is not known when the normal academic processes will be re-established. UN agencies (UNESCO, UNHR, UNDP and UNICEF), donor organisations, and international NGOs are currently very active in the reconstruction of Somali education systems. It is expected that in the future the Ministry of Education under the Transitional Federal Government (TFG) will coordinate educational matters and will develop policy for the entire country. At present reconstruction of the educational system is not effective enough, mainly because of a lack of capacity and resources.

Families with adequate income bypass the collapsed public school system by sending children to private schools and hiring private tutors. Private schools are mostly concentrated within just a few urban centers.

However, since the Transitional Federal Government (TFG) came into power in 2005, the number of operational schools and enrolment rates has been increased.

2.2.2 Importance of education in social and economic development

The economic benefits of education to improve growth rates appear to be very large. A more educated society translates into higher rates of economic growth and thus the ability of governments to alleviate poverty. Since the work of Mankiw, Romer and Weil (1992) and Barro (1991), there has developed a large literature - Hanushek (1995), Temple (2001), Krueger and Lindahl (2001), Gemmel (1996), Ben-habib and Spiegel (1992) – on the positive association between education *quantity* and economic growth. Education quantity is measured by schooling enrolment ratios (Mankiw, Romer and Weil 1992, Barro 1991, Levine and Renelt 1992),

There are however, studies that find a weak association between education quantity and growth - Bils and Klenow(2000); and Prichett (2001) finds no relation at all between schooling and economic growth. The relationship between schooling *quality* and economic growth is examined in the work of Barro (1999), Hanushek and Kimko (2000), Hanushek and Kim (1995),

Hanushek and Woessmann (2007). The studies of Hanushek and Kimko, Hanushek and Kim and Hanushek and Woessmann develop a measure of labour force quality based on cognitive skills in mathematics and science and find that this has a strong and robust influence on economic growth. Barro (1999) using data on student scores on internationally comparable examinations to measure schooling quality finds a positive relation between schooling quality and economic growth. On the empirical front, the focus of the studies on education quality has been on test scores. Given the current emphasis on education by the United Nations and the Millennium Development Goal (MDG) of achieving education for all, this study seeks to investigate empirically, the effect of education quantity and quality on economic growth. This is examined at the cross country level by using a number of alternative variables to proxy for education quantity and quality. The educational challenges facing the developing economies due to resource constraints are considerable.

The relationship between economic growth and education has been one of the central threads of economic analysis. Both Adam Smith in the 18th century and Alfred Marshall in the 19th century, two important figures for the economics profession, addressed the question of how individual investments in “education” influence the wealth of nations. Throughout the 20th century, as Krueger and Lindahl (2001) point out in their survey of these issues, modern professional economists have been attempting to develop empirical estimates of the relationship between education and economic growth. Some of the most famous names in late 20th century

economics made their reputations studying the question of individual returns to investment in education. Jacob Mincer (1974), Gary Becker (1964) and a long list of researchers inspired by their work have produced hundreds of books and papers.

Much of this literature is highly technical in the sense that it uses formal econometric models to test hypotheses using empirical data. Some highlights of this impressive work will be sketched below, but the bottom line is that the economic evidence supports the view that both public and private returns to investment in education are positive—at both the individual and economy-wide levels. The vast technical literature on this subject can be subdivided into two general areas:

a. The micro-economic literature looks at the relationship between different ways of measuring a person's educational achievement and what they earn. Most studies show consistent results for what can be called the private or personal pay-off from education. For individuals this means that for every additional year of schooling they increase their earnings by about 10%. This is a very impressive rate of return.

b. The macro-economic literature examines the relationship between different measures of the aggregate level of educational attainment for a country as a whole and, in most cases, the standard measure of economic growth in terms of GDP. Once again, most studies find evidence of higher GDP growth in countries where the population has, on average, completed more years of schooling or attains higher scores on tests of cognitive achievement.

That education is an essential ingredient of prosperity is at once obvious and contentious. Obvious because any person able to read this text knows what a difference it makes in their lives to have gone to school, to have learned to read, write and calculate. Contentious because when social scientists try to “prove” that education is a cause of economic growth it turns out to be quite difficult to decide which came first, the chicken or the egg. What is more, even the basic terms such as “what is education” and “what is prosperity” become vast and cloudy terrains for the technical experts like economists, sociologists, education specialists and policy analysts.

about the relationship between education, defined as the classroom school system that has been the predominant way of organizing formal education throughout the 20th century, and economic growth, defined as the monetary aggregate GDP (gross domestic product) that is used widely by economists and the press to measure the economic performance of industrial societies.

Social and political reasons for associating education with growth, It is a hypothesis that rests on clarifying the role of one specific way of organizing learning, universal mass compulsory

classroom schooling and the preponderant kinds of knowledge that emerge from this process, with the creation of one particular form of prosperity, typically summarized by the metric of gross domestic product (GDP).

The hypothesis is that making investments in all the elements of a school system (teachers, buildings, text books, information technology, curriculum, supervision, testing, etc.) and then forcing young people to attend them (i.e. give up the income they might otherwise earn) is a necessary but not sufficient condition for expanding the gross domestic product of an industrial society. To be clear, the massive systems of universal compulsory schooling pioneered in the 19th century and “perfected” as well as extended to post-secondary education in the 20th century do not encompass all human learning—far from it. What people learn and know, the practices that are informed and inspired by experience and reflection arise from all kinds of human activity. However the argument here is that the specific cognitive, behavioral and social knowledge, that is the basic result of a specific form of schooling introduced in the 19th century, played and continues to play a crucial role in spectacular feats of industrial development.

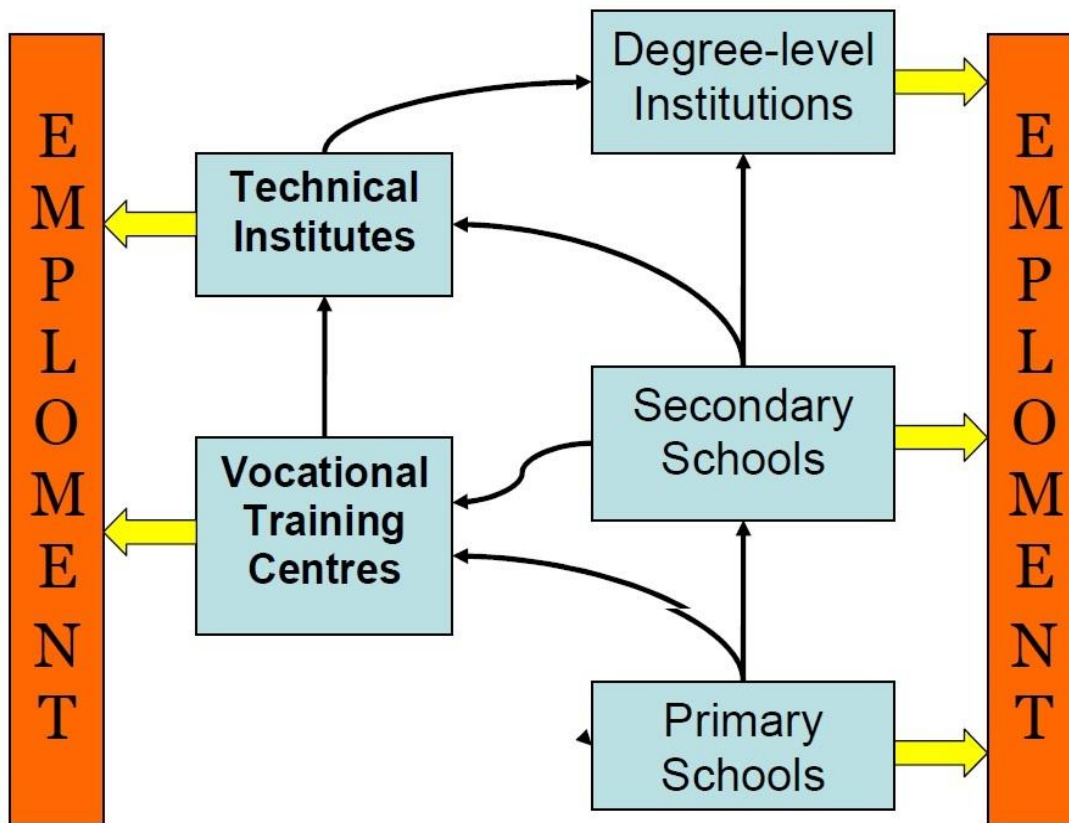
2.2.3 Technical and vocational education in Somalia

In most countries, TVET is normally regarded as that part of the national education system which refers to the set of learning opportunities that are offered to young persons and adults for the provision of basic skills training for occupational proficiency needs. TVET is sometimes regarded to be part of the non-formal education (NFE) system and this is the prevailing view in the Somalia education system. Before the civil war five main institutions offering TVET existed. These were termed technical schools and were located in Mogadishu, Kismayu, Burao and two in Hargeisa. Only the Industrial Vocational Training Centre in Mogadishu (established by GTZ) still has its equipment intact, the others were looted and the buildings badly damaged during the war. Only the Hargeisa Technical School is presently (partially) operating, as a result of some joint renovation work of part of the site by GTZ to allow a limited range of courses to be offered. Based on the research with the education authorities in Somalia, it appears that TVET is planned to be an integral part of the overall education system in the future.

Entry will be at the post-primary (Grade 8) level, as well as with provision for entry for secondary drop-outs and post-secondary level students (Grade 12). TVET is to be offered at

these different levels through vocational training centers (VTC) and technical institutes. Women will also be able to receive skills training through Family Life Education Centers (FLEC) and various types of women’s centres, many of which are already existing. Other forms of post-primary TVET that are planned are related to training to enhance livelihoods in the fields of agriculture, livestock and marine resources exploitation. Examples of institutions offering these types of training are the Veterinary Training School in Sheikh and AVOCATE in Boroma. Where and how TVET is envisaged by the local education and training authorities in Somalia to fit into the overall education system is illustrated diagrammatically in Figure below. The distinction between technical institutes and VTC is more with reference to the prewar situation. In practice at the present time there is no such differentiation and whether a distinction between two levels of TVET institutions is really needed at the present stage of development of the education system in Somalia is debatable.

Figure .. Position of TVET in the education system in Somalia.



In 2004 EC SOM OPS has a budget of €14.5m for education in Somalia. This represents 60% of the total education budget for Somalia. The majority of EC funding in this sector has been for projects and activities related to primary education, with a much smaller amount for secondary education and none concerning tertiary education or TVET. The proposed TVET intervention will be the first of its type for EC SOM OPS in the education and training sector.

Still, in spite of the efforts of the international community, weak coordination and fragmented implementation of actions has not supported the effective growth of the TVET sector. The choice of skills training is not always guided by the needs of the market but by need to 'address all needs' by projects whose scope is too small to warrant such undertakings.

Somalia does not have standardized curriculum or syllabi for TVET. There is also no standardized system for TVET assessment, examination and certification. The only standardized curriculum available but not being used in most of the TVET centers is the UNESCO PEER developed curriculum. It is imperative that this is considered in any future intervention.

Implementation of education programs in Somalia is coordinated through the Education Sector Committee (ESC), yet there are many partners with sub-programs falling under this sector but subsumed under a different thematic area. In such situations, the TVET does not receive appropriate technical direction for its success.

Poverty, insecurity, low expectations and an overall environment characterized by market imperfections limit skills development and will be critical challenges during project implementation.

Based on the findings, it recommends the following:

1. Financial support to partners and institutions implementing vocational training activities should demand a proportionate financial contribution from the partner government or institutions. This could take either or all of the following forms: cost recovery through charging user fees; government part funding to the VTCs or public-private-partnership.
2. Capacity strengthening of MOEs structures to execute a policy framework which will guide the quality implementation of vocational training by public and private institutions.

3. Given the nascent/formation level of the management structures of respective vocational training centers, it is critically important to train and build the functional capacity of these institutions on the vocational skills training concept and Employment Promotion so that they can be stronger in their role of designing and implementation of literacy and vocational training in skills with economic and social relevance to the community.

4. Orientation of the vocational training teachers on adult education pedagogy/methodologies. Even if they have been found qualified during recruitment, orientation is critically important for consensus and solidifying their understanding on vocational and livelihoods skills training objectives and expectations as well as the different stages in the learning process.

5. UNESCO needs to re/design modular training process entailing the following three areas:

(i) Basic functional literacy and numeracy skills.

(ii) Vocational and Livelihoods skills in identified trade areas.

(iii) Simple business management or entrepreneurship skills on identifying and evaluating a viable business idea, market effect on skills demand, getting started and basic management and book keeping, and customer care principles.

Continuous efforts should be made to bear in mind that livelihood and skill training is a process and not an episodic event.

6. Given the landscape of insecurity and the concomitantly heavy investment in security, it is advisable to link vocational training with peace and reconstruction efforts.

7. In order to enhance the marketability and relevance of the skills, it is critical to support a research and marketing development unit that regularly undertakes local Economic Development and Skills Market survey for consideration by VTCs in reviewing vocational skills curriculum. The training approach adopted should be one that links center-based vocational training and apprenticeships in which those being trained can undertake practical work with the local business/merchant community for purposes of applying the knowledge acquired and getting exposed in starting their own enterprises. The capacity of the master craftsmen to whom the trainees will be attached will have to be improved through training and induction on areas of practical emphasis.

The political and social turmoil in Somalia provides many challenges for young people, which could be potentially alleviated by providing them with opportunities to acquire appropriate

employable skills. Consequently, UNESCO is supporting the development of a systematic, coordinated, needs-based and institutionalized provision of vocational, technical and livelihoods skills approach in Somalia. By working with the local administrations, partners and institutions to set systems and standards for skills development, UNESCO aims at strengthening vocational, technical and livelihoods skills for development and participation of young people.

One of the major problems is the need to increase opportunities for employment and participation in income generation activities for the youth.

In the last 7 years, there has been increased attention by the international community to the revitalization of the TVET sector. Unfortunately, the capacity of the Ministry of Education to coordinate and monitor the implementation of the TVET is weak raising serious questions on quality and sustainability.

The result has been training that is neither linked to the market nor designed with adequate consideration of the capacity of the trainees to uptake and practices the skills effectively.

2.2.4 Institution-based TVET

The types of TVET courses currently being offered at the different VTC, These courses vary in length from 4 months to 12 months in duration depending on the course type with an average duration of 8 months. Some courses can be taken to certificate or diploma level but overall, the majority of currently available TVET courses correspond to a basic level of skills training. This is equivalent to Level III of the UNESCO PEER curriculum for TVET in Somalia. Significantly however the duration of the same course can vary between different VTC. This is an indication of a lack of standardization of the TVET syllabi in use by the VTC in Somalia and suggests that there is presently no uniform understanding/agreement on the required content and tuition time for TVET courses. In most countries this is normally considered to be a key function of education ministries in collaboration with other concerned bodies.

This issue is closely linked to the need for standardized and agreed TVET curricula/syllabi. At the present time there are no VTC operated by the concerned education authorities in Somalia. Almost all are either private, ‘for-profit’ training centers or else run directly by INGO or indirectly by their LNNGO implementing partners.

There are a significant and increasing number of private training centers in all the larger towns in Somalia. For example, Bossaso is reported to have 8 private management/accounting schools and

5 centers offering computing courses, while Hargeisa has almost double these numbers²⁷. The courses they offer can be considered as TVET courses in the broadest sense but are limited to 'office-based' professional skills and do not include the more traditional, technical/mechanical trade skills. Courses offered are largely confined to the five main subject areas mentioned earlier. Some training centers also offer Islamic studies as well as supplementary education subjects, e.g. Somali, maths, English and science, for those who have some gaps in their formal education.

The labour market study indicates that private sector businesses providing education and training services are one of the most dynamic sectors of local economies and there is a growing need for part-time trainers to teach in private training centers. The availability and level of teaching skills of all types of trainers and instructors is a problematic area for TVET in Somalia.

FLEC and Women's Centers are also common in Somalia, funded by several UN agencies and INGO, These centers all offer broadly the same range of **courses for women**, typically some combination of sewing, tailoring, knitting, cooking, tie dying, weaving and handicrafts. The better equipped and more ambitious centers may also offer typing & computing. Normally literacy and numeracy courses are also offered at these centers.

The payment of course fees is another problematic issue in Somalia that needs to be carefully addressed in the design and implementation of the proposed EC project. None of the existing VTC appear to be covering their operating costs. In discussions with VTC managers the mission was repeatedly told that people were not able to pay the full costs for their training courses. A number of VTC are charging nominal course fees. In some cases, there were no course fees and the issue of course fee payment was not addressed. VTC in Somalia need to be encouraged and supported to manage themselves in a more commercial manner if they are to have any hope of become sustainable. For the proposed EC intervention this implies that the TVET component needs to be implemented and managed with a strong emphasis on cost-recovery through course fee payments from the start. Some agencies have expressed an interest in sending beneficiaries from other programmes to any IBTVET established under the proposed EC intervention. This could be used to help promote a more commercial approach to VTC management based on a coherent course fee payment or training voucher system.

Some VTC have established production units in attempts to create revenue streams that will help to cover operating costs. Based on the mission's findings and other international experiences, a cautionary note is needed. These production units or workshops benefit from facilities and

equipment provided by the VTC. As in the case of others enterprises, they are producing for private clients. VTC often state that they are independent and private. However in most cases it is noted that these workshops do not have appropriate accounting practices. The ownership of equipment is not clearly specified and no depreciation rate is integrated in the pricing of products. Very often the price margin is seen as a net profit and provisions for reinvestments are forgotten. The financial transfers between the VTC and production workshop are not integrated in a client/supplier relation. When the first difficulties come up (equipment to renew or to repair) the production workshop does not have financial resources available, as income has already been used for VTC functioning. Consequently the financial position of the production workshops deteriorates and the workshop is unable to establish a viable, financially independent position.

2.2.5 Development of technical and vocational education in Somalia

Financial support towards development of TVET sector by EC, Italian Cooperation, UNDP and other international development partners have resulted to enhanced institutional framework for implementation of vocational training. In particular, capacity has been developed in the ministry of Education to the establishment of TVET units, administered under the NFE department headed by a Director. TVET policy developed under the EC funded PETT project has already been approved and adopted by MOE, the draft policy developed under the same project has not been finalized for adoption by the council of ministers and parliament.

Personnel working in Vocational Training Institutions have benefited from capacity building programs funded by EC and UNESCO support. The vocational training centers in Kismayo, Mogadisho, Berbera, Burao, Hargeisa, Galkaio, Garowe and Bosaso have received support in the form of equipment. The Kuwait government contributed equipment towards Garowe Technical and Vocational Training center. However, due to low pay, the institutions have not been able to retain all the trained personnel.

However, as captured by End of Project evaluation report of PETT (Promotion of Employment through Training) project, there are many gaps that the current grants are not able to completely address owing to the large number of people who need the skills.

The vocational training manuals developed by UNESCO for 11 crafts and trade skills covering levels 3 & 2 are the only coherent manuals that exist. The manuals have been good references

materials for vocational training programs implemented from different funding sources in Somalia.

Several studies undertaken by international development partners indicate that the vast majority of the 14-20 year age group is out of school and with very limited access to education and skills training. Among the urban, rural and pastoral families, lack of employment and poverty are consistently ranked the most common problems and potentially the most common causes of other social problems.

The institutional framework for implementing TVET in all the zones in Somalia is weak and currently not able to offer technical support that would guarantee quality control, registration and certification of all the institutions providing vocational training.

The Technical, vocational and livelihood skills development envisaged by UNESCO is in tandem with the Rehabilitation and Development priorities for Somalia that can partly be pursued through supporting sustainable livelihoods improvement via provision of employable skills to the youth. Currently the majority of the youth have limited knowledge and skills to enhance their employability (self or paid) and productivity. It is recognized that chances of gainful employment are enhanced by acquisition of employable skills.

The Technical and Vocational Education and Training (TVET) in Somalia are very limited due to lack of adequate infrastructure and systems to implement the activities falling under the sector. Trainings are provided by private vocational training centers and the few public training centers funded by the international community. As institutionalized training is limited, most trainees acquire their skills through apprentice training. In effect the quality of skills acquired is dependent on the capacity of the trainee and the quality of the trainers/craftsmen to provide training. TVET needs to be expanded in order to produce skilled artisans and middle level technicians who will eventually strengthen the Somali economy, which can then increasingly rely on their own domestic workforce. Consequently, the MOEs need support in order to expand their capacities by strengthening the TVET framework.

The increased efforts by the international community to provide improved technology (eg motorized water pumps, grain milling machines, tractor hire, and improved livestock management systems) are intended to raise productivity and value addition to cushion people's livelihood activities from the effects of extreme weather patterns. Due to limited technical skills, the uptake and sustainability of this technology has been discouraging. The low unemployment

in the rural areas by itself is deceiving as there is plenty of disguised unemployment. Many implementing partners (IPs) have activities under the broad category of livelihoods development. These entail beekeeping, tailoring and dressmaking, soap making, sesame oil extraction and flour milling. By funding livelihood activities, Implementing partners plan to graduate the communities from emergency to development status. But despite the increased programming around the livelihoods development activities, beneficiaries are not being linked to vocational training institutions to acquire the relevant skills; in other regions, skills training opportunities are completely lacking. Evaluation reports of many of these interventions present a very grim picture of the sustainability of provided technologies. The primary objective in providing the technologies was to increase productivity that was to result to increased income and employment opportunities for the many unemployed youth in the urban and rural areas.

A countrywide market feasibility study conducted by European Commission in 2004 re-confirmed this state of affairs by citing the following constraints in the TVET sub-sector.

- Weaknesses in the management of TVET activities;
- Difficulties of quality assurance for TVET, especially limited availability of course syllabi and lack of qualified technical trainers;
- Limited number of standardized TVET courses;
- Lack of standardized assessment and certification services;
- Urban bias of TVET opportunities and limited benefits to rural communities;
- Difficulties of sustaining TVET interventions;
- Lack of strategic planning for TVET by local authorities;
- Limited capacity of local authorities to manage TVET

Prior to the civil war that culminated in the collapse of the government in 1991, Somalia had functioning technical and vocational institutions in Mogadishu, Kismayu, Burao and Hargeisa that specialized in a range of technical courses and traditional trades at craft and artisan levels. Youth joined these institutions to acquire specialized skills that in turn enabled them to join the employment sector, either as employees or self employed persons.

Most of these institutions were however destroyed or run down during the long period of civil. Consequently, these events resulted to high drop out of youth from schools to add to the number

of unskilled youth that existed even before the civil war. With limited skills and no functioning education system, the youth had limited livelihood options.

In apparent response to the demand for education and vocational skills training, the international community through UN, INGOs, LINGOs have supported the rehabilitation and or construction of vocational training centers in major towns of such as Hargeisa, Berbera and Burao, (Bosaso, Garowe, Gardo and Galkaio, Mogadishu, Merka, Baidoa.

Most of the functioning institutions are owned by local Institutions and governments through the support of the International Community.

Several skills provided in these institutions include: garment making, soap making, tie and dye, carpentry, computer technology, masonry, electrical installation, plumbing and metal fabrication.

2.2.6 Livelihoods skills development

Pastoralist and farming is central to all elements of life in Somalia. Income generation and livelihood activities undertaken by the majority of the people are either directly or indirectly related to these two key economic activities, which despite challenges, they are still the key to economic and social development at the community and household levels. The poor in particular derive their livelihoods from activities that have a direct link to crop and livestock production. Numerous constraints exist at the political and macroeconomic levels in relation to conflicts, land, and water administration, trade restrictions, and infrastructure. In addition, technical and physical constraints include: a harsh/arid climate with erratic rainfalls and recurrent dry periods; poor quality soils; marketing constraints; and domestic price distortions. Major constraints at the household and community level identified include:

- (a) Few opportunities for acquiring new knowledge, technical expertise and managerial skills for efficient management of Income Generation Activities;
 - (b) Limited access to efficient markets for pastoral and farming output;
 - (c) A lack of skills and organizational capacity to sustainably manage existing resources for enterprise creation and growth,
 - (d) Underutilization of limited non-traditional enterprise activities for livelihoods diversification.
- Lacking entrepreneurship training, capital and marketing support; the disadvantaged eke a living as casual labourers and micro-enterprises operators, where they earn less than enough income to

meet total household needs. Resultant failure to meet basic needs is the increasing number of unemployed youths that are highly susceptible to be recruited into crime.

The sectors are still relatively underdeveloped and the extent to which they can be relied on to create employment is limited unless there is injection of new skills to increase productivity and profitability. The skills provided should entail value addition through simple processing and improved marketing efficiency. Further analysis of the sector will be useful to guide in pinpointing the specific scope of interventions.

2.2.7 Employment promotion and TVET intervention

UNESCO Regional Programme of Education for Emergencies, Communication & Culture of Peace (PEER) implemented a programme of basic and vocational education for demobilization of youth in Somalia in Mogadishu through two local NGOs in 2001 - 2002. The approach used was EBTVET and this proved largely successful in providing employment for the trainees.

UNESCO PEER has also supported the production of TVET syllabi for Somalia. The proposed EC intervention will benefit from the lessons learned by UNESCO PEER and the materials it has already produced. The proposed TVET activities of the EC intervention will be able to support the introduction of standardized TVET syllabi, assessment and certification thereby complimenting and adding value to the work already done by UNESCO in this field. ILO has been actively promoting a Local Economic Development (LED) approach in Somalia since 2002 in connection with the Promotion of Economic Recovery, Employment creation and Support to Decentralization in Somalia (PERPS) programme. LED is a process that assists local communities to develop their capacity to stimulate and accelerate economic and business/livelihood growth and to sustain this in the long run. With the foundations for identifying, planning and implementing actions, the different stakeholders can start developing economic opportunities through different supporting programmes. LED is an evolving methodology based on a participatory development process that encourages partnerships between the main private and public stakeholders in a defined geographical area. The focus is on a longer term and broader approach to employment creation that addresses the wider issues of local economic development. The use of territorial diagnosis and institutional mapping (TDIM) is central to the LED approach. Since 2001 UNDP has also been funding two VTC in Somalia, the Berbera Port Training Centre and Bossaso Port Training Centre under the Poverty Reduction and

Economic Recovery (PRER) programme. These two VTC were originally established by UNCTAD in 1996 with the original intention of helping these two ports to develop their human resources to operate the newly renovated ports more efficiently. With the end of UNCTAD funding, UNDP PRER took over support to both VTC but will phase out its low-level funding over the next three years. UNDP PRER has been trying to encourage both VTC to become self funding and autonomous, however, despite both VTC having suitable premises and equipment for the courses they offer, there has been little progress in this direction to-date. As part of UNDP Rule of Law and Security Programme (ROLSP), support to demobilization, disarmament and reintegration (DDR) activities has been included. This includes a currently ongoing EBTVET project in Mogadishu. In the second half of 2004, UNDP will shortly commence a 43 month project (budget US\$ 1.2m) to establish a Public Administration Training Institute in Hargeisa for the purpose of training and capacity building activities with civil servants authority. This should add value to the proposed intervention as significant numbers of officials at all levels in the ministries occupy posts for which they are untrained and lack the necessary basic skills. UNHCR has provided support to some LNGO to provide TVET for returning refugees and IDP. In particular in Hargeisa UNHCR is presently supporting a LNGO with funding for the construction of VTC premises, purchase of equipment and operating costs for running a range of TVET courses. This has not however been done in a wider framework of support to institution based TVET in Somalia and with little consideration of VTC sustainability or donor coordination. Cases of other LNGO-run VTC in Hargeisa and Bossaso established and initially run with funding from an INGO but now closed or barely operating provide clear lessons about the difficulties LNGO have in managing sustainable institution-based TVET and the need for improved donor coordination.

The Swedish International Development Agency (Sida) has provided funding to Gothenburg Initiative (GI), a Swedish NGO, for a number of activities including TVET in Galkayo VTC. The VTC premises are those of the former Galkayo Technical School built by the Islamic Development Bank (IDB) but never brought fully into operation. GI has been able to agree with IDB that it can make use of the premises to establish a VTC for the benefit of the people in Galkayo and that this will be handed over to the Galkayo Municipality in the future. It has also been able to establish a well managed VTC offering quality TVET and has been able to engage women in learning trade skills normally regarded in Somalia as only for men. The proposed EC

intervention can take advantage of these experiences and results to provide a model for IBTVET in Somalia.

CARE International has been extensively involved in providing EBTVET through LNGO in Somalia and a number of these programmes are still being implemented. Overall these interventions appears to have been very successful in providing meaningful EBTVET opportunities for significant numbers of youth, many of whom have gained jobs in the host enterprises or started their own small businesses after completing the EBTVET programme.

On the one hand, there are problems about ensuring training quality and EBTVET becoming a significant source of income for some host enterprises. However on the other hand it is apparent that EBTVET can be a very cost-effective approach to TVET in terms of employment promotion.

2.3 General problems faced by in service electrical and electronic engineers

In the developed countries, Employees are the backbone of an organization. Hence, the retention of the employees is important in keeping the organization on track. In order to retain the best talents, strategies aimed at satisfying employee's needs are implemented, regardless of global companies or small-sized firms. According to Armstrong and Kotler (2008), it is vital for firms to apply the right marketing strategies in order to succeed. Traditionally, organizations have focused their marketing strategies of attracting new customers and increasing their market share. However, due to improved business strategies, most industries and markets are appropriate more and more competitive forcing significant changes in the way firms do business (ibid).

They speak positively about the firm in comparison newer customers; they are also less expensive and easier to serve. Robbins and Judge (2007) indicate that satisfied employees were increase the customer retention this is especially true of frontline employees working customer sectors and are directly related to the customers. However, according to Hamberg and Stock (2007) even though job satisfaction and customer retention are significant business outcome and have been widely studied, the relationship between the two variables been studied at the organizational and service level of the firms, with limited studies of two variables within business to business context.

In Somalia, private companies have done for public services providing the basic services and maintaining the corporate social responsibility since the collapse of Somali republic in 1991.

Private telecommunication companies have made the telephone system and the internet possible to communicate, send and receive a lot of information quickly. According to Naaji (2012), the major dilemma in Somali communication companies, they do not measure the satisfaction of their customers, while the customer is related directly to the profitability. If your customers are happy, they tend to be loyal. In addition, if they are loyal they not only buy more, but also attract other customers. Well-established research found that, for many companies, an increase of 5% in customer retention could increase profits by 25% to 95% (ibid).

The term employee satisfaction literally has many definitions, which a great number of authors defined, such as Robbins (2003) defines “Job satisfaction as means what are the feelings of different employees about the different dimensions of their jobs”. Job satisfaction may be the general behavior emerged due to different happenings at the work place; it may be supervisor’s behavior, relationship with peers or the work environment (Janet, 1987).

His second variable of the study is customer retention and according to Egan (2004) defines customer retention as the strategies focusing on firms existing customers with the aim of securing a customer’s loyalty over time. Ranaweera and Prabhu (2003) defined customer retention as the tendency for customers to stay with their services providers. Researchers were use the definition of Ranaweera and Prabhu (2003) customer retention as the tendency for customers to stay with their services providers because it is clear, concise statement with more meaningful.

Employee satisfaction is one of the central factors that can help the employer to improve the personnel and organizational performance. Job satisfaction refers to how employees recognize their jobs (Mc Shane &Glinow, 2005). It is an emotional state resulting from experiences at work. If employees experience high satisfaction with their jobs, it may create enjoyable emotional State (Bartolo&Furlonger, 1999). On the other hand, it is significant for service providers to understand why the customers stay or leave and what creates value for them also, firms require to recognizing those customers with whom they want to create long term strategy Jobber (2001).

However most private companies in Somalia especially telecommunication and electric companies they do not give more consideration to satisfy their employee and mainly this problem backs to there is no labour right in Somalia since after collapse of central government of Somalia since 1991. some of those problems are, induction process stage the most workers

are working a field that is not related to their educational background and also there is security problem but new workers are guided by their senior during the work and they provide some guidance to be capable to do the work, the rules and regulation are strictly followed but some senior employee are not applicable to that rules because of their positions. The telecommunication and electric companies in Somalia they have poor training facility comparing to the developed and some developing countries, installing or replacing one system to another system it takes more time because of the lack knowledge, and it's difficult to the employees to get opportunity for higher studies in to his company but the telecommunication company they provide their employee some promotion and that promotion is not fix amount it changes time to time, according to working condition the managers they are responsible to set weekly working hours and mostly it's not based on according to international standards, engineering staffs are difficult to get annual holiday, and most of the companies they don't have transport facility and the employee they have to use their own money to reach working place, and all companies they don't have free medical care and also the companies they don't provide education facilities to the family of the employee.

The common problem of the electrical and electronic engineers is that they don't have sufficient knowledge about practical problem in the field, and main causes of that problem is the private institutes because they don't have good labs and equipments and they produce low skilled engineers and the curriculum of the engineering degree doesn't match with the practical field.

Specific problems faced by serving electrical and electronic engineers.

2.3.1 Administrative problems that electrical and electronic engineers faces on the job

Administrative can create complex problems when they monitor workers. Should administrative be able to monitor their workers? If so, what should they be restricted to monitoring, and do the employees have the right to know that administrative are monitoring them. Each of these questions creates a multifaceted response from both the employer's side, as well as the viewpoint of the administrative. As Frayer (2002) notes, increased employee use of the Internet created opportunities for several companies to produce sophisticated monitoring software, which enables employers to peer into literally everything employees do online. According to Frayer,

organization created employee monitoring because there was a substantial need for organizations to monitor their workforce. If a company owner does nothing to stop these counter-productive activities, then it is not likely the owner could stay in company. Workplace monitoring can be beneficial for an organization to obtain productivity and efficiency from its employees (Bezek, Britton, 2001). The enormity of potential productivity losses, as reported by Court (2004), is approximately one million dollars annually for a company with 500 employees surfing the Internet for just a half hour a day. Using these facts, if an employee spends two hours per day on the Internet, and the organization has 500 unmonitored employees, the potential annual loss could be nearly \$4 million. While computers are often essential work tools, giving employees open, unmonitored, computer access causes productivity and efficiency to suffer. There has to be a balance between protecting the company's information assets without going overboard to the point where employees feel alienated. Education and communication are the best tools to attain this balance. Educate workers to let them know what monitoring is, what it will monitor, and convey the message that this monitoring is not due to lack of trust, but is being used to protect the company. The main disconnect between the organization and the employees interpretation is poor communication or training (Duffy, 2003). Lawyers generally advise that one way for businesses to avoid liability for monitoring employees' online activities is to take all necessary steps to eliminate any reasonable expectation of privacy that employees may have concerning their use of company email and other communications systems (Duermyer 2007). People, the employees, by nature generally tend to desire more freedom and less monitoring. Many people and organizations are against monitoring the activities of people in the work place. Opponents include civil liberty groups, privacy advocates, and many employees themselves. Among the major criticisms of electronic employee monitoring, as noted by Watson (2001), are increased levels of stress, decreased job satisfaction, decreased work life quality, and lower levels of customer service. Monitoring can create a hostile workplace, possibly eliminating the whole point of monitoring in the first place (i.e., to increase efficiency). Watson (2001) continues to say labor unions and other advocacy groups have complained exceedingly about electronic monitoring – charging that it invades employees' privacy, causes work-related stress, and low morale, and employers can use it unfairly. It is possible that employees will feel like their employers are treating them unfairly - resulting in the employees taking less initiative, and perhaps do only the bare minimum just to keep their job. Therefore, from an employee stance,

workplace monitoring could be detrimental to productivity and efficiency. The need comes from more than just a desire to increase productivity, but there are also issues relating to protection from potential legal liability. Security is yet another reason that gives rise to an organization's need for employee monitoring. Woodbury (2003) explains that opening unsolicited e-mail at work creates danger because attached files could contain a virus, wreaking havoc on a workstation hard drive and then spreading through a company's entire computer network. With more monitoring, a company could perhaps prevent, or at least detect sooner, a computer network vulnerability created unknowingly by employee e-mail. Managing the knowledge of an organization could also help catch employees who may be giving away a business' trade secrets, designs, or formulas, to a competitor (Oprea, 2012).

2.3.2 Impact of gap between engineers and managers

Engineers are responsible for millions of dollars of revenue, yet few people know about it. Meanwhile, engineering staffs are being reduced, in part because management cannot articulate and promote their value. A gap exists between what engineers are delivering and what management is seeing and understanding. The work-culture divide between engineers and management can be a source of frustration, career stagnation, and poor business decision-making. This disconnect is not just a gap in communications, but also one of expectations and understanding. The two groups are focused on different results, with different objectives and different measures of success. A typical engineer is focused on the details of the problems in his facility. Engineers find joy in the act of solving problems. They want to dive in to the technical details and develop scientific ways of analyzing and measuring the problem. They are often reluctant to share results until they are certain and have documented proof. In addition, some engineers do not enjoy communicating their results to people who may not have a nuanced appreciation of the problem. Managers, on the other hand, may not have the time or inclination to delve into the technical details that interest and motivate engineers. Managers often want to get "straight to the bottom line," using a limited set of business metrics: production, cost, quality, reliability, safety, and environment.

In fact, managers may become frustrated when engineers cannot describe their results according to these metrics. And, unlike engineers, managers often seek the spotlight, recognizing the value of self-promotion, especially when they have positive results to share. To help bridge these gaps,

engineers can learn techniques to identify business priorities, put those improvements into effect, and communicate the economic value to management using business metrics. Managers can become better collaborators and coaches by learning more about how engineers work, and then teaching them how to think in business terms, how to demonstrate bottom-line value, and how to communicate with a broader audience.

Today's engineers face increasing responsibilities and a huge influx of data, e-mail, and other requests. In this environment, the challenge is setting priorities. The engineer must triage his daily activities so that the most important items receive primary attention. Triageing priorities takes discipline. Before agreeing to work on a problem, determine its relative business value, how it relates to production, cost, quality, reliability, safety, or environmental objectives. In addition, be aware of the overall business climate in your company and at your facility, because priorities may shift from month to month. For example, when a plant is sold, production usually becomes the primary focus. When sales drop off, the focus often shifts to cost reduction. By staying on top of such trends, you will be better positioned to deliver results that managers want to see. Suppose you want to increase production. Begin by reviewing data from the process historian to identify potential bottlenecks, such as control valves that are open for a significant portion of the time. You can then apply your process knowledge to determine which valves or pumps should be upsized to provide maximum benefit. If quality is the primary concern, start by looking for sources of process variability. Control-loop monitoring tools are an excellent way to quantify process variation because they can sort data by their variances or by specific components of oscillation. Reducing process variability usually yields an immediate improvement in quality.

2.3.3 Problems of computer use on the health of the electrical and electronic engineers

The increased use of computers in the field of electrical and electronic workplace has brought about the development of a number of health concerns. Many individuals who work at a computer report a high level of job-related complaints and symptoms, including ocular discomfort, muscular strain and stress. The level of discomfort appears to increase with the amount of computer use. Visual discomfort and related symptoms occurring in computer workers must be recognized as a growing health problem. The complex of eye and vision

problems related to near work experienced during computer use has been termed "computer vision syndrome". Many individuals who work at a computer experience eye-related discomfort and/or visual problems. However, based on current evidence it is unlikely that the use of computers causes permanent changes or damage to the eyes or visual system.

Studies have found that the majority of computer workers experience some eye or vision symptoms. However, it is unclear whether these problems occur to a greater extent in computer workers than in workers in other highly visually demanding occupations. The most common symptoms are eyestrain, headaches, blurred vision and neck or shoulder pain.

The extent to which an individual may experience symptoms is largely dependent upon his visual abilities in relation to the visual demands of the task being performed. These vision problems are not new or unique to computer use. Many individuals in other highly visually demanding occupations will experience similar vision related problems. However, the unique characteristics and high visual demands of computer work make many individuals susceptible to the development of eye and vision-related symptoms. Uncorrected vision conditions, poor computer design and workplace ergonomics and a highly demanding visual task can all contribute to the development of visual symptoms and complaints.

Vision problems experienced by computer operators are generally only temporary and will decline after stopping computer work at the end of the day. However, some workers may experience continued impaired or reduced visual abilities, such as blurred distance vision, even after work. If nothing is done to address the cause of the problems, they will continue to recur and perhaps worsen with future computer use. Work that is visually and physically fatiguing may result in lowered productivity, increased error rate and reduced job satisfaction. Therefore, steps should be taken to reduce the potential for development of stress and related ocular and physical discomfort in the workplace.

Viewing a computer screen is different than viewing a typewritten or printed page. Often the letters on a computer screen are not as precise or sharply defined, the level of contrast of the letters to the background is reduced and the presence of glare and reflections on the screen may make viewing more difficult. Viewing distances and angles used for computer work are also often different from those commonly used for other reading or writing tasks. As a result, the eye focusing and eye movement requirements for computer work can place additional demands on the visual system. Older workers particularly may find adjusting to these working requirements

difficult. Eyeglasses or contact lenses prescribed for general use may not be adequate for computer work. Specific occupational lenses prescribed to meet the unique demands of computer work may be needed. Special lens designs, lens powers or lens tints or coatings may help to maximize visual abilities and comfort. Computer workers who receive eye examinations and occupational eyewear have reported improved comfort and resolution of their symptoms. The quality and efficiency of their work have also been improved. Some computer workers may experience problems with eye focusing or eye coordination that cannot be adequately corrected with eyeglasses or contact lenses. A program of optometric vision therapy designed to treat specific binocular vision dysfunctions may be needed. A preventive approach to reducing visual stress from computer work incorporates the use of rest or alternate task breaks throughout the workday. Many computer tasks are repetitive and can become stressful both mentally and physically after an extended period of continuous work. Occasional rest or alternate task breaks are helpful to combat fatigue and stress. They provide an opportunity to incorporate different and less visually demanding tasks into the work regimen. Specific rest or task breaks should be based on the individual visual needs of the operator.

Like most electrical appliances, computers emit both ionizing and non-ionizing radiation. These include visible light, ultraviolet, infrared, and x-ray and radio frequency emissions. However, computer emissions are often so low as to be un-measurable or are found to be significantly below recommended safety levels. Numerous studies have been conducted to determine what effect, if any, radiation levels emitted from computers may have on workers' health. Repeated studies to date have failed to find any direct link between computer use and radiation related general or eye health problems. There is no evidence that radiation from computers contributes to the development of cataracts. While not technically a form of radiation, most computers will build up an electrostatic charge in the vicinity of the screen surface. Static charges can cause the attraction and accumulation of dust and other airborne particles on the face of the computer screen. Although there is no conclusive evidence, it has been suggested that these charges may be related to the development of skin rash or eye irritation in some very sensitive people. This problem can usually be managed by cleaning the computer screen regularly.

One of the most significant environmental factors affecting computer work is lighting.

Surveys indicate that many computer users report problems with general workplace lighting, glare and images reflected on the computer screen. Many problems related to lighting may be

caused by the introduction of computers into offices where the lighting was originally designed for traditional desk top work. Bright lights in the peripheral field of view may cause discomfort glare. Windows, overhead fluorescent lights and desk lamps often contribute to this problem. These bright light sources can be controlled with proper workstation and/or room design and arrangement. An acceptable lighting level may require a compromise between that amount of light needed to enhance computer screen visibility and reduce reflections and glare and that needed to perform other office reading and work tasks. Older individuals will generally require more light than younger individuals to perform the same tasks comfortably. Workers over 50 years of age require twice the light levels of young adults for comfortable work.

2.3.4 Lack of engineers training opportunities

There is a broad range of skills and services that fall within the ambit of engineering and not all of these are provided by “professional” (four year university trained) engineers. Most professions, including engineering, acknowledge the broad scope of possible practice within them, and allow for differences in qualifications and for specialisation in areas of work. Engineering work is undertaken by individuals trained at both university and through the vocational educational system. As a group these engineers form the “Engineering Team”.

For example, engineers can be divided into three main occupational categories. These are professional engineer, engineering technologist and engineering officer/associate. The occupational categories can be differentiated by the length of education and training undertaken by the engineer.

Professional engineers, technologists and associates come together in different combinations to undertake projects and programs. Their activities and competencies are often closely inter-related with some features of engineering being common to all three categories. All members of the engineering team work together and provide services to each other in order to complete engineering tasks.

Just like the university system, the vocational education system (VET) needs to increase graduation numbers in order to meet industry needs. Skill shortages exist across the engineering team and the problems of attracting students to study engineering are equally valid for both the university and vocational education system.

The current blurring of the boundary between the delivery of vocational (VET) and university education does not need to have a negative outcome. There are significant benefits to creating clear pathways between vocational and higher education where students can maintain lifelong learning by jumping in and out of education between vocational and university provided training. Setting up pathways between VET and university education with clearly defined options and credit transfer arrangements would support the different roles of VET and university education and encourage life-long learning. Given that skill shortages are being experienced in engineering at both the trade, associate, technologist and professional level, training options need to be maintained at both the vocational and university level.

A shift toward any one level could have a negative outcome as engineering skills are needed by industry across the engineering team. A focus on education and training opportunities, with the application of “schoolroom solutions” to encourage students into engineering careers are all important in working to ameliorate engineering skill shortages in the telecommunication industry.

The earlier reports by Engineers Somalia on the industry considered an action program to counteract skill shortages in the sector. Many of the options canvassed remain relevant and Engineers Somalia recommends the findings of the report related to the development of an action plan to the Committee.

Engineering for telecommunication Sector Growth indicated that despite the shortage being recognised by telecommunication sector organisations, very few were taking substantial action to counteract the situation. This is despite organisations having the potential to undertake initiatives aimed at both reducing staff turnover and attracting experienced telecommunication engineering staff. The report recommended that companies consider the introduction of policies and programs which:

- reduced the number of engineers moving into another industry sector,
- reduced the number of engineers moving into non-engineering management in the telecommunication sector,
- attracted former telecommunication engineers who now work in another sector,
- redeployed experienced telecommunication engineers who are working in telecommunication sector organisations on non-telecommunication projects,
- retained engineers who would otherwise take early retirement,

However, because these actions do not address the underlying reasons for shortages the report suggested that the most effective actions to ensure the availability of a pool of skilled engineers in the long-term were:

- increasing the number of graduates in the telecommunication sector,
- increasing the number of experienced engineers employed from other sectors in the telecommunication sector,
- increasing the number of telecommunication employees who upgrade their qualifications and skills into/within the engineering team. For example, engineering technologists who undertake study to upgrade their qualifications to the level of a professional engineer.

The key recommendation was that a sector-wide skills strategy was required for the telecommunication industry.

Given the ongoing nature of skill shortages it would seem that this recommendation is still valid and that a strategy must be developed as a priority and include the input and support of industry, government, professional associations and education providers.

Comments from Somali Engineers indicate that a number of options exist to increase the number of graduates interested in being employed in the telecommunication sector including the introduction of industry based training opportunities, a promotional campaign to raise the profile of telecommunication engineering and excite the interest of students so they consider telecommunication engineering as a career and the introduction of telecommunication specific undergraduate electives and design projects to encourage engineering students to seek employment in the sector. Other suggestions were the need to increase industry linkages with university programs including opportunities for students to undertake industry placements with companies in the telecommunication sector and increased options to specialise in the industry with post-graduate and short-courses.

2.3.5 Impact of skill shortages of electrical and electronic engineers

Skills are often divided into two types: transferable or generic skills, which can be used across large numbers of different occupations; and vocational skills, which are specific occupational or technical skills needed to work within an occupation or occupational group. Hence, the labour market can be viewed as not one homogeneous market, but several smaller markets, each defined by the skill levels/types demanded and supplied by the participants. The Employers Skill Survey

(ESS) provides two definitions of lack of skills. The first is skills shortages, defined as recruitment difficulties caused specifically by a shortage of individuals with the required skills in the accessible labour market. Alternatively, there are skill gaps which are deficiencies in the skills of an employer's existing workforce, both at the individual level and overall, which prevent the firm from achieving its business objectives. Skill gaps can be defined in two ways: a broad definition includes all establishments that reported that at least some of their staff lacked full proficiency; a narrow measure includes only those establishments where a significant proportion of the workforce was reported lacking full proficiency. In the 2001 ESS a significant proportion was defined to be a third or more staff in at least one occupational area. As one would never expect to have a workforce in which everyone is always fully proficient (it takes at least some time to get to grips with a new job), Some firms experiencing internal skill gaps may not recruit because of the perception that the relevant skills are in short supply, that is, the same skills are lacking for both types of shortages. Research on the results from the ESS found that both types of lack of skill rarely overlapped in firms. The 2001 ESS found that only 1 per cent of establishments experienced both skill gaps and skills shortages. This suggests that firms experiencing skill gaps either decided not to use recruitment as a solution to the skill gaps or recruited new staff without difficulty.

The employers most affected by skills shortages were primarily in high skill occupations typically requiring long periods of education and training. In contrast, skill gaps were most common in low-skilled occupations such as sales, personal services, and operative and assembly occupations. Although the ESS uses a stringent definition of skills shortages, there are other sources which use different definitions.

Skills shortages arise when there are more vacancies with certain skills needs than there are people available with those skills. The 2001 ESS found that the main occupations associated with skill-shortage vacancies were those where relatively long periods of education and on-the-job training are needed to gain the required skills and knowledge. Although professional, associate professional, and skilled trades account for only 34 per cent of all jobs, 56 per cent of all skill-shortage vacancies were in these occupations. The sectors which had the highest density of skill-shortage vacancies were engineering and business sectors. The skilled trade skill shortage vacancies were predominantly in manufacturing and construction and the professional and associate professional skills shortages were concentrated in business services, although for

associate professional and professional skill-shortage vacancies a fair proportion were in health and social care. Comparisons with 1999 show that skills shortages have eased in all occupations with the exception of professional and elementary occupations (such as porters and cleaners) where the share of skill-shortage vacancies has more than doubled for both. The Reed Skills Index has consistently highlighted four occupational areas in which organisations experience difficulties in recruiting: secretarial and administrative staff; technical and engineering; IT; and accountancy. Secretarial staff has ranked high consistently since 1998, and the levels seem to remain stable. The reported frequency of recruitment difficulties in technical and engineering occupations has recently increased. IT skills showed strong and growing shortages up until the beginning of 1999, and have eased since. The 2001 ESS found that although administrative/secretarial staff had a high proportion of vacancies its proportion of skill-shortage vacancies was modest. This highlights one of the dangers involved in using recruitment difficulties as a proxy for skills shortages. The Reed Skills Index is useful, however, because of its timeliness and frequency The ESS has been produced twice, in 1999 and 2001, and data were only available several months after collection.

2.3.6 Role of the managers that influences an engineer's decision to stay or depart from the company

People will leave if they don't like their manager—even when they are well paid, receive recognition and have a chance to learn and grow. In fact, disliking or not respecting the “boss” is the primary reason for talent loss. Reasons for employee departures cited in major research studies, are, in descending order (Buckingham and Coffman, 1999; Kaye and Jordan-Evans 1999; Kreisman, 2002; Herman, 1999):

1. Employee/manager relationship.
2. Inability to use core skills.
3. Not able to impact the organization's goals, mission.
4. Frequent reorganizations; lack of control over career.
5. Inability to “grow and develop”.
6. Employee/organization values misalignment.
7. Lack of resources to do the job.
8. Unclear expectations.

9. Lack of flexibility; no ‘whole life balance’.

10. Salary/benefits.

It is very important to know that the above factors are often NOT the ones mentioned in attrition studies published by individual organizations. Additionally, this information does not match the data (reasons for departing) frequently obtained during an employee’s exit interview. The rationale behind this discrepancy is that exit interviews are often conducted by the departing employee’s manager or Human Resource Manager. Typically, employees are hesitant to tell these ‘company representatives’ the truth about their decision to leave for fear of ‘burning bridges’ or “getting a bad reference” (Dibble, 1999; Kreisman, 2002).

A recent research study conducted at a large multinational technical firm showed that a significant number of employees (96 per cent of those interviewed) admitted they did not provide the “real” reason for departure (Kreisman, 2002). For these individuals, acknowledging that their manager was the primary reason they left seemed “too risky”. Instead, they chose to give reasons (for resigning) such as:

- Better opportunity
- Industry change
- Better working conditions
- Lack of development

As noted by Marcus Buckingham and Curt Coffman in their recent book, “First Break All the Rules”, a talented employee “may join a company because of its charismatic leaders, its generous benefits, and its world class training programs, but how long that employee stays and how productive he is while there is determined by his relationship with his immediate supervisor” (Buckingham and Coffman, 1999).

Why employees said they were attracted to the company

- Type of work (job content).
- Career opportunities.
- Skills development.
- Company reputation.
- Potential for significant financial reward.

Why employees said they left the company

- Poor management/leadership.

- Inability to use core skills (type of work not stimulating/challenging).
- Feeling unappreciated; not valued.
- Lack of development; no career opportunities.
- Frequent reorganizations.

Buckingham and Coffman believe that the most important difference between a great manager and one of lesser quality is that great managers look inward. “They look inside the company, into each individual, into the differences in style, goals, needs and motivation of each person.” The ability to look inward is the right way to release each person’s unique talents and performance.

Buckingham and Coffman further explain that each person has a “filter”, formed by genetic inheritance and experiences over time that creates a characteristic and individualistic way of responding to the world. Our filter apparently tells us which stimuli to notice and which to ignore—it creates our innate motivations—are we competitive, altruistic, or ego driven? It defines how we think—are we disciplined, practical or strategic? It forges our prevailing attitudes—are we optimistic or cynical, calm or anxious, empathetic or cold? Our filter creates in all of us, our distinct patterns of thought, feeling and behavior (Buckingham and Coffman, 1999).

This “filter” can account for the fact that the same stimulus produces vastly different reactions in one individual vs. the person next to him. Scientists argue about what causes a person’s brain to function in one way vs. another resulting in various behavior patterns. Some contend that genetic inheritance predisposes the person to respond in a certain way; others claim that the way an individual is raised has a significant effect on our behaviors, but few disagree on the outcome. By the time a child reaches his early teens, each individual will have a unique way of responding to the world. These two Gallup surveys included over a million employees from a broad range of companies, industries and countries.

Great managers, according to Buckingham and Coffman, recognize that each person is motivated differently, that each person has his own way of thinking and his own style of relating to others. “They don’t bemoan these differences and try to grind them down...instead; they capitalize on them they try to help each person become more and more of who he/she already is” (Buckingham and Coffman, 1999).

CHAPTER III

METHOD AND PROCEDURE

3.1 Introduction

This chapter describes the method and procedure that were used in conducting the research. It consists of research design, population, sample, research tools, data collection procedure and techniques of data analysis.

3.2 Design of the study

The study was quantitative in nature.

3.3 Population

The population of the study comprised of electrical and electronic engineers in four private companies in Somalia. There were many public and private companies in the country, the researcher found it easier to collect data from the selected companies because of their easy access, limited time he had, and availability of volunteers who offered help to him in those companies. The following companies were selected;

- Hormuud Telecommunication Company
- Nationlink Telecommunication Company
- Somali Energy Company
- Nugaal Electric Company

3.4 Sampling

The sample comprised subjects who were simply available in a convenient way and they were willing to cooperate for providing required information. Therefore convenience sampling technique was used. In total forty (40) electrical engineers and forty (40) electronic engineers were selected from the above mentioned companies based on accessibility and availability.

3.5 Tools of research

The researcher used questionnaires for gathering information regarding the opinions of electrical and electronic engineers about the problems faced by them during their service. The questionnaires covered some specific areas like job satisfaction of the engineers; the pay and facilities provided by the different industrial organizations to the engineers, social and job status of the engineers, promotion of technical staff and competence of the engineers in their respective fields, etc. The questionnaires consisted of structured and open-ended questions. Structured questions were on five (5) point likert type scale. The questionnaires were prepared in simple language for easy understanding and to avoid ambiguity. The questionnaires were developed by the researcher under close guidance of the supervisor. The questionnaires were validated with expert's opinions. Questionnaires were finalized in the light of the opinion of the experts.

3.6 Data collection procedure

The data was collected by the researcher mainly through volunteers who helped to carry the questionnaires and submit it to the respondents.

The researcher also sent the questionnaires to the respondents through mail. And they mailed the questionnaire back to the researcher after completion.

3.7 Techniques of data analysis

Chi square test and weighted average were used to analyze and interpret the data.

The value of chi square was compared with the critical value at 0.05 levels.

Table: Interpretation of the weighted average

Weighted Average (WA)	Weighted Average Interpretation
$4.5 \leq \text{Weight Average}$	Strongly Agree
$3.5 \leq \text{WA} \leq 4.5$	Agree
$2.5 \leq \text{WA} \leq 3.5$	Undecided
$1.5 \leq \text{WA} \leq 2.5$	Disagree
$0 \leq \text{WA} \leq 1.5$	Strongly Disagree

CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

This chapter presents the analysis and interpretation of data. The data from the questionnaires were tabulated in the form of frequencies. Separate tables were prepared for different parts of the questionnaires. Each table was followed by its interpretation. A quantitative approach using different statistical methods was used for analyzing the data. Weighted average and chi-square values were calculated from the raw data gathered from electrical and electronic engineers. The significance level of confidence was 0.05 for chi-square analysis. The detailed analysis is shown in appendix B. The responses of the electrical and electronic engineers on the open-ended questions were analyzed in narrative form at the end of the qualitative analysis of the responses from electrical and electronic engineers.

Table 4-1: Opinion of the Electrical Engineers Regarding the Induction Process

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	x^2	Asymp. Sig.
1.	You got current job on merit	7	19	9	4	1	3.66	23.50	0.000
2.	Your working field is related to your educational background	7	19	11	3	0	3.75	14.00	0.003
3.	You are satisfied with the induction process of your company	8	11	9	10	2	3.33	6.25	0.181
4.	Before this job you were jobless for more than a year	1	7	11	17	4	2.60	19.50	0.001

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly Disagree (1), WA=Weighted Average

In table 4.1 shows that the majority of the respondents agreed that:

- They got the current job on merit.
- Their working field is related to their educational background.
- They are satisfied with the induction process of their company.

The majority of the respondents disagreed that they were jobless for more than one a year.

Table 4-2: Opinion of the Electrical Engineers Regarding the Working Environment

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	x^2	Asymp. Sig.
1.	Your boss is friendly with you	6	14	13	6	1	3.45	14.75	0.005
2.	General problems in the company are solved as a group	7	18	7	7	1	3.58	19.00	0.001
3.	New workers are guided by their senior during the work	5	18	9	7	1	3.50	20.00	0.000
4.	Your boss cares for your rights	8	18	1	12	1	3.50	26.50	0.000
5.	Your boss and your colleagues work along with you	5	16	9	9	1	3.38	15.50	0.004
6.	Your boss has enough knowledge about practical work and theoretical and also he guides you always	11	18	3	5	3	3.73	21.0	0.000
7.	Rules and regulations are strictly followed	7	19	2	11	1	3.78	27.0	0.000

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly Disagree (1), WA=Weighted Average

In table 4.2 the majority of the respondents agreed that:

- Their boss is friendly with them.
- The general problems in the company are solved as a group.
- The new workers are guided by their seniors during the work.
- Their boss cares for their rights.
- Their boss and their colleagues work along with them.
- Their boss has enough knowledge about practical and theoretical work and he always guides them.

- Rules and regulations are strictly followed.

Table 4-3: Opinion of the Electrical Engineers Regarding the Management and Administration

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	χ^2	Asymp. Sig.
1.	Management solves your problems on priority basis	3	12	2	21	2	2.83	35.25	0.000
2.	Management gives attention to your ideas	3	8	4	24	1	2.70	43.25	0.000
3.	Management encourages hard workers by appreciating their work	7	20	1	12	0	3.55	19.40	0.000
4.	Management follows the rules and also try to implement them	8	20	3	9	0	3.68	15.40	0.002
5.	Management organizes cultural and sports events for staff members and their families	6	12	3	15	4	3.03	13.75	0.008

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly

Disagree (1), WA=Weighted Average

In table 4.3 the majority of the respondents agreed that:

- Management encourages hard workers by appreciating their work.
- Management follows the rules and also tries to implement them.

The majority of the respondents disagreed that:

- Management solves their problems on priority basis.
- Management gives attention to their ideas.

The opinions of the respondents were divided regarding the question that their Management organizes cultural and sports events for staff members and their families.

Table 4-4: Opinion of the Electrical Engineers Regarding the Professional Development

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	χ^2	Asymp. Sig.
1.	There is training facility in your company	3	11	3	19	4	2.75	24.50	0.000
2.	In the training facility good trained instructors are available	2	9	4	18	7	2.53	19.25	0.001
3.	There is an immediate training program after induction process	2	20	3	12	3	3.15	30.75	0.000
4.	Company provides different training courses on regular basis	2	8	5	19	6	2.53	21.25	0.000
5.	There is equal opportunity for each employee of the company to get training	2	9	7	16	6	2.63	13.25	0.01
6.	Employee are provided opportunity for higher studies	3	10	5	15	7	2.68	11.00	0.027

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly Disagree (1), WA=Weighted Average

In table 4.4 shows that the majority of the respondents disagreed that:

- There is training facility in their company.
- In the training facilities good trained instructors are available.
- Company provides different training courses on regular basis.
- There is equal opportunity for each employee of the company to get training.
- Employees are provided opportunity for higher studies.

The majority of the respondents agreed that there is an immediate training program after induction process.

Table 4-5: Opinion of the Electrical Engineers Regarding the Promotion**(N=40)**

No	Statement	SA	A	UD	DA	SD	WA	x^2	Asymp. Sig.
1.	There is proper promotion policy in your company	2	8	5	17	8	2.48	15.75	0.003
2.	This promotion policy is strictly followed	2	9	6	17	6	2.60	15.75	0.003
3.	There is timely promotion in your company	2	10	7	17	4	2.73	17.25	0.002
4.	There is a need to change promotion policy	4	24	2	7	3	3.48	41.75	0.000

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly Disagree (1), WA=Weighted Average

Table 4.5 shows that the majority of the respondents agreed that there is a need to change promotion policy.

The majority of the respondents disagreed that:

- There is a proper promotion policy in their company.
- This promotion policy is strictly followed.
- There is timely promotion in their company.

**Table 4-6: Opinion of the Electrical Engineers Regarding the Working
Conditions and Safety**

(N=40)

N	Statement	SA	A	UD	DA	SD	WA	χ^2	Asymp. Sig.
1.	Weekly working hours are fixed according to international standards	2	11	11	12	4	2.88	10.75	0.03
2.	Employees do not stay after duty hours	2	23	2	10	3	3.28	40.75	0.000
3.	In case of working extra time company will give some compensation to the employee	4	19	3	12	2	3.28	26.75	0.000
4.	Engineering staffs get annual holidays without any difficulties	3	22	4	9	2	3.38	34.25	0.000
5.	Physical layout of the machinery is satisfactory	4	19	2	14	1	3.28	32.25	0.000
6.	Laboratories are well equipped and well maintained	2	14	3	11	10	2.68	13.75	0.008
7.	Standard procedures are followed during field work	1	17	9	10	3	3.08	20.00	0.000
8.	Quality assurance standards are followed by the company	4	21	4	9	2	3.40	29.75	0.000
9.	There are separate departments for protecting industrial safety and quality control which ensures safety of working conditions	4	12	3	18	3	2.90	22.75	0.000
10.	Safety department of the company is active	3	25	3	8	1	3.53	48.50	0.000
11.	Safety related tools and aids are provided by the company to every field	5	20	5	7	3	3.43	23.50	0.000

	worker								
12.	First aid facilities are available in each area	3	15	2	18	2	2.98	30.75	0.000
13.	Firefighting facilities are adequate	6	24	2	7	1	3.68	43.25	0.000
14.	Company conducts annual medical checkup of its workers	3	14	3	13	7	2.83	14.00	0.007

SA=Strongly Agree (5), **A**=Agree (4), **UD**=Undecided (3), **DA**=Disagree (2), **SD**=Strongly Disagree (1), **WA**=Weighted Average

Table 4.6 the majority of the respondents agreed on the following questions:

- Employees do not stay after duty hours.
- In case of working extra time company will give some compensation to the employee.
- Engineering staffs get annual holidays without any difficulties.
- Physical layout of the machinery is satisfactory.
- Standard procedures are followed during field work.
- Quality assurance standards are followed by the company.
- Safety department of the company is active.
- Safety related tools and aids are provided by the company to every field worker.
- Firefighting facilities are adequate.

The opinions of the respondents were divided on the following questions:

- Weekly working hours are fixed according to international standards.
- Laboratories are well equipped and well maintained.
- There are separate departments for protecting industrial safety and quality control which ensures safety of working conditions.
- First aid facilities are available in each area.
- Company conducts annual medical checkup of its workers.

**Table 4-7: Opinion of the Electrical Engineers Regarding the Other Benefits/
Fringes**

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	x^2	Asymp. Sig.
1.	Conveyance allowance or transport facility is available for the workers	3	6	4	22	5	2.50	31.25	0.000
2.	There is good family accommodation facility provided by the company	4	5	3	20	8	2.43	24.25	0.000
3.	There is good bachelor's accommodation facility provided by the company	3	16	2	15	4	2.98	23.75	0.000
4.	There is a free medical care for workers and their family	3	3	4	24	6	2.33	40.75	0.000
5.	Company provides educational facilities to the children of the employees	5	3	3	22	7	2.43	32.00	0.000

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly Disagree (1), WA=Weighted Average

Table 4.7 shows that majority of the respondents disagreed that:

- Conveyance allowance or transportation facility is available for the workers.
- There is good family accommodation facility provided by the company.
- There is a free medical care for workers and their family.
- Company provides educational facilities to the children of the employees.

The respondent's opinions were divided regarding the questions that there is good bachelor's accommodation facility provided by the company.

Table 4-8: Opinion of the Electrical Engineers Regarding the Financial Facilities

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	χ^2	Asymp. Sig.
1.	The company provides special engineering allowance to engineering staffs	6	16	1	12	5	3.15	17.75	0.001
2.	There is overtime payment	5	13	5	12	5	3.03	8.50	0.075
3.	Overtime payment is according to the factory act	9	15	2	10	4	3.38	13.25	0.010
4.	Workers are satisfied with overtime payment rates	8	14	3	10	5	3.25	9.25	0.055
5.	There is annual bonus	4	10	5	18	3	2.85	19.25	0.001
6.	There are plenty of welfare loan schemes for employees	7	13	5	11	4	3.20	7.50	.112

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly Disagree (1), WA=Weighted Average

Table 4.8 shows that the majority of the respondents agreed that:

- Overtime payment is according to the factory act.
- The Workers are satisfied with overtime payment rates.

The majority of the respondents disagreed that there is annual bonus.

The respondents were divided on the following questions:

- The company provides special engineering allowance to the engineering staff.
- Overtime payment is according to the factory act.
- There are plenty of welfare loan schemes for employees.

Table 4-9: Opinion of the Electrical Engineers Regarding the Level of Their Competence

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	χ^2	Asymp. Sig.
1.	Engineers face problems in the field because of insufficient knowledge about the practical problems in the field of work	10	15	2	9	4	3.45	13.25	0.010
2.	Private institutes produce low skilled engineers because of shortage of labs and equipment	11	13	1	10	5	3.38	12.00	0.017
3.	Engineers face problems because curriculum of engineering degree program doesn't satisfy the needs of the practical field	14	13	0	10	3	3.63	7.40	0.060
4.	Due to insufficient technical knowledge, the engineers face problems in field of work	13	16	0	8	3	3.70	9.80	0.020

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly Disagree (1), WA=Weighted Average

Table 4.9 shows that majority of the respondents agreed that:

- Engineers face problems in the field because of insufficient knowledge about the practical problems in the field of work.
- Private institutes produce low skilled engineers because of shortage of labs and equipment.
- Engineers face problems because curriculum of engineering degree program doesn't satisfy the needs of the practical field.
- Due to insufficient technical knowledge, the engineers face problems in field of work.

Table 4-10: Opinion of the Electronic Engineers Regarding the Induction Process

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	x^2	Asymp. Sig.
1.	You got current job on merit	8	21	6	4	1	3.78	29.75	0.000
2.	Your working field is related to your educational background	8	20	9	3	0	3.83	15.40	0.002
3.	You are satisfied with the induction process of your company	7	13	9	9	2	3.35	8.00	0.092
4.	you were jobless Before this job for more than a year	2	18	4	12	4	3.05	23.00	0.000

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly Disagree (1), WA=Weighted Average

In table 4.10 shows that the majority of the respondents agreed that:

- They got the current job on merit.
- Their working field is related to their educational background.
- They are satisfied with the induction process of your company.

The respondent's opinions were divided regarding the questions that they were jobless before this job for more than a year.

Table 4-11: Opinion of the Electronic Engineers Related to Working Environment

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	x^2	Asymp. Sig.
1.	Your boss is friendly with you	6	14	13	6	1	3.50	14.75	0.005
2.	The general problems in the company are solved as a group	7	18	4	10	1	3.50	21.25	0.000
3.	New workers are guided by their senior during the work	10	18	7	4	1	3.80	21.25	0.000
4.	Your boss cares for your rights	6	19	1	13	1	3.40	31.00	0.000
5.	Your boss and your colleagues work along with you	6	17	9	8	0	3.53	7.00	0.072
6.	Your boss has enough knowledge about practical and theoretical works and he always guides you	8	16	4	9	3	3.43	13.25	0.010
7.	Rules and regulations are strictly followed	8	19	4	9	0	3.65	12.20	0.007

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly Disagree (1), WA=Weighted Average

In table 4.11 the majority of the respondents agreed that:

- Their boss is friendly with them.
- The general problems in the company are solved as a group.
- The new workers are guided by their seniors during the work.
- Their boss cares for their rights.
- Their boss and their colleagues work along with them.
- Their boss has enough knowledge about practical and theoretical works and he always guides them.
- Rules and regulations are strictly followed.

Table 4-12: Opinion of the Electronic Engineers Regarding the Management and Administration

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	x^2	Asymp. Sig.
1.	Management solves your problems on priority basis	4	8	5	22	1	2.80	33.75	0.000
2.	Management gives attention to your ideas	4	5	5	25	1	2.65	46.50	0.000
3.	Management encourages hard workers by appreciating their work	8	19	3	10	0	3.63	13.40	0.004
4.	Management follows the rules and also tries to implement them	9	18	4	8	1	3.65	20.75	0.000
5.	Management organizes cultural and sports events for the staff members and their families	6	8	6	16	4	2.90	11.00	0.027

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly Disagree (1), WA=Weighted Average

In table 4.12 the majority of the respondents agreed that:

- Management encourages hard workers by appreciating their work.
- Management follows the rules and also tries to implement them.

The majority of the respondents disagreed that:

- Management solves your problems on priority basis.
- Management gives attention to your ideas.

The respondent's opinions were divided regarding the question that Management organizes cultural and sports events for the staff members and their families.

Table 4-13: Opinion of the Electronic Engineers Regarding the Professional Development

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	χ^2	Asymp. Sig.
1.	There is training facility in your company	6	9	4	17	4	2.90	14.75	0.005
2.	In the training facilities good trained instructors are available	2	7	8	18	5	2.58	18.25	0.001
3.	There is an immediate training program after the induction process	4	18	6	10	2	3.30	20.00	0.000
4.	Company provides different training courses on regular basis	3	8	7	17	5	2.68	14.50	0.006
5.	There is equal opportunity for each employee of the company to get training	3	10	8	14	5	2.80	9.25	0.055
6.	Employees are provided opportunity for higher studies	4	9	7	14	6	2.78	7.25	0.123

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly Disagree (1), WA=Weighted Average

In table 4.13 shows that the majority of the respondents agreed that there is an immediate training program after the induction process.

The majority of the respondents disagreed that:

- There is training facility in their company.
- In the training facilities good trained instructors are available.
- Company provides different training courses on regular basis.

The respondents were divided the following points:

- There is equal opportunity for each employee of the company to get training.
- Employees are provided opportunity for higher studies.

Table 4-14: Opinion of the Electronic Engineers Regarding the Promotion

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	x^2	Asymp. Sig.
1.	There is a proper promotion policy in your company	2	18	4	11	5	3.03	21.25	0.000
2.	This promotion policy is strictly followed	4	20	3	11	2	3.33	28.75	0.000
3.	There is timely promotion in your company	4	18	6	9	3	3.28	18.25	0.001
4.	There is a need to change promotion policy	2	29	1	5	3	3.55	70.00	0.000

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly Disagree (1), WA=Weighted Average

Table 4.14 shows that majority of the respondents agreed that:

- The promotion policy is strictly followed.
- There is timely promotion in your company.
- There is a need to change promotion policy.

The respondents were divided the following question that there is a proper promotion policy in their company.

**Table 4-15: Opinion of the Electronic Engineers Regarding the Working
Conditions and Safety**

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	x^2	Asymp. Sig.
1.	Weekly working hours are fixed according to international standards	3	11	10	13	3	2.95	11.00	0.027
2.	Employees do not stay after the duty hours	9	21	0	8	2	3.68	19.00	0.000
3.	If the employee works extra time the company will give him some compensation	12	20	1	5	2	3.88	31.75	0.000
4.	Engineering staffs get annual holidays without any difficulties	5	21	3	10	1	3.48	32.00	0.000
5.	Physical layout of the machinery is satisfactory	5	18	6	10	1	3.40	20.75	0.000
6.	Laboratories are well equipped and well maintained	4	15	7	9	5	3.10	9.50	0.000
7.	Standard procedures are followed during field work	4	15	8	10	3	3.18	11.75	0.019
8.	Quality assurance standards are followed by the company	5	23	4	7	1	3.60	37.50	0.000
9.	There are separate departments for protecting industrial safety and quality control which ensure safety working condition	3	12	4	18	3	2.85	22.75	0.000
10.	Safety department of the company is active	3	29	2	5	1	3.70	70.00	0.000
11.	Safety related tools and aids are provided by the company to every	5	20	5	7	3	3.43	23.50	0.000

	field worker								
12.	First aid facilities are available in each area	4	13	5	15	3	3.00	15.50	0.004
13.	Firefighting facilities are adequate	9	20	3	6	2	3.70	26.25	0.000
14.	Company conducts annual medical checkup of its workers	2	13	6	14	5	2.83	13.75	0.008

SA=Strongly Agree (5), **A**=Agree (4), **UD**=Undecided (3), **DA**=Disagree (2), **SD**=Strongly Disagree (1), **WA**=Weighted Average

Table 4.15 the majority of the respondents agreed that:

- Employees do not stay after the duty hours.
- If the employee works extra time the company will give him some compensation.
- Engineering staffs get annual holidays without any difficulties.
- Physical layout of the machinery is satisfactory.
- Quality assurance standards are followed by the company.
- Safety department of the company is active.
- Safety related tools and aids are provided by the company to every field worker.
- Firefighting facilities are adequate.

The opinions of the respondents were divided on the following questions:

- Weekly working hours are fixed according to international standards.
- There are separate departments for protecting industrial safety and quality control which ensure safety working condition.
- Laboratories are well equipped and well maintained.
- Standard procedures are followed during field work.
- First aid facilities are available in each area.
- Company conducts annual medical checkup of its workers.

Table 4-16: Opinion of the Electronic Engineers Regarding the Other Benefits/ Fringes

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	χ^2	Asymp. Sig.
1.	Conveyance allowance or transportation facility is available for the workers	1	7	4	22	6	2.38	33.25	0.000
2.	There is good family accommodation facility provided by the company	11	13	1	12	3	3.43	15.50	0.004
3.	There is good bachelor's accommodation facility provided by the company	6	14	2	14	4	3.10	16.00	0.003
4.	There is a free medical care for the workers and their family	4	7	5	20	6	2.73	23.25	0.000
5.	Company provides educational facilities for the children of the employees	6	7	1	20	6	2.68	25.25	0.000

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly Disagree (1), WA=Weighted Average

Table 4.16 shows that the majority of respondents agreed that there is good family accommodation facility provided by the company.

The majority of the respondents disagreed that:

- Conveyance allowance or transportation facility is available for the workers.
- There is a free medical care for the workers and their family.
- Company provides educational facilities for the children of the employees.

The respondent's opinions were divided regarding the question that there is good bachelor's accommodation facility provided by the company.

Table 4-17: Opinion of the Electronic Engineers Regarding the Financial Facilities

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	χ^2	Asymp. Sig.
1.	Company provides special engineering allowance to engineering staffs	9	13	3	11	4	3.30	9.50	0.050
2.	There is overtime payment	10	9	5	11	5	3.20	4.00	0.406
3.	Overtime payment is according to the factory act	10	17	1	10	2	3.58	21.75	0.000
4.	Workers are satisfied with overtime payment rates	7	10	5	13	5	3.03	6.00	0.199
5.	There is annual bonus	9	14	3	13	1	3.43	17.00	0.002
6.	There are plenty of welfare loan schemes for the employees	7	20	2	9	2	3.52	27.25	0.000

SA=Strongly Agree (5), A=Agree (4), UD=Undecided (3), DA=Disagree (2), SD=Strongly Disagree (1), WA=Weighted Average

Table 4.17 shows that majority of the respondents agreed that:

- Company provides special engineering allowance to engineering staffs.
- Overtime payment is according to the factory act.
- There is annual bonus.
- There are plenty of welfare loan schemes for the employees.

The respondent's opinions were divided on the following questions:

- There is overtime payment.
- Workers are satisfied with overtime payment rates.

Table 4-18: Opinion of the Electronic Engineers Regarding the Level of Their Competence

(N=40)

No	Statement	SA	A	UD	DA	SD	WA	χ^2	Asymp. Sig.
1.	Engineers face problems in the field because of insufficient knowledge about the practical problems in the field of work	13	15	0	12	3	3.80	8.40	0.038
2.	Private institutes produce low skilled engineers because of shortage of labs and equipment	6	19	0	12	3	3.33	15.00	0.002
3.	Engineers face problems because curriculum of engineering degree program doesn't satisfy the needs of the practical field	16	11	1	9	3	3.70	18.50	0.001
4.	Due to insufficient technical knowledge, the engineers face problems in field of work	12	14	3	9	2	3.63	14.25	0.007

SA=Strongly Agree (5), **A**=Agree (4), **UD**=Undecided (3), **DA**=Disagree (2), **SD**=Strongly Disagree (1), **WA**=Weighted Average

Table 4.17 shows that majority of the respondents agreed that:

- Engineers face problems in the field because of insufficient knowledge about the practical problems in the field of work.
- Private institutes produce low skilled engineers because of shortage of labs and equipment.
- Engineers face problems because curriculum of engineering degree program doesn't satisfy the needs of the practical field.
- Due to insufficient technical knowledge, the engineers face problems in field of work.

The response of the electrical and electronic engineers on the open-ended questions:

- The basic problem that engineers face during their service is how to do the work.
- They suggested that the companies must give training to the new workers.
- These are different areas in which electrical and electronic engineers need improvement:
 - I. Report writing.
 - II. English language.
 - III. Practical work.
- There is no proper promotion policy in their companies
- The private institutes have to provide their students good labs and better learning environment.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

The purpose of this study was to identify various problems faced by serving electrical and electronic engineers in Somalia. The specific objectives of the study were to:

1. Identify the nature of the problems faced by serving electrical and electronic engineers.
2. Obtain the opinion of the electrical and electronic engineers how to solve those problems.

The population of the study comprised of electrical and electronic engineers working in four different companies, Somali Electric Company, Nugaal electric Company, Hormuud Telecommunication Company, Nationlink Telecommunication Company.

The sample was selected by using the convenience sampling technique. In total forty (40) electrical engineers and forty (40) electronic engineers were selected from above mentioned companies based on accessibility and availability.

Questionnaires were used for gathering information regarding the opinions of the engineers about the problems which the electrical and electronic engineers are facing during their services. The questionnaires consisted of structured and open-ended questions. Structured questions were on five (5) point likert type scale. Chi square test and weighted average were used to analyze and interpret the data. The open-ended questions were analyzed in a narrative way. Finally, based on findings conclusions were drawn and recommendations were made.

5.2 Findings

Based on analysis and interpretation of the data the following findings emerged:

1. The electrical and electronic engineers' view point regarding the induction process of their company is as follows:
 - They got current job on merit and their working field is related to their educational background.
 - They are satisfied with the induction process of the company were not jobless for more than a year.
2. The electrical and electronic engineers' view point regarding the working environment of their company is as follows:
 - The general problems in the company are solved as a group.
 - The new workers are guided by their seniors during the work.
 - Their boss cares for their rights.
 - Their boss and their colleagues work along with them.
 - Their boss has enough knowledge about practical work and theoretical issues and also he guides them always.
 - Rules and regulations are strictly followed.
3. The electrical and electronic engineers' view point regarding the management and administration is as follows:
 - The Management encourages hard workers by appreciating their work.
 - The Management follows the rules and also tries to implement them.
 - Management doesn't solve their problems on priority basis.
 - Management doesn't give attention to their ideas.
4. The electrical and electronic engineers' view point related to promotion is as follows:
 - There is a need to change promotion policy.
 - There is no proper promotion policy in their company.
 - The promotion policy is not strictly followed in their company.
5. The electrical and electronic engineers' view point related to working conditions and safety is as follows:

- Employees do not stay after duty hours.
 - In circumstances where an employee works extra time company will give some compensation to the employees.
 - The Engineering staffs get annual holiday without any difficulties.
 - Quality assurance standards are followed by the company.
 - Safety department of the company is active.
 - Firefighting facilities are adequate.
6. The electrical and electronic engineers' view point related to other benefits/ fringes:
- No conveyance allowance or transport facility for workers is available.
 - There is no free medical care for workers and their family.
 - The Company doesn't provide education facilities to the children of the employees.
7. The electrical and electronic engineers' view point related to financial facilities:
- Company doesn't provide special engineering allowance to engineering staff.
 - Overtime payment is according to the factory act.
 - There are plenty of welfare loan schemes for employees while electrical engineers had no clear answer about that point.
8. The electrical and electronic engineers' view point related to level of competence:
- Engineers face problem in the field because of insufficient knowledge about practical problem in the field.
 - The private institutes produce low skilled engineers because of shortage of labs and equipment.
 - Engineers face problem because curriculum of engineering degree doesn't match with the practical field.
 - Due to lack of technical knowledge most engineers face problem in the field.

The analysis of the open-ended question for electrical and electronic engineers shows that:

1. There were no good training facility in the company specially fresh engineers don't get enough training facility to perform well in their specific jobs.
2. Electrical and electronic engineers pointed that they face problem in report writing.
3. Private institutes produce low skilled engineers because mostly they don't have good labs and good teachers.
4. Poor English language skill is also a cause for low achievement in institutes.
5. Electrical and electronic engineers face difficulties in getting higher education through their company and if someone decides to go for higher studies first he must submit his resignation papers to the company.
6. In private companies there is no job security.
7. There is no good family accommodation for electrical and electronic engineers and there is no medical care.
8. Companies don't provide free education facility to the children of the employees.
9. The promotion policy of the companies is not adequate.

5.3 Conclusions

Based on analysis of data and findings of the study, following conclusions were drawn:

1. Regarding the induction process and working environment there are no significant problems
2. Regarding management and administrative problems:
 - Management doesn't solve their problems on priority basis.
 - Managers don't give attention to their ideas and their suggestions.
3. Regarding the professional development problems:
 - There is no training facility in their companies and there are no good training instructors. The companies don't provide training courses on regular basis and also there is no equal opportunity for each employee of the company to get training.
4. Regarding the promotion problems:
 - That there is a need to change promotion policy of the companies.

5. Related to working conditions and safety problems:
 - The safety department of the company is active and safety related tools and aids are provided by the company to every field worker.
6. Related to benefits/fringes problems:
 - There is no conveyance allowance or transport facility for workers and there is no free medical facility provided to the workers and their family. Also there is no free education facility for the employees' children.
7. Related to the level of engineering competence problems:
 - Private institutes produce low skilled electrical and electronic engineers because of shortage of labs and equipment and curriculum of engineering program doesn't match with the practical field.

Based on analysis of data regarding the open ended questions of both electrical and electronic engineers following conclusion were drawn

8. Electrical and electronic engineers cannot get higher education easily during the contract from their companies. Even if they get the opportunity for higher studies the companies force them to resign from their jobs after that they can go for higher study. That means private companies don't care job security.
9. There is no good family accommodation for the engineers and even there is no medical facility and education facility for their families

5.4 Recommendations

In the light of the findings and conclusions following recommendations were made:

1. The management has to give more consideration to the ideas of the engineers and try to understand what they are suggesting and they have to solve their problems on priority basis, it's good for the management sometimes to organize social activities such as cultural and sport events for the staff members and their families.
2. The company's management has to establish some training centers inside the company so that the fresh engineers can easily get training programs inside the company, and they

have to give equal training opportunities to their workers. They must also give their workers chances to go for higher studies without difficulties.

3. The companies have to change their promotion policy.
4. The companies have to provide free transport facility for their workers and also they have to increase family accommodation facility, they must provide free medical care for the workers and their family and free education facility to the workers' children.
5. The private institutes have to update their curriculum and maintain good labs and good teachers, and they have to give more consideration to the practical classes to improve the skills of the students.
6. Arrangement should be made to improve English language and report writing skills.

5.5 Recommendation for Further Studies

To get a generalized view and clear information of the problems faced by serving electrical and electronic engineers; more studies are recommended by taking a larger sample and from wider sector of the companies from all provinces of the country.

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APPENDIX-A

Dear respondent.

For the analysis of “**A study to identify the problems faced by in service electrical and electronic engineers in Somalia**”, your ideas, opinions, responses and cooperation are highly essential.

These data will be used for the research purpose only and your responses will kept confidential.

Thanking you in advance.

Questionnaire for engineers

Personal information

Name: _____

Designation: _____

Name of the Company: _____

How long have you been in this company: _____

Please give your response to the following items and mark the columns with (Y) sign which you consider as the most appropriate.

SA=strongly agree;

A= Agree;

UD= Undecided;

DA= Disagree;

SD= strongly disagree.

No:	Statement	SA	A	UD	DA	SD
	Induction Process					
1	you got current job on merit					
2	Your working field is related to your educational background					
3	You are satisfied with the induction process of your company					

4	Before this job you were jobless for more than a year					
	Working environment					
5	Your boss is friendly with you					
6	General problems in the company solves us a group?					
7	New workers are guided by their seniors during the work					
8	Your boss cares for your rights					
9	Your boss and your colleagues work along with you					
10	Your boss has enough knowledge about practical work and theoretical and also he guides you always					
11	Rules and regulations are strictly followed					
	Management and administration					
12	Management solves your problems on priority basis					
13	Management gives attention to your ideas					
14	Management encourages hard workers by appreciating their work					
15	Management follows the rules and also try to implement them					
16	Management organizes cultural and sport event for staff members and their families					
	Professional development					
17	There is training facility in your company					
18	In the training facility good trained instructors are available					
19	There is an immediate program of training after induction process					
20	Company provides different training courses on regular basis					
21	There is equal opportunity for each employee of the company to get training					
22	Employees are provided opportunity for higher studies					
	Promotion					
23	There is a proper promotion policy in your company					
24	This promotion policy is strictly followed					
25	There is in time promotion in your company					
26	There is need to change promotion policy					

	Working conditions and safety					
27	Weekly working hours are fixed according to international standards					
28	Employees do not stay after duty hours					
20	In case of working extra time company will give some compensation to the employee					
30	Engineering staffs get annual holiday without any difficulties					
31	Physical layout of the machinery is satisfactory					
32	Laboratories are well equipped and well maintained					
33	Standard procedure are followed during field work					
34	Quality assurance standard are followed by the company					
35	There is separate departments of protection industrial safety and quality control which ensure safety working conditions					
36	Safety department of the company is active					
37	Safety related material tools and aids are provided by the company to every field worker					
38	First aid facilities are available in each area					
39	Firefighting facilities are adequate					
40	Company conducts annual medical checkup of its workers					
	Other Benefits/ Fringes					
41	Conveyance allowance or transport facility for workers is available					
42	There is good family accommodation facility by the company					
43	There is good bachelor's accommodation facility by the company					
44	There is free medical care for workers and their family					
45	Company provides education facilities to the childrens of the employee					
	Financial Facilities					
46	Company provides special engineering allowance to engineering staffs					
47	There is overtime payment					
48	Overtime payment is according to the factory act					
49	Workers are satisfied with overtime payment rates					
50	There is annual bonus					

51	There are plenty of welfare loan schemes for employees					
	Level of engineers competence					
52	engineers face problem in the field because of insufficient knowledge about practical problem in the field					
53	Private institutes produce low skilled engineers because of shortage of labs and equipment					
54	Engineers face problem because curriculum of engineering degree doesn't match with the practical field					
55	Because of less technical knowledge most engineers face problems in the field					

Q1: what are the main problems which you think engineers are facing in service?

Q2: give some suggestion to solve above mentioned problems?

Q3: what recommendation do you have to make electrical and electronic engineering curriculum more effective?

Q4: what are the areas in which electrical and electronic engineer's needs improvement?

Q5: How do you think the promotion and allowance police in your company?

Q6: what are the suggestions that you give to the engineering institute to produce high skilled engineers?

APPENDIX-B

Details of Data Analysis

Chi-Square Test

Frequencies

Electrical Engineers

you got current job on merit

	Observed N	Expected N	Residual
Strongle agree	7	8.0	-1.0
Agree	19	8.0	11.0
Undecided	9	8.0	1.0
Disagree	4	8.0	-4.0
Strongly disagree	1	8.0	-7.0
Total	40		

Electronic Engineers

you got current job on merit

	Observed N	Expected N	Residual
Strongle agree	8	8.0	.0
Agree	21	8.0	13.0
Undecided	6	8.0	-2.0
Disagree	4	8.0	-4.0
Strongly disagree	1	8.0	-7.0
Total	40		

Your working field is related to your educational background

	Observed N	Expected N	Residual
Strongle agree	7	10.0	-3.0
Agree	19	10.0	9.0
Undecided	11	10.0	1.0
Disagree	3	10.0	-7.0
Total	40		

Your working field is related to your educational background

	Observed N	Expected N	Residual
Strongle agree	8	10.0	-2.0
Agree	20	10.0	10.0
Undecided	9	10.0	-1.0
Disagree	3	10.0	-7.0
Total	40		

You are satisfied with the induction process of your company

	Observed N	Expected N	Residual
Strongle agree	8	8.0	.0
Agree	11	8.0	3.0
Undecided	9	8.0	1.0
Disagree	10	8.0	2.0
Strongly disagree	2	8.0	-6.0
Total	40		

You are satisfied with the induction process of your company

	Observed N	Expected N	Residual
Strongle agree	7	8.0	-1.0
Agree	13	8.0	5.0
Undecided	9	8.0	1.0
Disagree	9	8.0	1.0
Strongly disagree	2	8.0	-6.0
Total	40		

Before this job you were jobless for more than a year

	Observed N	Expected N	Residual
Strongly agree	1	8.0	-7.0
Agree	7	8.0	-1.0
Undecided	11	8.0	3.0
Disagree	17	8.0	9.0
Strongly disagree	4	8.0	-4.0
Total	40		

Before this job you were jobless for more than a year

	Observed N	Expected N	Residual
Strongly agree	2	8.0	-6.0
Agree	18	8.0	10.0
Undecided	4	8.0	-4.0
Disagree	12	8.0	4.0
Strongly disagree	4	8.0	-4.0
Total	40		

Your boss is friendly with you

	Observed N	Expected N	Residual
Strongly agree	6	8.0	-2.0
Agree	14	8.0	6.0
Undecided	13	8.0	5.0
Disagree	6	8.0	-2.0
Strongly disagree	1	8.0	-7.0
Total	40		

Your boss is friendly with you

	Observed N	Expected N	Residual
Strongly agree	6	8.0	-2.0
Agree	14	8.0	6.0
Undecided	13	8.0	5.0
Disagree	6	8.0	-2.0
Strongly disagree	1	8.0	-7.0
Total	40		

General problems in the company solves us a group?

	Observed N	Expected N	Residual
Strongly agree	7	8.0	-1.0
Agree	18	8.0	10.0
Undecided	7	8.0	-1.0
Disagree	7	8.0	-1.0
Strongly disagree	1	8.0	-7.0
Total	40		

General problems in the company solves us a group?

	Observed N	Expected N	Residual
Strongly agree	7	8.0	-1.0
Agree	18	8.0	10.0
Undecided	4	8.0	-4.0
Disagree	10	8.0	2.0
Strongly disagree	1	8.0	-7.0
Total	40		

New workers are guided by their seniors during the work

	Observed N	Expected N	Residual
Strongly agree	5	8.0	-3.0
Agree	18	8.0	10.0
Undecided	9	8.0	1.0
Disagree	7	8.0	-1.0
Strongly disagree	1	8.0	-7.0
Total	40		

New workers are guided by their seniors during the work

	Observed N	Expected N	Residual
Strongly agree	10	8.0	2.0
Agree	18	8.0	10.0
Undecided	7	8.0	-1.0
Disagree	4	8.0	-4.0
Strongly disagree	1	8.0	-7.0
Total	40		

Your boss cares for your rights

	Observed N	Expected N	Residual
Strongly agree	8	8.0	.0
Agree	18	8.0	10.0
Undecided	1	8.0	-7.0
Disagree	12	8.0	4.0
Strongly disagree	1	8.0	-7.0
Total	40		

Your boss cares for your rights

	Observed N	Expected N	Residual
Strongly agree	6	8.0	-2.0
Agree	19	8.0	11.0
Undecided	1	8.0	-7.0
Disagree	13	8.0	5.0
Strongly disagree	1	8.0	-7.0
Total	40		

Your boss and your colleagues work along with you

	Observed N	Expected N	Residual
Strongly agree	5	8.0	-3.0
Agree	16	8.0	8.0
Undecided	9	8.0	1.0
Disagree	9	8.0	1.0
Strongly disagree	1	8.0	-7.0
Total	40		

Your boss and your colleagues work along with you

	Observed N	Expected N	Residual
Strongly agree	6	10.0	-4.0
Agree	17	10.0	7.0
Undecided	9	10.0	-1.0
Disagree	8	10.0	-2.0
Total	40		

Your boss has enough knowledge about practical work and theoretical and also he guides you always

	Observed N	Expected N	Residual
Strongly agree	11	8.0	3.0
Agree	18	8.0	10.0
Undecided	3	8.0	-5.0
Disagree	5	8.0	-3.0
Strongly disagree	3	8.0	-5.0
Total	40		

Your boss has enough knowledge about practical work and theoretical and also he guides you always

	Observed N	Expected N	Residual
Strongly agree	8	8.0	.0
Agree	16	8.0	8.0
Undecided	4	8.0	-4.0
Disagree	9	8.0	1.0
Strongly disagree	3	8.0	-5.0
Total	40		

Rules and regulations are strictly followed

	Observed N	Expected N	Residual
Strongly agree	7	8.0	-1.0
Agree	19	8.0	11.0
Undecided	2	8.0	-6.0
Disagree	11	8.0	3.0
Strongly disagree	1	8.0	-7.0
Total	40		

Rules and regulations are strictly followed

	Observed N	Expected N	Residual
Strongly agree	8	10.0	-2.0
Agree	19	10.0	9.0
Undecided	4	10.0	-6.0
Disagree	9	10.0	-1.0
Total	40		

Management solves your problems on priority basis

	Observed N	Expected N	Residual
Strongly agree	3	8.0	-5.0
Agree	12	8.0	4.0
Undecided	2	8.0	-6.0
Disagree	21	8.0	13.0
Strongly disagree	2	8.0	-6.0
Total	40		

Management solves your problems on priority basis

	Observed N	Expected N	Residual
Strongly agree	4	8.0	-4.0
Agree	8	8.0	.0
Undecided	5	8.0	-3.0
Disagree	22	8.0	14.0
Strongly disagree	1	8.0	-7.0
Total	40		

Management gives attention to your ideas

	Observed N	Expected N	Residual
Strongly agree	3	8.0	-5.0
Agree	8	8.0	.0
Undecided	4	8.0	-4.0
Disagree	24	8.0	16.0
Strongly disagree	1	8.0	-7.0
Total	40		

Management gives attention to your ideas

	Observed N	Expected N	Residual
Strongly agree	4	8.0	-4.0
Agree	5	8.0	-3.0
Undecided	5	8.0	-3.0
Disagree	25	8.0	17.0
Strongly disagree	1	8.0	-7.0
Total	40		

Management encourages hard workers by appreciating their work

	Observed N	Expected N	Residual
Strongly agree	7	10.0	-3.0
Agree	20	10.0	10.0
Undecided	1	10.0	-9.0
Disagree	12	10.0	2.0
Total	40		

Management encourages hard workers by appreciating their work

	Observed N	Expected N	Residual
Strongly agree	8	10.0	-2.0
Agree	19	10.0	9.0
Undecided	3	10.0	-7.0
Disagree	10	10.0	.0
Total	40		

Management follows the rules and also try to implement them

	Observed N	Expected N	Residual
Strongly agree	8	10.0	-2.0
Agree	20	10.0	10.0
Undecided	3	10.0	-7.0
Disagree	9	10.0	-1.0
Total	40		

Management follows the rules and also try to implement them

	Observed N	Expected N	Residual
Strongly agree	9	8.0	1.0
Agree	18	8.0	10.0
Undecided	4	8.0	-4.0
Disagree	8	8.0	.0
Strongly disagree	1	8.0	-7.0
Total	40		

Management organizes cultural and sport event for staff members and their families

	Observed N	Expected N	Residual
Strongly agree	6	8.0	-2.0
Agree	12	8.0	4.0
Undecided	3	8.0	-5.0
Disagree	15	8.0	7.0
Strongly disagree	4	8.0	-4.0
Total	40		

Management organizes cultural and sport event for staff members and their families

	Observed N	Expected N	Residual
Strongly agree	6	8.0	-2.0
Agree	8	8.0	.0
Undecided	6	8.0	-2.0
Disagree	16	8.0	8.0
Strongly disagree	4	8.0	-4.0
Total	40		

There is training facility in your company

	Observed N	Expected N	Residual
Strongly agree	3	8.0	-5.0
Agree	11	8.0	3.0
Undecided	3	8.0	-5.0
Disagree	19	8.0	11.0
Strongly disagree	4	8.0	-4.0
Total	40		

There is training facility in your company

	Observed N	Expected N	Residual
Strongly agree	6	8.0	-2.0
Agree	9	8.0	1.0
Undecided	4	8.0	-4.0
Disagree	17	8.0	9.0
Strongly disagree	4	8.0	-4.0
Total	40		

In the training facility good trained instructors are available

	Observed N	Expected N	Residual
Strongly agree	2	8.0	-6.0
Agree	9	8.0	1.0
Undecided	4	8.0	-4.0
Disagree	18	8.0	10.0
Strongly disagree	7	8.0	-1.0
Total	40		

In the training facility good trained instructors are available

	Observed N	Expected N	Residual
Strongly agree	2	8.0	-6.0
Agree	7	8.0	-1.0
Undecided	8	8.0	.0
Disagree	18	8.0	10.0
Strongly disagree	5	8.0	-3.0
Total	40		

There is an immediate program of training after induction process

	Observed N	Expected N	Residual
Strongly agree	2	8.0	-6.0
Agree	20	8.0	12.0
Undecided	3	8.0	-5.0
Disagree	12	8.0	4.0
Strongly disagree	3	8.0	-5.0
Total	40		

There is an immediate program of training after induction process

	Observed N	Expected N	Residual
Strongly agree	4	8.0	-4.0
Agree	18	8.0	10.0
Undecided	6	8.0	-2.0
Disagree	10	8.0	2.0
Strongly disagree	2	8.0	-6.0
Total	40		

Company provides different training courses on regular basis

	Observed N	Expected N	Residual
Strongly agree	2	8.0	-6.0
Agree	8	8.0	.0
Undecided	5	8.0	-3.0
Disagree	19	8.0	11.0
Strongly disagree	6	8.0	-2.0
Total	40		

Company provides different training courses on regular basis

	Observed N	Expected N	Residual
Strongly agree	3	8.0	-5.0
Agree	8	8.0	.0
Undecided	7	8.0	-1.0
Disagree	17	8.0	9.0
Strongly disagree	5	8.0	-3.0
Total	40		

There is equal opportunity for each employee of the company to get training

	Observed N	Expected N	Residual
Strongly agree	2	8.0	-6.0
Agree	9	8.0	1.0
Undecided	7	8.0	-1.0
Disagree	16	8.0	8.0
Strongly disagree	6	8.0	-2.0
Total	40		

There is equal opportunity for each employee of the company to get training

	Observed N	Expected N	Residual
Strongly agree	3	8.0	-5.0
Agree	10	8.0	2.0
Undecided	8	8.0	.0
Disagree	14	8.0	6.0
Strongly disagree	5	8.0	-3.0
Total	40		

Employees are provided opportunity for higher studies

	Observed N	Expected N	Residual
Strongly agree	3	8.0	-5.0
Agree	10	8.0	2.0
Undecided	5	8.0	-3.0
Disagree	15	8.0	7.0
Strongly disagree	7	8.0	-1.0
Total	40		

Employees are provided opportunity for higher studies

	Observed N	Expected N	Residual
Strongly agree	4	8.0	-4.0
Agree	9	8.0	1.0
Undecided	7	8.0	-1.0
Disagree	14	8.0	6.0
Strongly disagree	6	8.0	-2.0
Total	40		

There is a proper promotion policy in your company

	Observed N	Expected N	Residual
Strongly agree	2	8.0	-6.0
Agree	8	8.0	.0
Undecided	5	8.0	-3.0
Disagree	17	8.0	9.0
Strongly disagree	8	8.0	.0
Total	40		

There is a proper promotion policy in your company

	Observed N	Expected N	Residual
Strongly agree	2	8.0	-6.0
Agree	18	8.0	10.0
Undecided	4	8.0	-4.0
Disagree	11	8.0	3.0
Strongly disagree	5	8.0	-3.0
Total	40		

This promotion policy is strictly followed

	Observed N	Expected N	Residual
Strongly agree	2	8.0	-6.0
Agree	9	8.0	1.0
Undecided	6	8.0	-2.0
Disagree	17	8.0	9.0
Strongly disagree	6	8.0	-2.0
Total	40		

This promotion policy is strictly followed

	Observed N	Expected N	Residual
Strongly agree	4	8.0	-4.0
Agree	20	8.0	12.0
Undecided	3	8.0	-5.0
Disagree	11	8.0	3.0
Strongly disagree	2	8.0	-6.0
Total	40		

There is in time promotion in your company

	Observed N	Expected N	Residual
Strongly agree	2	8.0	-6.0
Agree	10	8.0	2.0
Undecided	7	8.0	-1.0
Disagree	17	8.0	9.0
Strongly disagree	4	8.0	-4.0
Total	40		

There is in time promotion in your company

	Observed N	Expected N	Residual
Strongly agree	4	8.0	-4.0
Agree	18	8.0	10.0
Undecided	6	8.0	-2.0
Disagree	9	8.0	1.0
Strongly disagree	3	8.0	-5.0
Total	40		

There is need to change promotion policy

	Observed N	Expected N	Residual
Strongly agree	4	8.0	-4.0
Agree	24	8.0	16.0
Undecided	2	8.0	-6.0
Disagree	7	8.0	-1.0
Strongly disagree	3	8.0	-5.0
Total	40		

There is need to change promotion policy

	Observed N	Expected N	Residual
Strongly agree	2	8.0	-6.0
Agree	29	8.0	21.0
Undecided	1	8.0	-7.0
Disagree	5	8.0	-3.0
Strongly disagree	3	8.0	-5.0
Total	40		

Weekly working hours are fixed according to international standards

	Observed N	Expected N	Residual
Strongly agree	2	8.0	-6.0
Agree	11	8.0	3.0
Undecided	11	8.0	3.0
Disagree	12	8.0	4.0
Strongly disagree	4	8.0	-4.0
Total	40		

Weekly working hours are fixed according to international standards

	Observed N	Expected N	Residual
Strongly agree	3	8.0	-5.0
Agree	11	8.0	3.0
Undecided	10	8.0	2.0
Disagree	13	8.0	5.0
Strongly disagree	3	8.0	-5.0
Total	40		

Employees do not stay after duty hours

	Observed N	Expected N	Residual
Strongly agree	2	8.0	-6.0
Agree	23	8.0	15.0
Undecided	2	8.0	-6.0
Disagree	10	8.0	2.0
Strongly disagree	3	8.0	-5.0
Total	40		

Employees do not stay after duty hours

	Observed N	Expected N	Residual
Strongly agree	9	10.0	-1.0
Agree	21	10.0	11.0
Disagree	8	10.0	-2.0
Strongly disagree	2	10.0	-8.0
Total	40		

In case of working extra time company will give some compensation to the employee

	Observed N	Expected N	Residual
Strongly agree	4	8.0	-4.0
Agree	19	8.0	11.0
Undecided	3	8.0	-5.0
Disagree	12	8.0	4.0
Strongly disagree	2	8.0	-6.0
Total	40		

In case of working extra time company will give some compensation to the employee

	Observed N	Expected N	Residual
Strongly agree	12	8.0	4.0
Agree	20	8.0	12.0
Undecided	1	8.0	-7.0
Disagree	5	8.0	-3.0
Strongly disagree	2	8.0	-6.0
Total	40		

Engineering staffs get annual holiday without any difficulties

	Observed N	Expected N	Residual
Strongly agree	3	8.0	-5.0
Agree	22	8.0	14.0
Undecided	4	8.0	-4.0
Disagree	9	8.0	1.0
Strongly disagree	2	8.0	-6.0
Total	40		

Engineering staffs get annual holiday without any difficulties

	Observed N	Expected N	Residual
Strongly agree	5	8.0	-3.0
Agree	21	8.0	13.0
Undecided	3	8.0	-5.0
Disagree	10	8.0	2.0
Strongly disagree	1	8.0	-7.0
Total	40		

Physical layout of the machinery is satisfactory

	Observed N	Expected N	Residual
Strongly agree	4	8.0	-4.0
Agree	19	8.0	11.0
Undecided	2	8.0	-6.0
Disagree	14	8.0	6.0
Strongly disagree	1	8.0	-7.0
Total	40		

Physical layout of the machinery is satisfactory

	Observed N	Expected N	Residual
Strongly agree	5	8.0	-3.0
Agree	18	8.0	10.0
Undecided	6	8.0	-2.0
Disagree	10	8.0	2.0
Strongly disagree	1	8.0	-7.0
Total	40		

Laboratories are will equipped and well maintained

	Observed N	Expected N	Residual
Strongle agree	2	8.0	-6.0
Agree	14	8.0	6.0
Undecided	3	8.0	-5.0
Disagree	11	8.0	3.0
Strongly disagree	10	8.0	2.0
Total	40		

Laboratories are will equipped and well maintained

	Observed N	Expected N	Residual
Strongle agree	4	8.0	-4.0
Agree	15	8.0	7.0
Undecided	7	8.0	-1.0
Disagree	9	8.0	1.0
Strongly disagree	5	8.0	-3.0
Total	40		

Standard procedure are followed during field work

	Observed N	Expected N	Residual
Strongle agree	1	8.0	-7.0
Agree	17	8.0	9.0
Undecided	9	8.0	1.0
Disagree	10	8.0	2.0
Strongly disagree	3	8.0	-5.0
Total	40		

Standard procedure are followed during field work

	Observed N	Expected N	Residual
Strongle agree	4	8.0	-4.0
Agree	15	8.0	7.0
Undecided	8	8.0	.0
Disagree	10	8.0	2.0
Strongly disagree	3	8.0	-5.0
Total	40		

Quality assurance standard are followed by the company

	Observed N	Expected N	Residual
Strongle agree	4	8.0	-4.0
Agree	21	8.0	13.0
Undecided	4	8.0	-4.0
Disagree	9	8.0	1.0
Strongly disagree	2	8.0	-6.0
Total	40		

Quality assurance standard are followed by the company

	Observed N	Expected N	Residual
Strongle agree	5	8.0	-3.0
Agree	23	8.0	15.0
Undecided	4	8.0	-4.0
Disagree	7	8.0	-1.0
Strongly disagree	1	8.0	-7.0
Total	40		

There is separate departments of protection industrial safety and quality control which ensure safety working conditions

	Observed N	Expected N	Residual
Strongle agree	4	8.0	-4.0
Agree	12	8.0	4.0
Undecided	3	8.0	-5.0
Disagree	18	8.0	10.0
Strongly disagree	3	8.0	-5.0
Total	40		

There is separate departments of protection industrial safety and quality control which ensure safety working conditions

	Observed N	Expected N	Residual
Strongle agree	3	8.0	-5.0
Agree	12	8.0	4.0
Undecided	4	8.0	-4.0
Disagree	18	8.0	10.0
Strongly disagree	3	8.0	-5.0
Total	40		

Safety department of the company is active

	Observed N	Expected N	Residual
Strongle agree	3	8.0	-5.0
Agree	25	8.0	17.0
Undecided	3	8.0	-5.0
Disagree	8	8.0	.0
Strongly disagree	1	8.0	-7.0
Total	40		

Safety department of the company is active

	Observed N	Expected N	Residual
Strongle agree	3	8.0	-5.0
Agree	29	8.0	21.0
Undecided	2	8.0	-6.0
Disagree	5	8.0	-3.0
Strongly disagree	1	8.0	-7.0
Total	40		

Safety related material tools and aids are provided by the company to every field worker

	Observed N	Expected N	Residual
Strongle agree	5	8.0	-3.0
Agree	20	8.0	12.0
Undecided	5	8.0	-3.0
Disagree	7	8.0	-1.0
Strongly disagree	3	8.0	-5.0
Total	40		

Safety related material tools and aids are provided by the company to every field worker

	Observed N	Expected N	Residual
Strongle agree	5	8.0	-3.0
Agree	20	8.0	12.0
Undecided	5	8.0	-3.0
Disagree	7	8.0	-1.0
Strongly disagree	3	8.0	-5.0
Total	40		

First aid facilities are available in each area

	Observed N	Expected N	Residual
Strongle agree	3	8.0	-5.0
Agree	15	8.0	7.0
Undecided	2	8.0	-6.0
Disagree	18	8.0	10.0
Strongly disagree	2	8.0	-6.0
Total	40		

First aid facilities are available in each area

	Observed N	Expected N	Residual
Strongle agree	4	8.0	-4.0
Agree	13	8.0	5.0
Undecided	5	8.0	-3.0
Disagree	15	8.0	7.0
Strongly disagree	3	8.0	-5.0
Total	40		

Firefighting facilities are adequate

	Observed N	Expected N	Residual
Strongle agree	6	8.0	-2.0
Agree	24	8.0	16.0
Undecided	2	8.0	-6.0
Disagree	7	8.0	-1.0
Strongly disagree	1	8.0	-7.0
Total	40		

Firefighting facilities are adequate

	Observed N	Expected N	Residual
Strongle agree	9	8.0	1.0
Agree	20	8.0	12.0
Undecided	3	8.0	-5.0
Disagree	6	8.0	-2.0
Strongly disagree	2	8.0	-6.0
Total	40		

Company conducts annual medical checkup of its workers

	Observed N	Expected N	Residual
Strongle agree	3	8.0	-5.0
Agree	14	8.0	6.0
Undecided	3	8.0	-5.0
Disagree	13	8.0	5.0
Strongly disagree	7	8.0	-1.0
Total	40		

Company conducts annual medical checkup of its workers

	Observed N	Expected N	Residual
Strongle agree	2	8.0	-6.0
Agree	13	8.0	5.0
Undecided	6	8.0	-2.0
Disagree	14	8.0	6.0
Strongly disagree	5	8.0	-3.0
Total	40		

Conveyance allowance or transport facility for workers is available

	Observed N	Expected N	Residual
Strongle agree	3	8.0	-5.0
Agree	6	8.0	-2.0
Undecided	4	8.0	-4.0
Disagree	22	8.0	14.0
Strongly disagree	5	8.0	-3.0
Total	40		

Conveyance allowance or transport facility for workers is available

	Observed N	Expected N	Residual
Strongle agree	1	8.0	-7.0
Agree	7	8.0	-1.0
Undecided	4	8.0	-4.0
Disagree	22	8.0	14.0
Strongly disagree	6	8.0	-2.0
Total	40		

There is good family accommodation facility by the company

	Observed N	Expected N	Residual
Strongle agree	4	8.0	-4.0
Agree	5	8.0	-3.0
Undecided	3	8.0	-5.0
Disagree	20	8.0	12.0
Strongly disagree	8	8.0	.0
Total	40		

There is good family accommodation facility by the company

	Observed N	Expected N	Residual
Strongle agree	11	8.0	3.0
Agree	13	8.0	5.0
Undecided	1	8.0	-7.0
Disagree	12	8.0	4.0
Strongly disagree	3	8.0	-5.0
Total	40		

There is good bachelor's accommodation facility by the company

	Observed N	Expected N	Residual
Strongly agree	3	8.0	-5.0
Agree	16	8.0	8.0
Undecided	2	8.0	-6.0
Disagree	15	8.0	7.0
Strongly disagree	4	8.0	-4.0
Total	40		

There is good bachelor's accommodation facility by the company

	Observed N	Expected N	Residual
Strongly agree	6	8.0	-2.0
Agree	14	8.0	6.0
Undecided	2	8.0	-6.0
Disagree	14	8.0	6.0
Strongly disagree	4	8.0	-4.0
Total	40		

The is free medical care for workers and their family

	Observed N	Expected N	Residual
Strongly agree	3	8.0	-5.0
Agree	3	8.0	-5.0
Undecided	4	8.0	-4.0
Disagree	24	8.0	16.0
Strongly disagree	6	8.0	-2.0
Total	40		

The is free medical care for workers and their family

	Observed N	Expected N	Residual
Strongly agree	4	8.0	-4.0
Agree	7	8.0	-1.0
Undecided	5	8.0	-3.0
Disagree	20	8.0	12.0
Strongly disagree	4	8.0	-4.0
Total	40		

Company provides education facilities to the childrens of the employee

	Observed N	Expected N	Residual
Strongly agree	5	8.0	-3.0
Agree	3	8.0	-5.0
Undecided	3	8.0	-5.0
Disagree	22	8.0	14.0
Strongly disagree	7	8.0	-1.0
Total	40		

Company provides education facilities to the childrens of the employee

	Observed N	Expected N	Residual
Strongly agree	6	8.0	-2.0
Agree	7	8.0	-1.0
Undecided	1	8.0	-7.0
Disagree	20	8.0	12.0
Strongly disagree	6	8.0	-2.0
Total	40		

Company provides special engineering allowance to engineering staffs

	Observed N	Expected N	Residual
Strongly agree	6	8.0	-2.0
Agree	16	8.0	8.0
Undecided	1	8.0	-7.0
Disagree	12	8.0	4.0
Strongly disagree	5	8.0	-3.0
Total	40		

Company provides special engineering allowance to engineering staffs

	Observed N	Expected N	Residual
Strongly agree	9	8.0	1.0
Agree	13	8.0	5.0
Undecided	3	8.0	-5.0
Disagree	11	8.0	3.0
Strongly disagree	4	8.0	-4.0
Total	40		

There is overtime payment

	Observed N	Expected N	Residual
Strongly agree	5	8.0	-3.0
Agree	13	8.0	5.0
Undecided	5	8.0	-3.0
Disagree	12	8.0	4.0
Strongly disagree	5	8.0	-3.0
Total	40		

There is overtime payment

	Observed N	Expected N	Residual
Strongly agree	10	8.0	2.0
Agree	9	8.0	1.0
Undecided	5	8.0	-3.0
Disagree	11	8.0	3.0
Strongly disagree	5	8.0	-3.0
Total	40		

Overtime payment is according to the factory act

	Observed N	Expected N	Residual
Strongly agree	9	8.0	1.0
Agree	15	8.0	7.0
Undecided	2	8.0	-6.0
Disagree	10	8.0	2.0
Strongly disagree	4	8.0	-4.0
Total	40		

Overtime payment is according to the factory act

	Observed N	Expected N	Residual
Strongly agree	10	8.0	2.0
Agree	17	8.0	9.0
Undecided	1	8.0	-7.0
Disagree	10	8.0	2.0
Strongly disagree	2	8.0	-6.0
Total	40		

Workers are satisfied with overtime payment rates

	Observed N	Expected N	Residual
Strongly agree	8	8.0	.0
Agree	14	8.0	6.0
Undecided	3	8.0	-5.0
Disagree	10	8.0	2.0
Strongly disagree	5	8.0	-3.0
Total	40		

Workers are satisfied with overtime payment rates

	Observed N	Expected N	Residual
Strongly agree	7	8.0	-1.0
Agree	10	8.0	2.0
Undecided	5	8.0	-3.0
Disagree	13	8.0	5.0
Strongly disagree	5	8.0	-3.0
Total	40		

There is annual bonus

	Observed N	Expected N	Residual
Strongly agree	4	8.0	-4.0
Agree	10	8.0	2.0
Undecided	5	8.0	-3.0
Disagree	18	8.0	10.0
Strongly disagree	3	8.0	-5.0
Total	40		

There is annual bonus

	Observed N	Expected N	Residual
Strongly agree	9	8.0	1.0
Agree	14	8.0	6.0
Undecided	3	8.0	-5.0
Disagree	13	8.0	5.0
Strongly disagree	1	8.0	-7.0
Total	40		

There are plenty of welfare loan schemes for employees

	Observed N	Expected N	Residual
Strongly agree	7	8.0	-1.0
Agree	13	8.0	5.0
Undecided	5	8.0	-3.0
Disagree	11	8.0	3.0
Strongly disagree	4	8.0	-4.0
Total	40		

There are plenty of welfare loan schemes for employees

	Observed N	Expected N	Residual
Strongly agree	7	8.0	-1.0
Agree	20	8.0	12.0
Undecided	2	8.0	-6.0
Disagree	9	8.0	1.0
Strongly disagree	2	8.0	-6.0
Total	40		

engineers face problem in the field because of insufficient knowledge about practical problem in the field

	Observed N	Expected N	Residual
Strongly agree	10	8.0	2.0
Agree	15	8.0	7.0
Undecided	2	8.0	-6.0
Disagree	9	8.0	1.0
Strongly disagree	4	8.0	-4.0
Total	40		

engineers face problem in the field because of insufficient knowledge about practical problem in the field

	Observed N	Expected N	Residual
Strongly agree	13	10.0	3.0
Agree	15	10.0	5.0
Disagree	9	10.0	-1.0
Strongly disagree	3	10.0	-7.0
Total	40		

Private institutes produce low skilled engineers because of shortage of labs and equipment

	Observed N	Expected N	Residual
Strongly agree	11	8.0	3.0
Agree	13	8.0	5.0
Undecided	1	8.0	-7.0
Disagree	10	8.0	2.0
Strongly disagree	5	8.0	-3.0
Total	40		

Private institutes produce low skilled engineers because of shortage of labs and equipment

	Observed N	Expected N	Residual
Strongly agree	6	10.0	-4.0
Agree	19	10.0	9.0
Disagree	12	10.0	2.0
Strongly disagree	3	10.0	-7.0
Total	40		

Engineers face problem because curriculum of engineering degree doesn't match with the practical field

	Observed N	Expected N	Residual
Strongly agree	14	10.0	4.0
Agree	13	10.0	3.0
Disagree	10	10.0	.0
Strongly disagree	3	10.0	-7.0
Total	40		

Engineers face problem because curriculum of engineering degree doesn't match with the practical field

	Observed N	Expected N	Residual
Strongly agree	16	8.0	8.0
Agree	11	8.0	3.0
Undecided	1	8.0	-7.0
Disagree	9	8.0	1.0
Strongly disagree	3	8.0	-5.0
Total	40		

Because of less technical knowledge most engineers face problems in the field

	Observed N	Expected N	Residual
Strongly agree	13	10.0	3.0
Agree	16	10.0	6.0
Disagree	8	10.0	-2.0
Strongly disagree	3	10.0	-7.0
Total	40		

Because of less technical knowledge most engineers face problems in the field

	Observed N	Expected N	Residual
Strongly agree	12	8.0	4.0
Agree	14	8.0	6.0
Undecided	3	8.0	-5.0
Disagree	9	8.0	1.0
Strongly disagree	2	8.0	-6.0
Total	40		

Electrical Engineers Test Statistics

	you got current job on merit	Your working field is related to your educational background	You are satisfied with the induction process of your company	Before this job you were jobless for more than a year	Your boss is friendly with you	General problems in the company solves us a group?	New workers are guided by their seniors during the work	Your boss cares for your rights	Your boss and your colleagues work along with you	Your boss has enough knowledge about practical work and theoretical and also he guides you always
Chi-Square ^{a,b}	23.500	14.000	6.250	19.500	14.750	19.000	20.000	26.750	15.500	21.000
df	4	3	4	4	4	4	4	4	4	4
Asymp. Sig.	.000	.003	.181	.001	.005	.001	.000	.000	.004	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.0.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0.

	Rules and regulations are strictly followed	Management solves your problems on priority basis	Management gives attention to your ideas	Management encourages hard workers by appreciating their work	Management follows the rules and also try to implement them	Management organizes cultural and sport event for staff members and their families	There is training facility in your company	In the training facility good trained instructors are available	There is an immediate program of training after induction process
Chi-Square ^{a,b}	27.000	35.250	43.250	19.400	15.400	13.750	24.500	19.250	30.750
df	4	4	4	3	3	4	4	4	4
Asymp. Sig.	.000	.000	.000	.000	.002	.008	.000	.001	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.0.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0.

	Company provides different training courses on regular basis	There is equal opportunity for each employee of the company to get training	Employees are provided opportunity for higher studies	There is a proper promotion policy in your company	This promotion policy is strictly followed	There is in time promotion in your company	There is need to change promotion policy	Weekly working hours are fixed according to international standards	Employees do not stay after duty hours
Chi-Square ^{a,b}	21.250	13.250	11.000	15.750	15.750	17.250	41.750	10.750	40.750
df	4	4	4	4	4	4	4	4	4
Asymp. Sig.	.000	.010	.027	.003	.003	.002	.000	.030	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.0.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0.

	In case of working extra time company will give some compensation to the employee	Engineering staffs get annual holiday without any difficulties	Physical layout of the machinery is satisfactory	Laboratories are well equipped and maintained	Standard procedure are followed during field work	Quality assurance standard are followed by the company	There is separate departments of protection industrial safety and quality control which ensure safety working conditions	Safety department of the company is active	Safety related material tools and aids are provided by the company to every field worker
Chi-Square ^{a,b}	26.750	34.250	32.250	13.750	20.000	29.750	22.750	48.500	23.500
df	4	4	4	4	4	4	4	4	4
Asymp. Sig.	.000	.000	.000	.008	.000	.000	.000	.000	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.0.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0.

	First aid facilities are available in each area	Firefighting facilities are adequate	Company conducts annual medical checkup of its workers	Conveyance allowance or transport facility for workers is available	There is good family accommodation facility by the company	There is good bachelor's accommodation facility by the company	The is free medical care for workers and their family	Company provides education facilities to the childrens of the employee	Company provides special engineering allowance to engineering staffs
Chi-Square ^{a,b}	30.750	43.250	14.000	31.250	24.250	23.750	40.750	32.000	17.750
df	4	4	4	4	4	4	4	4	4
Asymp. Sig.	.000	.000	.007	.000	.000	.000	.000	.000	.001

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.0.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0.

	There is overtime payment	Overtime payment is according to the factory act	Workers are satisfied with overtime payment rates	There is annual bonus	There are plenty of welfare loan schemes for employees	engineers face problem in the field because of insufficient knowledge about practical problem in the field	Private institutes produce low skilled engineers because of shortage of labs and equipment	Engineers face problem because curriculum of engineering degree doesn't match with the practical field	Because of less technical knowledge most engineers face problems in the field
Chi-Square ^{a,b}	8.500	13.250	9.250	19.250	7.500	13.250	12.000	7.400	9.800
df	4	4	4	4	4	4	4	3	3
Asymp. Sig.	.075	.010	.055	.001	.112	.010	.017	.060	.020

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.0.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0.

Electronic Engineers Test Statistics

	you got current job on merit	Your working field is related to your educational background	You are satisfied with the induction process of your company	Before this job you were jobless for more than a year	Your boss is friendly with you	General problems in the company solves us a group?	New workers are guided by their seniors during the work	Your boss cares for your rights	Your boss and your colleagues work along with you	Your boss has enough knowledge about practical work and theoretical and also he guides you always
Chi-Square ^{a,b}	29.750	15.400	8.000	23.000	14.750	21.250	21.250	31.000	7.000	13.250
df	4	3	4	4	4	4	4	4	3	4
Asymp. Sig.	.000	.002	.092	.000	.005	.000	.000	.000	.072	.010

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.0.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0.

	Rules and regulations are strictly followed	Management solves your problems on priority basis	Management gives attention to your ideas	Management encourages hard workers by appreciating their work	Management follows the rules and also try to implement them	Management organizes cultural and sport event for staff members and their families	There is training facility in your company	In the training facility good trained instructors are available	There is an immediate program of training after induction process
Chi-Square ^{a,b}	12.200	33.750	46.500	13.400	20.750	11.000	14.750	18.250	20.000
df	3	4	4	3	4	4	4	4	4
Asymp. Sig.	.007	.000	.000	.004	.000	.027	.005	.001	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.0.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0.

	Company provides different training courses on regular basis	There is equal opportunity for each employee of the company to get training	Employees are provided opportunity for higher studies	There is a proper promotion policy in your company	This promotion policy is strictly followed	There is in time promotion in your company	There is need to change promotion policy	Weekly working hours are fixed according to international standards	Employees do not stay after duty hours
Chi-Square ^{a,b}	14.500	9.250	7.250	21.250	28.750	18.250	70.000	11.000	19.000
df	4	4	4	4	4	4	4	4	3
Asymp. Sig.	.006	.055	.123	.000	.000	.001	.000	.027	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.0.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0.

	In case of working extra time company will give some compensation to the employee	Engineering staffs get annual holiday without any difficulties	Physical layout of the machinery is satisfactory	Laboratories are well equipped and maintained	Standard procedure are followed during field work	Quality assurance standard are followed by the company	There is separate departments of protection industrial safety and quality control which ensure safety working conditions	Safety department of the company is active	Safety related material tools and aids are provided by the company to every field worker
Chi-Square ^{a,b}	31.750	32.000	20.750	9.500	11.750	37.500	22.750	70.000	23.500
df	4	4	4	4	4	4	4	4	4
Asymp. Sig.	.000	.000	.000	.050	.019	.000	.000	.000	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.0.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0.

	First aid facilities are available in each area	Firefighting facilities are adequate	Company conducts annual medical checkup of its workers	Conveyance allowance or transport facility for workers is available	There is good family accommodation facility by the company	There is good bachelor's accommodation facility by the company	The is free medical care for workers and their family	Company provides education facilities to the childrens of the employee	Company provides special engineering allowance to engineering staffs
Chi-Square ^{a,b}	15.500	26.250	13.750	33.250	15.500	16.000	23.250	25.250	9.500
df	4	4	4	4	4	4	4	4	4
Asymp. Sig.	.004	.000	.008	.000	.004	.003	.000	.000	.050

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.0.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0.

	There is overtime payment	Overtime payment is according to the factory act	Workers are satisfied with overtime payment rates	There is annual bonus	There are plenty of welfare loan schemes for employees	engineers face problem in the field because of insufficient knowledge about practical problem in the field	Private institutes produce low skilled engineers because of shortage of labs and equipment	Engineers face problem because curriculum of engineering degree doesn't match with the practical field	Because of less technical knowledge most engineers face problems in the field
Chi-Square ^{a,b}	4.000	21.750	6.000	17.000	27.250	8.400	15.000	18.500	14.250
df	4	4	4	4	4	3	3	4	4
Asymp. Sig.	.406	.000	.199	.002	.000	.038	.002	.001	.007

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.0.

b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.0.