

**Assessment of Environmental Management
System implementation in Ethiopian Liquor
industry.**

BY

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Assessment of Environmental Management System implementation in Ethiopian Liquor industry.

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Statement of Declaration

I hereby declare that this thesis, “**Assessment of Environmental Management System implementation in Ethiopian liquor industry.**” is entire my own work and has not been taken from the work of others. All sources and materials used for this thesis have been duly acknowledged.

By: Yohannes Kidane

Signature:

Date:

Letter of Certification

This is to certify that Yohannes Kidane carried out this research entitled **Assessment of Environmental Management System implementation in Ethiopian liquor industry**. This work is original and suitable for submission to the award of Master of Arts Degree in Project Management.

Wubshet Bekalu (Dr) _____

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ABBREVIATIONS AND ACRONYMS

- **Project:** is a temporary endeavor undertaken to create a unique product, service or result (PMDOK, 2004)
- **Project implementation (or project execution):** is the phase where visions and plans become reality. This is the logical conclusion, after evaluating, deciding, visioning, planning, applying for funds and finding the financial resources of a project, SSWM (2008).
- **EMS:** Environmental Management System; a strategy put in place within an organization that dictates internal environmental policy (ISO, 2015).
- **ISO:** A series of international certifying standards that govern a variety of aspects of business (ISO, 2015).
- **ISO 14001:** An international certifying standard under the ISO group that seeks to certify Environmental Management Systems (ISO, 2015).
- **IER:** Initial environmental review (IER) is a report composed by an exhaustive analysis of the problems, impacts and environmental performances relevant to an organization's activity

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ABSTRACT

Industrial activities in business pose serious and tangible threats to both the wellbeing of society and the environment. Negative consequences of activities on environment and society, referred to as negative externalities, can increase in both magnitude and frequency in the face of a growing global economy. The risk of increased negative externalities warrants the need to adequately manage organizational activities to preserve both environmental and social capital.

This research aimed to find out the critical success factors for ISO 14001 EMS implementation among liquor companies in Ethiopia from the Resource based view. A cross-sectional approach using survey was conducted. A research model was proposed which comprises of ISO 14001 EMS implementation as the criterion variable while physical capital resources (i.e. environmental performance tracking and organizational infrastructures), human capital resources (i.e. top management commitment and support, training and education, employee empowerment and teamwork) and organizational capital resources (i.e. recognition and reward, organizational culture and organizational communication) as the explanatory variables. The research findings show that only environmental performance tracking, top management commitment and support and organizational culture are found to be positively and significantly associated with ISO 14001 EMS implementation.

Key Words: *Critical Success Factor, EMS*

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

The current economic growth in developing economies involve high rates of consumption of natural resources that nature is unable to restore and great amounts of residues that cannot be absorbed. A change in this situation is becoming more and more necessary to guarantee the availability of natural resources for future generations. Industry plays an important role in the process of achieving a better balance with nature but, it is essential that manufacturing companies should adopt new strategies and initiate new practices to reduce environmental impact.

Liquor is an alcoholic drink produced by distillation of grains, fruits or vegetables that have already gone through alcoholic fermentation. The distillation process purifies the liquid and removes diluted components called spent wash. Distillery spent wash is a dark brown highly organic effluent. It is one of the most complex, troublesome and strongest organic effluent. The spent wash is acidic and characterized by high BOD and COD value. Bing plant origin, the spent wash contains considerable amount of plant nutrients and organic matter. Besides that there is liquid pollutant that discharged from liquor preparation and bottle cleaning process.

The implementation of an environmental management system can be an appropriate initial step to move towards more environmentally aware positions. An environmental management system provides a framework where the environmental policy of the company is defined and deployed, the procedures to establish objectives and implement environmental practices are determined, the environmental responsibilities are allocated and the process and tools to assess advancement and introduce corrective actions are provided.

The development and implementation of an environmental management system can be simplified and systematized if the company chooses to comply with any widely accepted standard. In this way, public recognition of the effort can also be secured. One of the most popular and extensive environmental management system standards is the ISO14001, which forms part of the ISO14000 series of environmental standards. This series can in turn be seen as an extension of the ISO 9000 series of quality standards for the environmental problem.

1.2 Background of the Organizations

Currently only three liquors factories implemented ISO 14001 EMS in Ethiopia. Those are

i. Balezaf alcohol and liquors factory

Balezaf alcohol and liquors factory is a private owned company established in 1948. The company is engaged in the production of potable alcohol and different types of liquors for local and export consumption. The factory is located 25 km far from Addis Ababa at Sebeta region. Currently the company has a total number of 350 workers with different education levels. The company has got ISO 14001 EMS certification in 2016 by ISOQAR UK.

ii. National alcohol and liquors factory

National Alcohol & Liquor Factory is a pioneer sole government owned state enterprise in manufacturing & selling Liquors and Alcohol products in our Country. The factory comprises four branch factories which was once established and owned by individuals in different period. Three of them are in Addis Ababa and the other is in Sebeta town far away from Addis by 25 K.M. The branch factories are :

- Maichew Branch Factory,
- Mekanissa Branch Factory ,
- Sebeta Branch Factory, and
- Akaki Branch Factory.

The company has 635 man power engaged at different operation level at the above sites.

The company awarded ISO 14001 EMS in 2015 by ISOQAR UK.

iii. Super eagle alcohol and liquors factory.

Super eagle is a brand for the liquors under Rorank business SC with the manufacturing facility is found in the Amhara regional state, North shewa zone Angolela & Tara district around 135 KM away from Addis Ababa. The company is established in 2012 with production of different kinds of liquors and alcohol products. The company has 250 man powers with different educational level. The company awarded ISO-14001 EMS in 2017.

1.3 Statement of the problem

An Environmental management system (EMS) is a set of processes and practices that enable an organizational to reduce its environmental impacts and increase its operation efficiency. The EMS provides a framework that helps a company achieve its environmental goals through consistent control of its operations. However, the implementation of EMS is not easy and needs high resource. There are a number of challenges that companies may encounter in implementing EMS. EMS implementing can be a difficult, time-consuming, and expensive project for a company. The EMS is tightly integrated and requires a commitment from all divisions and often a change in the way a company does business to make it work. It can take more than a year to complete successful implementation. EMS implementation can reap enormous benefit for successful companies-or it can be disastrous for organizations fail to manage the implementation process. EMS system implementation is also highly affected by the culture of the country and organization.

There has been a lot of research on identifying success factors of EMS implementation in different sectors in world wide. In the context of Ethiopia, as per the knowledge of the researcher there is no a single study conducted on analyzing the critical success factor for EMS implementation in liquor industry.

Considering that most of studies in critical success factors of EMS implementation are contextualized in developed countries and there are no previous studies under this topic in Ethiopian Liquor manufacturing sector, this study aims to measure the extent of EMS implementation success in these three liquor factories, and identify the critical success factors of EMS implementation in Liquor companies.

1.4 Research Question

What are the critical factors that challenge implementation of Environmental Management System (ISO-14001) in liquor industry?

1.5 Objectives of the Study

The general objective of the study is to assess the infrastructure of Environmental Management System (ISO-14001) in Ethiopian liquor industry.

1.6 Scope of the Study

The scope of this research is bound to liquor factories that implemented ISO 14001 EMS in Ethiopia. Currently only three liquors company implemented Iso 14001 EMS namely; Balezaf alcohol, Super eagle alcohol and National alcohol (Mekanissa branch only since other branches are under expansion project). Balezaf alcohol is located in Sebeta region; Super eagle alcohol is located in North shewa and National alcohol Mekanissa branch in Addis Ababa. The study focused on response from top management, quality managers, technique managers, production managers and Iso management representatives.

1.7 Significance of the study

Implementing an EMS is a major project requiring a significant level of resources, commitment and changes throughout the organization. Often the EMS implementation project is amongst the biggest projects that an organization may launch. As a result, the issues surrounding the implementation process have been one of the major concerns in industries.

By identifying the critical success factors of EMS implementation, the finding of this study will enable the companies to have an insight about the systems functionality by highlighting the gains achieved and the challenges faced. In addition, the recommendations of this study will also be used as an input for future improvement work. Other companies who have a plan to implement EMS could also learn from the result of the study. Moreover, the study will play a significant role as a literature base on future researches of related topics.

1.8 Organization of the paper

The paper has contained five chapters, this include:

Chapter one: Introduction

This chapter would contain the background of the study, statement of the problem, research questions, objectives of the study, definition of terms, significance of the study and scope of the study.

Chapter Two: Review of Related Literature

This part of the study deals with the literature relevant to the proposed study. The division of the chapter will be on the topic from previous studies.

Chapter Three: Research Methodology of the Study

In this chapter the researcher will describe the type and design for the proposed research that is adapted from the previous studies, the subject/participant of the study, the sources of the data, the

data collection instruments to be employed, the procedures of data collection and the method of data analysis.

Chapter Four: Results and Conclusion

This chapter would summarize the results, and findings of the study, and also interpret or discuss the findings.

Chapter Five: Conclusions and Recommendations

It is a chapter that comprises four sections, which include summary of findings (which is optional), conclusions, limitations of the study as well as hint for future research and recommendations.

CHAPTER TWO: LITERATURE REVIEW

2. Introduction

In this chapter, the research explores information from publications on topics related to the research problem by accredited scholars and researchers. The aim is to examine what various scholars and authors have said about factors that challenges organization in the implementation process of Environmental Management Systems ISO 14001.

2.1 ISO 14001 Environmental Management System (EMS)

ISO is short for International Organization for Standardization. The name is derived from the Greek word isos, which means equal. Founded in 1946, ISO is an international organization composed of national standards bodies from over 75 countries. According to the 2016 ISO survey publication, at the end of 2016, the organization has a membership of 163 members each of which represents a country. ISO standards therefore tend to have very broad support. The ISO 14000 standard was developed in Amsterdam by the International Organization for Standardization (ISO) in 1996. The standard provides a guideline or framework for organizations that need to systematize and improve their environmental management efforts.

In today's environment where firms compete globally, it is very important to achieve global standards in order to withstand competition. Fierce competition in today's global markets has forced enterprises to improve their quality, cost, delivery, new product introduction speed, customer services, and the ability to be innovative. This severe competition also facilitates these nations and corporations to take more care of their environmental performance in order to access the Global market.

Implementation of ISO can be an important tool to gain competitive advantage. Care for the environment improves the image of a company. At the same time, the appropriate

management of environmental issues contributes positively to economic gain and increases the competitiveness of the company. In Ethiopia, a company can seek official accreditation for its EMS, under ISOQUAR and DQS international companies which have branch in Ethiopia. Certification helps to ensure that the company gets the greatest benefit from its efforts.

A very important element in understanding environmental management is to understand what the environment is (Hewitt and Gary, 1998). ISO defined the environment as “the surroundings in which an organization operates, including air, water, land, natural resources, flora fauna, humans and their interrelation” (ISO, 1996). Environmental Management (EM) can be said to mean different thing to different people, however Hewitt and Gary (1998) defined it as “management of an organization’s or company’s impact on the environment”. Therefore, in this study, EM is ‘the process of reducing the environmental impact of an organization or people’s activities through the control of all aspects of their operation that can cause or lead to an impact on the environment’.

The ISO 14001 standard defines EMS as “that part of the overall management system which includes the organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing implementing, achieving, reviewing and maintaining the environmental policy” (ISO, 1996). It can be said that EMS is derived from the environmental policy of an organization. A policy is a set of rules or principles that an individual or organization adopts for a chosen course of action (Hewitt and Gary, 1998). It can be formal and documented. Environmental policy, to these authors, is the “formal and documented set of principles and intentions of an enterprise with respect to the environment”. It serves as the guiding document for environmental improvement and adherence to it is very important to the integrity and success of the EMS.

2.2 Components of an EMS

EMS, according to ISO 14001 has four components. It is like a cycle of, plan, do, check, and act. If the cycle is adhered to constantly it leads to continuous improvement of the system. Figure 2.1 shows the EMS cycle which is an abstract description of the different components. The design and implementation of an EMS requires a considerable time and effort therefore requiring the commitment of management of the organization. Management needs to communicate their support to the system and emphasize that “they aim to improve their environmental performance”.

An inventory is then needed to assess how the organization currently deals with environmental issues. This is the initial review and it focuses on all elements of which an EMS consists in order to see the activities that have been undertaken and with what results. Some of the topics to be treated here according to ISO 14001 include environmental impact, use of resources like raw materials, water and energy, relevant regulations, organizational structures and culture, products and marketing, training and communications, instructions and handling of incidents. Deficiencies will emerge as the system is used and the gaps that need to be filled will become clear.

The ‘Plan’ Phase

This stage is helpful in the formulation of an environmental policy. It serves the direction for future action and communication of the organization’s environmental commitment and targets. According to ISO (1996) environmental policy deals with: the nature, scale, and environmental impacts of the organization’s activities, products or services; a commitment to continual improvement and pollution prevention; a commitment to comply with relevant environmental legislation and regulations, and other requirements to which the organization

subscribes; provides framework for setting and reviewing environmental objectives and targets; it is documented, implemented and maintained; it is communicated to all employees and; it is available to the general public.

Environmental policy and planning starts with the assessment of the environmental aspects and impacts of the organization's activities, products and services (Kuhre, 1995). Aspects can be said to be the 'potential effects', which can be good or bad. They become impacts when they manifest themselves and lead to changes on the landscape. Aspects can be direct or indirect resulting respectively from the firm's activities or from those of supplies.

The organization's environmental program specifies how the objectives and targets will be met by stipulating the actions, methods responsibilities, time frames and resources. These should be fully integrated in and coordinated with other areas of management and new structures can be identified if possible to enable total environmental management.

The 'Do' Phase

An organizational chart is defined and laid down at this stage in order to embed the environmental management in the organization. Individual roles and responsibilities are outlined in addition to the allocation of resources like finance, personnel, skills and technology. The next step is the identification of training needs to build environmental awareness and competence. This can be done from current staff or new employees recruited. Communication, both internally and externally is relevant for an EMS implementation since it helps keep people informed. Communication is best if it is top-down and bottom-up. It directs attention to the fact that environmental management involves more than a system with procedures, instructions, performance indicators, requirements and checks, laid down in manuals, plans, schemes and reports (ISO, 1996). Documentation is very important in any EMS since it points to

implementation and operation. Document control entails designation of someone to be responsible for revision and change. Operations and activities must be controlled to ensure that policy addressing the most significant environmental aspects is carried out.

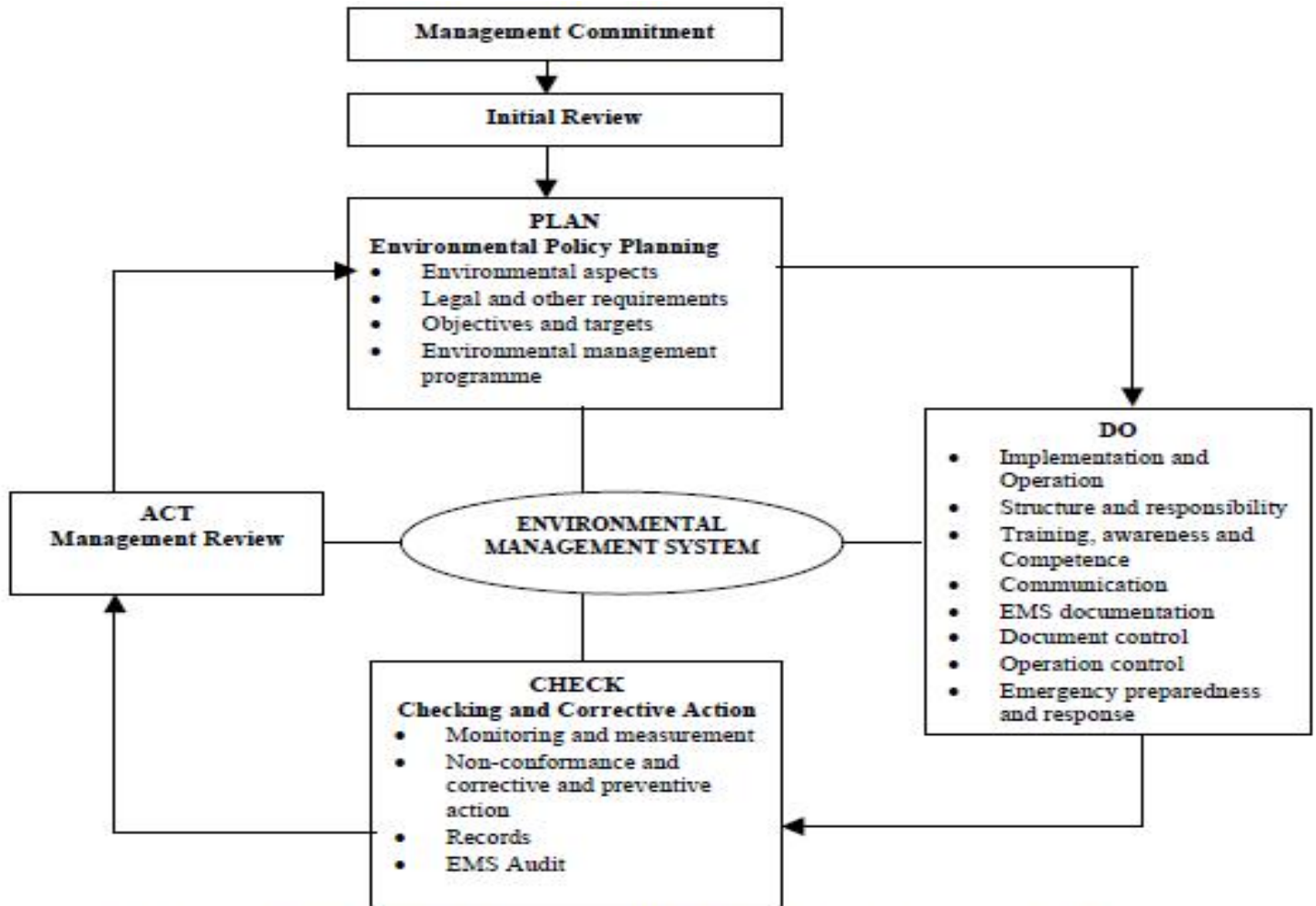
The 'Check' Phase

This stage aims at checking how the firm performs in terms of environmental management and if necessary, to analyze the causes of problems, identify possibilities for improvement and take subsequent action to realize these changes (ISO, 1996). Operations and activities of significant environmental impacts are to be monitored, their performance measured and compared with the objectives and targets, and compliance with regulations assessed.

The 'Act' Phase

Management review here aims at making sure that the EMS continues to produce the desired effects as outlined in the policy. Apart from the information derived from audits, other internal reports on performance and incidents, external reports on regulatory and environmental changes, and suggestions for improvement received from internal and external sources can play a role for the organization to act upon. The process is then repeated again. The drivers or motivations to use EMS are internal and external involving different forces.

These four steps of EMS should be linked together into a process in order to give improved environmental results. The concept of continual improvement is a key component of the environmental management system by completing the cycle.



Source: Kuhre (1995): ISO Certification- A Practical Guide for Preparing Effective EMS.

Figure 2.1: EMS Cycle According to ISO 14001

2.3 Benefits and drawbacks of Environmental Management System

➤ Benefit

Studies on the benefits of implementing EMS ISO14001 have been research by several researchers. For example, a study conducted in Australia claimed that the most significant benefit that an organization gained through the implementation of EMS, ISO14001 is cost reduction (Meena, 2005). On the other hand, a study in Sweden reported that the most significant benefit for organizations in Sweden is improved corporate image (Bozena, et al., 2003). There is

also another study conducted in Australia and New Zealand which showed that the most significant benefits experienced by organizations are morale building within the organization and fulfilling of the customers expectations' (Ambika and Amrik, 2004).

In a review of empirical studies on environmental management systems (most conducted in Germany and Austria) carried out by Steger (2000) mentioned the following benefits.

- Increase of motivation among staff.
- Compliance with complicated legislation.
- Decrease of risk of liabilities.
- Enhance of transparency and effectiveness in the organization.
- Distribution of responsibilities for environmental issues.

The different findings in these studies showed that organizations in different countries experience different type of benefits and this could be due to the different culture in each country and organizational expectations.

➤ **Drawback**

The standard has been criticized by a number of companies (Yiridoe et al, 2003). One of the major barriers to certification and development of an effective EMS is that, companies become vulnerable to legal claims as they develop EMS. The development of an EMS creates documentation on environmental performance and these documents can become a basis for court action against an organization that does not go according to its targets (Kolk, 2000). These litigation problems can create caution on the development of an EMS. The good side however is that, the standard does not mention reporting of environmental performance by companies. Auditors may have access to information on performance and can leak such information out.

Another weakness of the standard is its emphasis on conformance as against performance. Sadgrove, in Welford (1998) said that, “an organization sets its own environmental objectives and targets for improvement. It can thus improve its environmental performance as little as much, as fast or as slow as it likes”.

Another critic of the system is the high cost required to get certified. Not only the cost but the attendant bureaucracy involved in its preparation and implementation. The yearly auditing of records also adds to the cost. A number of man hours are therefore spent on the certificate. These problems reduce the interest of implementing EMS and get the certificate in small and medium scale enterprises.

2.4 Motivations and barriers of implementing an EMS

Due to the importance of the environmental management systems, studies of the different motivations and barriers found in its implementation are:

2.4.1. Motivations

Proponents of the standard ISO 14001 have suggested diverse reasons for organizations to certify. Those most often cited are as follows:

- Compliance with regulations.
- Increased market opportunities.
- Response to customer expectation.
- Cost reductions.
- Enhance reputation.

Studies to determine the motivations of organizations in implementing an EMS have been carried out all over the world. In Singapore, Quazi et al. (2001) identified eight possible motivations for companies to pursue ISO 14001 certification: cost savings, employee welfare,

meeting environmental regulations, concern over trade barriers, response to customer expectations, increase in competitive advantages, top management concern, and following head office environmental practices. After a survey of 300 companies from the Electronic and Chemical industries, only four out of the original eight motives identified were included in the model, these were: top management, employee welfare, compliance with environmental regulations and, following head office environmental practices.

A similar research, with similar results, was carried out in Greece by Evangelinos and Halkos (2002). They assessed four different motives for implementing EMS in two groups of Greek companies: a first group of 101 companies currently implementing an EMS, and a second group of 356 organizations that had decided not to implement an EMS. Three of those four motives were confirmed in the companies that were adopting an EMS, and they were: top management concern, recognition of opportunities arising from their activities with regard to environmental issues, and, to operate in sensitive environmental conditions.

The German Federal Environmental Agency in a study of 1264 organizations registered under EMS in 1998 and 1999 (Umweltbundesamt, 2000) suggested also the following motivations in the implementation of EMS:

- Achievement of continuous environmental improvement.
- Motivation of the staff.
- Identification of weaknesses and potential use of energy sources.
- Ensure regulatory compliance.
- Improve company image.
- Detection and minimization of environmental risks.
- Improve internal organization and documentation.

- Reduce specific environmental impacts.
- Cost savings.
- Competitive advantages.

2.4.2. Barriers

Motivations are important in promoting EMSs, but the barriers to implementation must be acknowledged and addressed in order to minimize them. The adoption of an environmental management system is a complicated procedure where difficulties can appear in the different stages, acting as barriers for its implementation. These can vary depending on the characteristics of the organization, such as, size, business sector, and even country. The findings of the analysis carried out by Hillary (1999), of the thirty-three separate studies that examined the implementation of formal EMSs (ISO 14001 and EMS) in small and medium-sized enterprises (SME's) in the UK, showed that these barriers could be differentiated between internal and external as follows:

➤ **Internal barriers:**

- Lack of resources: lack of time, cost constraints and lack of knowledge and specialists in environmental issues.
- Negative attitudes and company culture: for instance, inconsistent top management support for EMS, or, a general resistance to change.
- Inadequate understanding and perception: such as, low awareness of EMSs, and lack of knowledge of certifiers' systems
- Implementation problems: including, difficulty in dealing with environmental aspects such as the evaluation and determination of impact significance, and uncertainty about how to maintain continual improvement.

➤ **External barriers:**

- Certifiers' difficulties: such as, the degree of difficulty in obtaining the certification, and the associated costs, or, the amount of documentation and bureaucracy required.
- Economic aspects: including, for example, uncertainty of the value of an EMS in markets, or insufficient benefits and drivers.
- Lack of support and guidance: for instance, lack of specific implementation tools and examples, taking into account the different business sectors.
- Institutional weakness: for example, lack of promotion of EMSs, of financial support or of a legislative framework.

Hillary (1999) found that internal barriers were more significant in hindering easy implementation of EMSs in SMEs than the external ones. Among these internal difficulties, lack of human resources and negative company culture were the most cited in the studies.

Lack of human resources rather than financial ones was the major barrier found, not only in the implementation of an environmental management system, also in its maintenance, and it increased in importance as the size of the company decreased (Hillary, 1999).

The second biggest internal difficulty was an unfavorable company culture. It was the case that organizations that had had negative experiences with one of the ISO 9000 standards showed a negative attitude to ISO 14001 (Hillary, 1999).

However, in the case of large companies, where more resources are available (Davies, 2002), external barriers seem to be more important than the internal ones. Issues, such as, economic aspects, and, the complexity of the procedure of obtaining the certification, due to the amount of paperwork required, can play a significant role in the implementation of an environmental management system, and also in the choice of its certifier (Sunderland, 1996).

2.5 Requirements for International Standard for EMS Certification

Many organizations are under considerable pressure to obtain third-party certification for their internal EMS. In situations where this is not required, organizations should continually review and revise their objectives and targets and make the necessary improvements to the internal EMS. Training, communication and consultation with all stakeholders should continue to be a major role for management. On the other hand, if the organization decides to obtain certification to a formal standard, such as ISO 14001, the following steps should be performed.

A key requirement to obtaining certification to ISO 14001 is for managers to gain comprehensive information and understanding of the ISO requirements and the various elements of the standard. Many managers fail to do this, which results in the subsequent stages being implemented poorly. Only when managements have understood the elements of the standard and recognized the significance of certification for the organization should a decision be made to proceed. Another important decision to be taken is whether specific areas/business units or the whole organization would be certified. The drivers, benefits and the process involved in obtaining certification should then be evaluated and the final decision communicated across the organization.

Two-way communication is necessary to increase awareness amongst all stakeholders, reduce potential resistance and receive feedback on various aspects of the certification process. The next step is to conduct an initial environmental review (IER) and/or gap analysis against the standard requirements and elements. This will identify the areas where the organization needs to make improvements, in other words, fill the gaps to address the ISO 14001 standard's requirements. At this point managers should make the effort to learn from the experience of other organizations that have successfully gone through a similar process. This exercise will assist in

benchmarking their own processes and procedures. Furthermore, this analysis will also highlight to the management whether or not they have adequate resources to implement, certify and maintain a formal system/standard.

The next step is the identification of the potential need for seeking external assistance to complete implementation of the EMS/ISO 14001 standard and obtain certification.

Appointment of an external consultant, however, should be carefully discussed across the organization. The need to develop and maintain internal expertise is crucial and the problems and issues relating to using external consultants needs to be discussed openly. It is likely that the objectives and targets established earlier may require revision following feedback received from the consultant's study of the company documentation and site-visit. Alternatively, the organization can proceed towards the aim of certifying its internal EMS without any external assistance. In this case additional training may be necessary so that employees are better able to address the issues identified in the IER and the original objectives and targets.

Whichever approach is taken towards obtaining formal certification, as the next step, it is imperative that any changes being made in the procedures and system are properly documented and regular audits are undertaken. Documentation of all the steps and objectives and targets will serve two main purposes. Firstly, it will act as a tracking method to determine the extent of progress made towards the achievement of the set objectives and targets and secondly, it will also satisfy the elements of the ISO 14001 standard implementation. Internal audits, without saying, need to be conducted regularly, whether or not the organization is moving towards the certification stage.

When management is satisfied that all the standard requirements have been met and that they are ready for certification, they then, need to proceed and contact a registrar and conduct the

pre-audit/assessment. The gaps identified during this assessment should be addressed by the organization before it proceeds towards a full external audit which will decide whether or not its internal EMS fulfils the ISO 14001 standard requirements and can be certified. Once all the requirements have been fulfilled and the external audit has been completed, the organization is then granted the certificate for a period of three years, following which a re-certification audit will be conducted if the organization wishes to maintain its certificate. The day the certificate is granted, the organization then has the added responsibility of maintaining its certification by making and demonstrating continuous improvements within its operations and procedures and by conducting regular internal, surveillance and external audits.

In Ethiopia, a company can seek official accreditation for its EMS, only under ISOQUAR and DQS international companies which have branch in Ethiopia.

2.6. EMS maintenance and continuous improvement

Simply obtaining certification is not sufficient. The real challenge for many organizations is to make continuous improvements and maintain the certification over a long period of time. Maintaining certification requires conducting regular internal audits and one mandatory surveillance audits annually as a minimal. Setting new, more stringent objectives and targets to make improvements within the systems is also necessary. Continuous improvements in all aspects of the standard may also require regular re-training of the employees. It is essential that resources required to maintain the certification are appropriately budgeted, including the costs associated with training.

The internal audits covering all the systems are required to be conducted by the organization to track progress and make changes as required. Documentation also needs to be integrated and updated regularly. As with the integration of various elements of the management

systems, where possible, organizations should also attempt to integrate its external audits to save both time and resources, whilst making the process more comprehensive.

2.7 Success Factors for implementation of EMS

There is an increase number organizations showing interest in the implementation of ISO 14001 environmental management system. The growing trend in many organizations looking to certification could be due to fulfilling their customer requirements or due to other external pressures.

According to Resource Based View (RBV) firms' resources can be grouped into three categories namely physical capital resources, human capital resources and organizational capital resources.

Physical capital resources are liked equipment, physical technology, performance tracking and formal EMS structure. These are the resources which related to the hard resources of a firm. Interpretively, environment performance tracking and organizational infrastructure are more similar to physical capital resources since they are related to hard resources i.e. building, underground tank, drainage and communication lines.

Human capital resources comprised of training, experience of employees, knowledge or intelligence of employees and its relationship. Top management commitment and support served more as human capital resources as they represented vision and insight of managers in a firm. Training, education and teamwork served to be a function of human capital resources.

Organizational capital resources included formal reporting structure in a firm, informal relation among groups within a firm or between firms with those in the environment. Recognition and reward and organizational communication falls into the category of organizational capital resources as it served as controlling and coordinating system and informal

relations within a firm. All of the seven resources here are the unique organizational capabilities which helped a firm to achieve competitive advantage such as through successfully implementing ISO 14001 EMS.

A study conducted by (Ambika and Amrik, 2004) highlighted that the majority of the critical success factors in implementing EMS ISO 14001 are management leadership and support, learning and training, internal analysis and sustainability. While another study claimed that management commitment, rewards and feedback & review stood out as key elements in implementing EMS (Nalini and Bonnie, 2004). Then again, (Khalid, Robert and Matthew, 2002) have emphasized that top management should put greatest effort in identifying environmental aspects, environmental management system (EMS) documentation, training, EMS audits, operational control, environmental management program, objectives and targets, and document control .

From resource based view and studies conducted the critical success factors for the implementation of ISO 14001 are:

1. organizational infrastructure

Organizational infrastructure is the hard resources that an organization utilize in order to maintain the required level of environmental safety. In the case of liquor industry to treat the liquid waste sufficient amount of land, equipments and chemicals required. With adequate infrastructure a company can implement EMS and attain the regulations.

2. Top management commitment and support

Top management support has been constantly recognized as the most vital and crucial success factor in EMS implementation projects. Top management support in EMS implementation has two main facets:

- Developing environmental policy and providing leadership

- Providing the necessary resources

To implement EMS successfully, management should monitor the implementation progress and deliver clear direction of the project. They must be willing to allow for a mindset change by accepting that a lot of learning has to be done at all levels, together with themselves. Top management must take a dynamic role in leading the EMS implementation. The success of EMS implementation totally depends on the strong, sustained commitment of top management. This obligation when transferred down through the organizational levels results in an overall organizational commitment.

3. Training and Education

People must be handled on two levels. First, employees must be trained on the new system in order to use it to day-to-day processes. The second level is educational experience. Training, re-skilling and professional development must be performed to utilize workers efficiency. Employees need training to know how the system will change business processes. There should be additional or extra training and on-site support for staff as well as managers throughout implementation. EMS is not a complex system but without suitable training implementation and maintenance the system would difficult.

4. Project team competency

The project team should be competent on professional expertise, professional commitment and knowing the system and the process in detail to guide others which are involved in the system. Ability to communicate effectively, i.e. as appropriate for the given situation and the people involved, Enjoy and maintain acceptance, working with a good manner by understanding issues raised by the system users and escalating to the responsible parties.

5. Recognition & Reward

People want to be respected and valued by others for their contribution. Recognition and reward is a motivation mechanism that encourages workers to achieve the given work within the specified time table by utilizing their maximum capacity.

6. Organizational Communication

Communication is like the engine for the company who implement a system. Communication is as a key component across all factors of their project implementation profile and maintained that communication is crucial within the project team, between the team and the rest of the organization, and with the client. Poor communication between team members and other organizational members will create adverse effect in the implementation. Communication and cooperation should be of two kinds: inwards the project team and outwards to the whole organization.

7. Consultant capacity

The success of a project depends on the capabilities and capacity of the consultants to some extent. Finding the right people and keeping them through the implementation can be a major challenge. EMS implementation demands multiple skills – functional, technical, health, safety and interpersonal. The success or failure of the project depends on how well the organization can manage the necessary knowledge transfer between consultants and internal employees.

8. Environmental performance tracking

It is a systematic well design method that is used to follow implementation of a system. The performance of a system should be properly followed by predefined schedule. Every activity conducting in the implementation and maintenance process should be evaluated and recorded for future use.

2.8 . Conceptual Framework

A conceptual framework is an analytical tool with many variations and contexts. It is used to make conceptual distinctions and organize ideas by using diagrams or charts and the like. Hence, the researcher tries to see the relationship between Independent variables (organizational infrastructures, top management commitment and support, project team competency, training and education, organizational communication, recognition and reward, environmental performance tracking) and Dependent variable ISO 14001 environmental management system implementation. The researcher chose these variables due to the fact that previous researchers which are discussed in the literature review section identified that these variables are the critical success factors that affect Iso 14001 implementation.

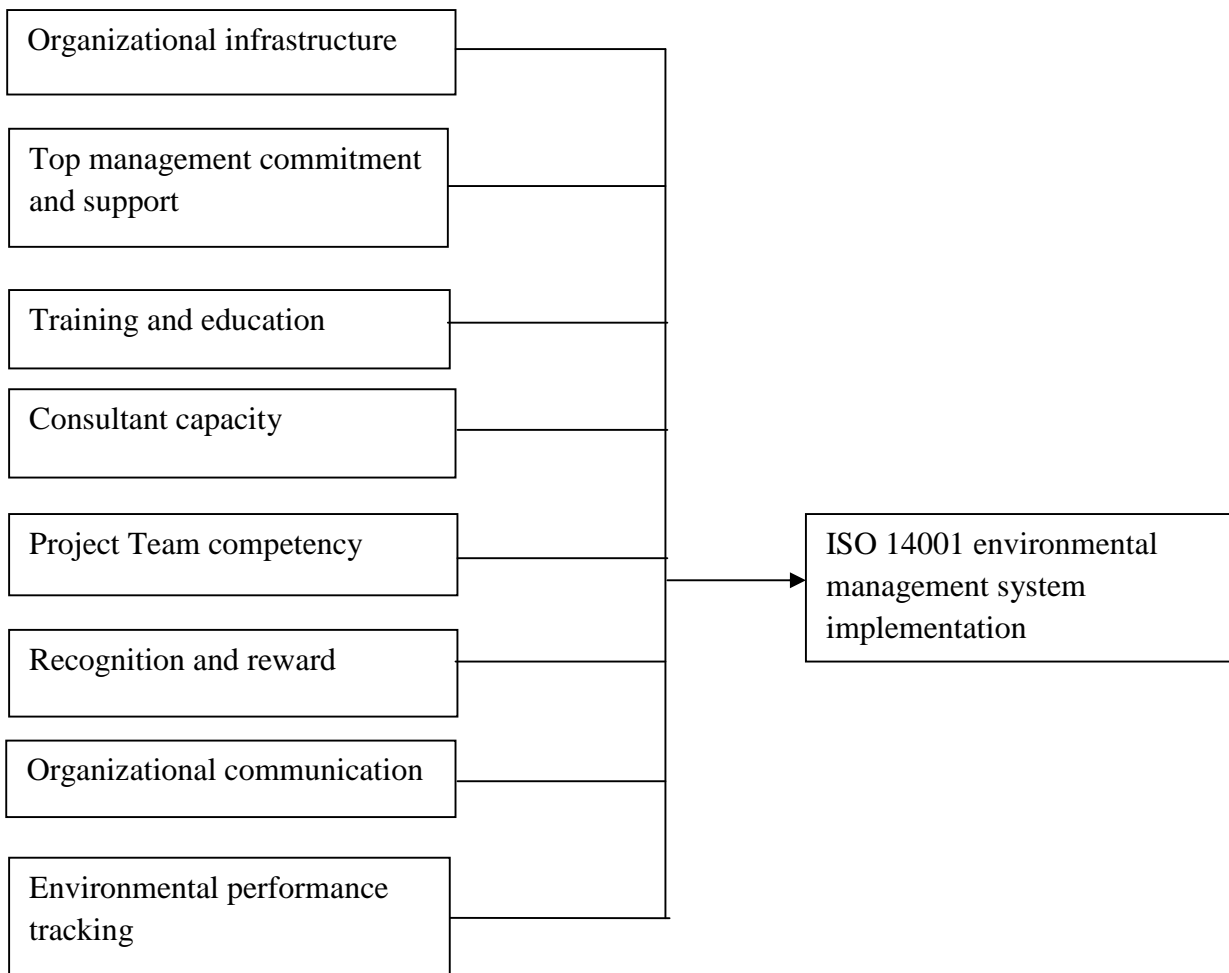


Fig 2.2 Conceptual framework

CHAPTER THREE: RESEARCH METHODOLOGY

3. Introduction

This chapter discusses the methodology that was used in the study. This involves the research design, sampling design, data collection methods and data analysis are discussed in details. All the elements in this chapter are constructed based upon the purpose of the research which is identifying the CSFs of EMS implementation. Primary data will be mainly used for this research.

3.1 Research Design

This study employs descriptive research method because the study attempts to systematically measure the success/ performance of EMS implementation by considering critical success factors. Questionnaire survey allows collection of data from a sizeable population in a highly economical way. It gives more control over the research process.

3.2 Study Population and Sampling

Study population

Population refers to the total or aggregate of all individuals with specified characteristics (Richard, 2006). The collection of all possible observations of a specified characteristic of interest is population while a collection of observations representing only a portion of the population is called a sample. Since the study aimed assessing the critical factor in the implementation of ISO 14001, the target population comprised of production manager, quality manager, technique manager, process supervisor, process chemist, management representative and environmental officer (i.e. seven respondents from each company). All the three ISO 14001 EMS implemented liquor companies were involved in the study and that would make the total population to 21 respondents.

Sample Size and Sampling Technique

Sampling helps to select the respondent according to the purpose of the study. In this study the target population comprised of production manager, quality manager, technique manager, process supervisor, process chemist, management representative and environmental officer who are responsible in implementing and maintaining ISO14001 EMS.

Generally seven respondents from each liquor company have been taken in the research study. All parties involved in the implementation and maintenance process of ISO-14001 EMS are represented by the sample. The total sample size is 21. The questionnaire will be distributed to all the 21 selected population in three liquor companies.

3.3 Data Collection Methods and Approach

Primary Data

Primary data will be collected through questionnaires prepared by the researcher from the three ISO14001EMS certified liquor companies.

Documentary Review

Various documents are used to collect information needed. In this regard, the relevant Information from published and unpublished documents including textbooks, journals, Company's reports and publications related to EMS implementation, dissertations, online Materials, training manuals and different papers related to EMS are planned to use.

3.4 Data Presentation and Data analysis method

3.4.1 Data Measurement

In order to be able to select the appropriate method of analysis, the level of measurement must be understood. In this research, ordinal scales were used. Ordinal scale is a ranking or a

rating data that normally uses integers in ascending or descending order. The five point scales are used in the measurement process to determine to what extent the statement fits the situation in their organization.

Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Scale	1	2	3	4	5

Table 3.1 The five point scale

Data Management

Data cleaning will be done prior to carrying out data analysis so as to ensure validity and reliability. Each questionnaire will be inspected and corrected to ensure that the data contained therein are eligible and accurate. Thereafter coding will be done by assigning numerical values.

Measurement scale references

Table 3.2 Measurement Scale References

MEASURES AND SOURCES OF VARIABLES			
No	variables	No of items	source
1	Environmental performance tracking	6	Adapted from [Wu, S. J., Melnyk, S. A. & Calantone, R. J. (2008)]
2	Organizational infrastructure	4	Adapted from [ISO 14001 (2015)]
3	Top management commitment and support	7	Adapted from [Zutshi, A. & Sohal, A. (2004a)]
4	Training and Education	7	Adapted from [Zhang, Z. H., Waszink, A., & Windgaard, W. (2000)]
5	Consultant capacity	5	Adapted from [Ahire, S. L., Golhar, D. Y. & Waller, M. A. (1996)]
6	project Team Competency	6	Adapted from [Daily, B. F., Bishop, J. W. & Steiner, R. (2007)]
7	Recognition & Reward	4	Adapted from [Zhang, Z. H., Waszink, A., & Windgaard, W. (2000)]
8	Organizational Communication	5	Adapted from [Zainudin, D. (2008).]
9	ISO 14001 EMS Implementation	6	Adapted from [Lefebvre, E. Lefebvre, L. A. & Talbot, S. (2003).]

3.4.2 Data Analysis

First, the researcher will collect the needed data by administrating a questionnaire to employee of Balezaf alcohol, National alcohol and Super eagle alcohol companies. After that, collected data rearranged, edited and calculated in order to become complete data that is needed for this study. Next, the collected data analyzed using descriptive statistics, and multiple linear regression analysis. The descriptive statistics (mean and standard deviations) used to analyze the general trends of the data. The descriptive statistics analyzed using the Statistical Package for Social Sciences (SPSS 20.0). A multiple linear regression model used to determine the relative importance of each independent variable in explaining the success of EMS implementation. The multiple linear regressions model is going to be conducted by the SPSS 20.0 software package.

3.4.3 Normality

Normality tests are used to determine if a data set is well-modeled by a normal distribution.

Statistical tests for normality are more precise since actual probabilities are calculated.

Tests for normality calculate the probability that the sample was drawn from a normal population.

The hypotheses used are:

Ho: The sample data are not significantly different than a normal population.

Ha: The sample data are significantly different than a normal population.

So when testing for normality:

$P > 0.05$ means the data are normal.

$P < 0.05$ means the data are NOT normal

Since it is 5 point likert scale data and sample size is less than 50 **Shapiro-Wilks** test is applied to analysis the normality

3.4.4. Multicollinearity

Multicollinearity will occur when some or all of the independent variables are highly correlated with one another. If the multicollinearity occurs, the regression model is unable to tell which independent variables are influencing the dependent variable. There is no one unique method to detect the multicollinearity problem, it only have some rules of thumb, which are high R^2 but few significant t ratio, high pair wise correlation coefficient and Variance Inflation Factor (VIF) or Tolerance. This study will use Variance Inflation Factor (VIF) method to test the presence of multicollinearity problem in a regression model.

If the correlation coefficient $VIF < 1$ or $VIF > 10$, the model would be considered as it consists of serious Multicollinearity problem.

3.4.5 Research Hypothesis development

The aim of this research is to investigate the relationship between organizational infrastructures, top management commitment and support, project team competency, training and education, organizational communication, recognition and reward and environmental performance tracking with ISO 14001 environmental management system implementation. The variables are taken from different papers discussed in the literatures taking into consideration the availability of data. Multiple linear regression model is used for the study using SPSS ver20.

H1: Organizational infrastructure has a positive and significant relationship with ISO 14001EMS implementation.

H2: Top management commitment and support has a positive and significant relationship with ISO 14001 EMS implementation.

H3: Training and education has a positive and significant relationship with ISO 14001 EMS implementation.

H4: Consultant capacity has a positive and significant relationship with ISO 14001 EMS implementation.

H5: Project team competency has a positive and significant relationship with ISO 14001 EMS implementation.

H6: Recognition and reward has a positive and significant relationship with ISO 14001 EMS implementation.

H7: Organizational communication has a positive and significant relationship with ISO 14001 EMS implementation.

H8: Environmental performance tracking has a positive and significant relationship with ISO 14001EMS implementation.

Decision Rule: Accept H1-H8 if Beta value is positive and significance level $P > 0.05$. Otherwise, reject the hypothesis.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4. Introduction

This chapter covers the presentation, analysis and interpretation of data collected from primary sources. A total of 21 questionnaires were distributed to Employees of National alcohol, Balezaf alcohol and super Eagle alcohol companies, located in Addis Ababa, Sebeta and North shewa respectively, to assess factors influencing ISO-14001 EMS implementation. All of the 21 questionnaires distributed were properly filled and usable for further analysis. This chapter presents the descriptive analysis on variables of the study and results of regression analysis that constitute the main findings of this study. All the data were coded and entered in to SPSS version 20 and inferences were made based on the statistical results.

4.1. Reliability and Validity

A reliability test is used to assess consistency in measurement items. If a research tool is consistent, stable, predictable and accurate, it is said to be reliable. The greater the degree of consistency and stability in an instrument results greater its reliability. (Bhattacharjee , 2012) defined reliability as the degree to which the measure of a construct is consistent or dependable. Internal consistency reliability test was used to determine reliability of the questionnaire by calculating Cranach's Alpha which is used to measure the internal consistency of the measurement items. If a coefficient alpha is between 0.6 and 0.7 it indicates that there is fair reliability, Higher Alpha coefficients indicate higher scale reliability (Joseph, 2003).

As shown in table below scale reliability Cronbach Alphas coefficients for organizational infrastructure is 0.742, top management Support is 0.735, project team competency is 0.723, training and education is 0.818, organizational communication is 0.795, recognition and reward

0.792, Consultant capacity is 0.789 and environmental performance tracking 0.797 , ISO implementation evaluation is 0.805. This study also demonstrates high internal consistency and the total Cronbach's Alpha coefficient is 0.782. Therefore, this study demonstrates high reliability.

Table 4.1 Reliability Test (Cronbach's Alpha)

Dimensions	Cronbach's Alpha coefficients
Organizational infrastructure	0.742
Top Management commitment and Support	0.735
project team competency	0.723
training and education	0.818
organizational communication	0.795
Recognition and reward	0.792
Consultant involvement	0.789
EMS Implementation Evaluation	0.805
Environmental performance tracking	0.797
Reliability of Total Scale	0.782

Source: Analysis of Survey data 2018, using SPSS 20

4.2 Demographic Characteristics of Respondents

As shown in table 4.2 below that majority of the respondents are male which accounts for 71.4% of the total respondents while the rest 28.6% are female.

Only four respondents are below 30 years of age which is 14.3%.The majority of respondents which accounts to 66.7% of the total respondents fall between 30 and 40 age group categories and the remaining 19.0% fall under 40 and 50 years between. This result indicates that most management representatives and project team members are at middle age.

All the respondents' academic qualification is above Diploma level. 81.0% of respondents hold bachelor degree and the rest 19.0% hold master's degree. The academic qualification of respondents has a direct effect in understanding and responding the questioner fairly and accurately.

From the findings, 65.7% of the respondents indicated that they have been working in their organization for more than 8 years, 22.4% indicated having been with the organization between five to eight years and 11.9% of the respondents indicated that they have been with the organization for less than five years.

All the three companies took 6 months to 1 year to implement the EMS and achieve certification. And all of the respondents were mentioned that their main reason for implementing ISO 14001 EMS is for export business purpose.

Table 4.2 Demographic characteristics of respondents

Category	Item	Frequency	Percent
Gender	Male	15	71.4%
	Female	6	28.6%
	Total	21	100%
Age	Less than 30 years	3	14.3%

	Between 30 and 40 years	14	66.7%
	Between 40 and 50 years	4	19.0%
	Total	21	100%
Qualification	Diploma	0	0%
	Degree	17	81.0%
	Masters	4	19.0%
	Total	21	100%

4.3. Factors Influencing ISO 14001 implementation

The different factors that can affect implementation of ISO 14001 environmental management system are Organizational infrastructure, Top Management commitment and Support, Project Team Competency, Training and Education, Employee recognition and reward , Organizational Communication, and Consultant capacity have been stated in the literature review and were analyzed as presented here below.

4.3.1 Top Management commitment and Support

For exploring the role of top management in ISO 14001 environmental management system implementation project seven questions are offered (as shown in table 4.3). The final result showed that the mean of top management commitment and support is 3.95. This means that top management had an appropriate support and commitment in ISO 14001 environmental management system implementation regarding allocation of resource, delegation of management representative, and motivation of employees.

From the responses it can be seen that most of the respondents were satisfied with all questions related with support and commitment of top management. Top management Support and commitment has been constantly recognized as the most vital and crucial success factor in ISO 14001 environmental management system implementation.

Table 4.3 Summary of Survey Findings for Top Management Support and commitment

Description	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Remark
Top management has allocated all the required resources (time, budget and money) for EMS implementation	0%	4.8%	19.0%	57.1%	19.0%	Agree
Top management has delegated Management representative for ISO 14001 project implementation	0%	4.8%	14.3%	66.7%	14.3%	Agree
Top management has understood the Objectives of ISO 14001 EMS.	0%	4.8%	14.3%	57.1%	23.8%	Agree
Top management had a good Knowledge of ISO 14001 EMS.	0%	4.8%	19.0%	66.7%	9.5%	Agree
Top management had taken a self-motivated role in leading the ISO 14001 EMS implementation	0%	4.8%	9.5%	71.4%	14.3%	Agree
Top management had taken all the	0%	4.8%	14.3%	71.4%	9.5%	Agree

necessary risk and responsibilities during ISO 14001 EMS implementation						
Top management has set official Environmental policies.	0%	0%	4.8%	71.4%	23.8%	agree

4.3.2 Project Team Competency

Six questions were designed to analysis project team competency. As represented in Table 4.11, the mean value 3.79 for this variable showed that project team was competent. This means the project was composed of skilled, qualified and experienced people who had a good knowledge in business and technical aspects.

Table 4.4 Summary of Survey Findings for Project Team Competency

Description	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Remark
The team members were skilled or qualified	0%	9.5%	14.3%	61.9%	14.3%	agree
ISO 14001 EMS project were the top &only priority for the team	0%	14.3%	19.0%	57.1%	9.5%	agree
The team members had effective training before engaged to ISO 14001 implementation	0%	9.5%	14.3%	61.9%	14.3%	agree
The project team had experienced in previous ISO quality implementations.	0%	4.8%	19.0%	61.9%	14.3 %	agree

The team members had safety and environmental impact assessment knowledge	0%	9.5%	14.3%	66.7%	9.5%	agree
The team members has carefully been selected based on their knowledge and ability to accept change	0%	4.8%	14.3%	66.7%	14.3%	agree

4.3.3 Recognition & Reward

Recognition & reward factor was investigated by four questions. The mean value for this variable is 3.44 (Table 11) and it indicates that execution of ISO 14001 EMS implementation moderately affected by reward and recognition.

Table 4.5 Summary of Survey Findings for Recognition & Reward

Description	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Remark
company improved working conditions by recognize employee achievement	0%	9.5%	19%	61.9%	9.5%	agree
Company provided incentive to motivate the project team ISO 14001 improvement.	0%	14.3%	23.8%	57.1%	4.8%	agree
Employees' rewards and penalties were clearly stated.	0%	14.3%	28.6%	52.4%	4.8%	agree
Recognition and reward activities shortened the ISO 14001 implementation duration	0%	19.0%	57.1%	23.8%	0%	neutral

4.3.4 Training and Education

To analysis training and education factor on the implementation of ISO 14001 seven questions were developed (see table 4.6). The final result showed that the mean of this variable is 3.63 (Table 11). The mean value indicates that organization wide training and education program with appropriate training materials in the implementation of ISO 14001 is a crucial step that companies should priority before starting the implementation process.

Table 4.6 Summary of Survey Findings for Training and education

Description	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Remark
Organization has provided all resources required for training.	0%	4.8%	19.0%	66.7%	15.7%	Agree
Training programs were properly and well designed for project team members	0%	4.8%	14.3%	61.9%	19.0%	Agree

Training materials (manual) have been customized for each specific Job.	0%	23.8%	28.6%	47.6%	0%	Agree
An organization-wide training program has been placed and all employees where involved	0%	28.6%	33.3%	38.1%	0%	Agree
Training materials target the benefit of implementing ISO 14001	0%	0%	23.8%	61.9%	14.3%	Agree
Enough time was allocated for ISO 14001 EMS Training	0%	9.5%	19.0%	57.1%	14.3%	agree

Training program was handled by highly qualified consultants and trainers	0%	14.3%	19.0%	52.4%	14.3%	agree
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4.3.5 Organizational communication

For investigating inter departmental communication five questions were designed and used. As represented in Table 4.11, the mean value 3.62 for this variable showed that interdepartmental communication was done in moderate manner. This means regular cross functional meeting was set to share new methods of working and collect improvement suggestions. Production staffs were shown some resistance in the implementation process.

Table 4.7 Summary of Survey Findings for organizational communication

Description	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Remark
There were regular cross functional meeting to discuss about the EMS implementation progress	0%	9.5%	33.3%	47.6%	9.5%	agree
There were regular internal groupmeeting to analysis environmental impact	0%	4.8%	38.1%	42.9%	14.3%	Agree
EMS improvement suggestions had been regularly collected from multiple employees levels	0%	9.5%	28.6%	52.4%	9.5%	agree
Production staff fully support environmental activities of ISO 14001	0%	14.3%	42.9%	38.1%	4.8%	agree

implementation.						
Communication was set to solve disagreement during impact assessment variation.	0%	4.8%	19.0%	57.1%	19.0%	agree

4.3.6 Consultant capacity

Five questions were designed to assess the role of consultants in ISO 14001 EMS implementation. As it's observed in Table 4.11 the mean value of this dependent variable is 3.49 which proved the great performance of consultants during different stages of ISO 14001 EMS implementation.

Table 4.8 Summary of Survey Findings for consultant involvement

Description	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Remark
Consultants had in-depth knowledge of ISO 14001	0%	4.8%	33.3%	52.4%	9.5%	agree
Consultant had involved in different stages of implementation.	0%	19.0%	23.8%	52.4%	4.8%	agree
Consultants had multiple skills covering functional, technical, business knowledge	0%	28.6%	33.3%	38.1%	0%	agree
Consultant had given quick response during error occurred in environmental impact assessment	0%	4.8%	33.3%	52.4%	9.5%	agree

Consultant had given required ISO training efficiently.	0%	9.5%	33.3%	47.6%	9.5	agree
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4.3.7 Environmental performance tracking

Five questions were designed to assess the role of environmental performance tracking in ISO 14001 EMS implementation. As it's observed in Table 4.11 the mean value of this dependent variable is 3.56 which indicated that low performance tracking of ISO 14001 EMS before and after the implementation process.

Table 4.9 Summary of Survey Findings for environmental performance tracking

Description	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Remark
Performance tracking measuring program were developed.	0%	4.8%	14.3%	71.4%	9.5%	agree
Weekly and monthly performance assessing records were filled properly	0%	9.5%	28.6%	52.4%	9.5%	agree
Internal audit conducted according to the schedule	0%	9.5%	28.6%	47.6%	14.3%	agree
Corrective action plane were developed after analyzing the audit	0%	19.0%	33.3%	42.9%	4.8%	agree
Corrective actions were conducted according to the plan	0%	14.3%	23.8%	57.1%	4.8%	agree

Effectiveness of the corrective actions taken was analyzed and documented.	0%	19.0%	33.3%	42.9%	4.8%	agree
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4.3.8 Organizational Infrastructure

Organizational infrastructure factor was investigated by four questions. The mean value for this variable is 3.61 (Table 11) and it indicates that execution of ISO 14001 EMS implementation is highly affected by availability of adequate infrastructure.

Table 4.5 Summary of Survey Findings for Organizational infrastructure

Description	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Remark
Sufficient land provided for waste treatment purpose	0%	9.5%	28.6%	47.6%	14.3%	agree
Untreated Waste collected safely in separate place/tank	0%	14.3%	23.8%	47.6%	14.3%	agree
Waste treatment equipments are installed and functional	0%	19.0%	28.6%	47.6%	4.8%	agree
Utility and chemical were available for waste treatment activity	0%	9.5%	19.0%	57.1%	14.3%	agree

4.4. ISO 14001 EMS Implementation Evaluation

The mean value of ISO 14001 environmental management system users' response to six questions which are designed to measure the success of EMS is 3.43. This indicates that the

implementation process is not satisfactory. High attention should be given to increase achievements on productivity, quality, financial visibility and waste reduction.

Table 4.10 Summary of Survey Findings for ISO 14001 EMS Implementation Evaluations

Description	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Remark
Iso 14001 implementation improved product quality.	0%	23.8%	42.9%	33.3%	0%	neutral
Iso 14001 implementation increased company profit	0%	19.0%	42.9%	38.1%	0%	neutral
productivity is improved after implementing ISO 14001	0%	23.8%	38.1%	33.3%	4.8%	neutral
It ensured regulatory compliance	0%	23.8%	42.9%	28.6%	4.8%	neutral
It allows for waste and environmental impact reduction	0%	0%	9.5%	57.1%	33.3%	Agree
ISO 14001 implementation has improved customer satisfaction	0%	9.5%	23.8%	52.4%	14.3%	Agree

4.5. Mean and Standard Deviation of Variable

Table 4.11 implies mean scores and deviations from the mean towards the different variable (Top Management Support, project team competency, training and education,

organizational communication, Recognition and reward, Consultant involvement, environmental performance tracking, organizational infrastructure and EMS Implementation Evaluation).

The average Sensitivity regarding the selected variables had a mean score that ranges between 3.436, and 3.945; with a standard deviation ranging from 0.6412 and 0.7623 respectively. Indicating the variation from the mean is small. The result also implies that the respondents have a positive view regarding the variables raised on the questioner.

Table 4.11 Mean and Standard Deviation of Variables

S.N.	Item	Mean	Standard
			Deviation
1	Top Management commitment and Support	3.9456	.64123
2	project team competency	3.7937	.75628
3	training and education	3.6327	.72502
4	organizational communication	3.6190	.74808
5	Consultant capacity	3.4857	.75252
6	Environmental performance tracking	3.5556	.76255
7	Recognition & Reward	3.4405	.72416
8	organizational communication	3.6071	.78506
9	Iso 14001 EMS Implementation Evaluation	3.4365	.74810

4.6. Normality test

The table 4.12 indicates that the Shapiro-Wilk statistic has a P-value of greater than 0.05 which indicates that there was no evidence for the presence of abnormality in the data. Thus, the null hypothesis that the data is normally distributed should be accepted since the p-value was considerably in excess of 0.05.

Table 4.12 Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.(p)
top management commitment and support	.296	21	.000	.865	21	.018
project team competency	.283	21	.000	.849	21	.024
training and education	.211	21	.015	.925	21	.110
organizational communication	.167	21	.130	.969	21	.718
consultant capacity	.233	21	.004	.930	21	.135
reorganization and reward	.237	21	.003	.914	21	.066
Environmental performance tracking	.196	21	.034	.933	21	.160
organizational infrastructure	.205	21	.022	.924	21	.102
Iso 14001 EMS implementation efficiency	.174	21	.097	.929	21	.129

4.7 Multicollinearity

Multicollinearity will occur if some or all of the independent variables are highly correlated with one another. It shows the regression model has difficulty in explaining which independent variables are affecting the dependent variable. If multicollinearity problem is too serious in a model, either additional important variable should be added or unimportant independent variable should be dropped. VIF correlation test using SPSS conducted to analysis Multicollinearity.

Table 4.13 Multicollinearity Test: Variance Inflation Factor (VIF)

Model	Collinearity Statistics	
	Tolerance	VIF
Top management commitment & support	.742	1.348
project team competency	.101	9.906
Training & education	.229	4.363

org. communication	.184	5.437
consultant capacity	.363	2.753
Environmental performance tracking	.109	9.139
organizational infrastructure	.276	3.618
Recognition & Reward	.543	1.841

4.8. Hypothesis Testing Using Multiple Regressions

The aim of this research is to investigate the relationship between organizational infrastructures, top management commitment and support, project team competency, training and education, organizational communication, recognition and reward and environmental performance tracking with ISO 14001 environmental management system implementation. Since correlation analysis do not provide enough information to make a proper decision regarding the relationships between the variables, multiple regression has been used to test the hypothesis for the independent and dependent variables. Furthermore, the discussion analyzes the statistical findings of the study in relation to the previous empirical evidences. SPSS version 20 used to conduct the multiple linear regressions.

Table 4.14 Multiple regression results

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.823 ^a	.677	.461	.54916	.677	3.139	8	12	.037

a. Predictors: (Constant), recognition, consultant, project team, org infrastructure, performance, top management, org. communication, training

b. Dependent Variable: iso1400 efficiency

In the above table the regression model presents how much of the variance in EMS implementation success is explained by the underlying factors. The predictor variables in this model have accounted for 67.7% of the variability. This means more than 67.7% of variations in

factors affecting implementation of EMS in Ethiopian liquors factory companies were explained by independent variables.

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.574	8	.947	3.139	.037 ^b
	Residual	3.619	12	.302		
	Total	11.193	20			

a. Dependent Variable: iso1400efficiency

b. Predictors: (Constant), recognition, consultant, project team, org infrastructure, performance, top management, org. communication, training

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
	B	Std. Error	Beta			Zero-order	Partial	Part
(Constant)	.102	1.469		.070	.046			
Top management commitment & support	.122	.196	.225	.625	.044	.020	.178	.090
project team competency	.178	.450	.180	.396	.339	.642	.114	.057
Training & education	.166	.112	.214	.176	.032	.226	.121	.070
org. communication	.184	.337	.184	.546	.345	.696	.156	.079
consultant capacity	-.187	-.238	-.188	-.784	.448	-.599	-.221	-.113
Environmental performance tracking	.186	.429	.190	.434	.037	.700	.124	.063
organizational infrastructure	.362	.346	.355	.450	.046	.378	.214	.072
Recognition & Reward	-.062	.203	-.060	-.308	.763	-.261	-.089	-.045

Table 4.14 presents the hierarchical regression results of control variable and all the 8 determining factors for ISO 14001 EMS implementation. The results showed that four variables are found positively and significantly associated with ISO 14001 EMS implementation, namely, environmental performance tracking (Beta = .190, p=.037), top management commitment and support (Beta = .105, p=0.044) , organizational infrastructure (Beta = .355, p=0.046) and training

and education (Beta = .214, p=0.032), (. On the other hand, project team competency and organization communications have acceptable beta value but not significantly associated with ISO 14001 EMS implementation. But recognition and reward (Beta = -.06, p=0.763), and consultant capacity (beta = -.188, p=-.488) are found negatively and insignificantly associated with ISO 14001 EMS implementation.

Hypothesis 1 posits that organizational infrastructure has a positive and significant relationship with ISO 14001 EMS implementation. The result showed that the relationship was positively and significantly associated with ISO 14001 EMS implementation. The building, drainage and tanks and waste treatment plant are critical factory for the successful implementation of ISO projects.

Hypothesis 2 posits that there is a relationship between top management commitment and support and ISO 14001 EMS implementation. The result showed that the relationship was positively and significantly associated with ISO 14001 EMS implementation. This relationship is consistent with previous research by [Quazi, H. A. (1999)] who agreed that top management play important role in influencing the implementation and adoption of EMS.

Hypothesis 3 posits that training and education has a positive and significant relationship with ISO 14001 EMS implementation. The results showed that the relationship was positively and significantly associated with ISO 14001 EMS implementation. Organizations will undertake extensive employee training and that the success of ISO implementation depends on the quality and adequacy of the training as indicated by Kaisu Sammalisto, Torbjorn Brorson (2006).

Hypothesis 4 posits that consultant capacity has a positive and significant relationship with ISO 14001 EMS implementation. The result from this study demonstrated that consultant capacity has a negative and not significant relationship with ISO 14001 EMS implementation. The probable reason for this is the availability of implementation guides which demonstrate each step of ISO 14001 implementation activities and limitation of consultant technical capability.

Hypothesis 5 posits that project team competency has a positive and significant relationship with ISO 14001 EMS implementation. However, the findings of this study portrayed otherwise with project team competency having a positive and not significant relationship with ISO 1401 EMS implementation. One possible justification for this is the availability of readymade procedures and training facility. Hoegl, M. (2005) also stressed that a team with 10 or more members cannot perform high quality teamwork. In his study, the higher number in the teamwork, the less likely that ISO 14001 EMS implementation will be successful may have been a result of the larger team size among the firms.

Hypothesis 6 posits that recognition and reward has a positive and significant relationship with ISO 14001 EMS implementation. The findings from this study showed that recognition and reward have a negative and not significant relationship with ISO 14001 EMS implementation. One possible explication is that although firms give a very attractive reward system for employee but if there are no clear guidelines on what are the rewards and punishment imposed, the ISO 14001 EMS implementation will most likely to be not successful. This may also due to some of the reward system may encourage risk taking among employee in solving environmental issues.

That is, the higher the risk, the higher the reward and may be the harsher is the punishment for mistakes made by the employee.

Hypothesis 7 posits that organizational communication has a positive and significant relationship with ISO 14001 EMS implementation. The results showed that organization communication have a positive and not significant relationship with ISO 14001 EMS implementation. The result is contradicted with the evidence from literature. One possible explanation for this inconsistent result is due to lack of open communication and active participation from lower level employees. As argued by Sambasivan, M. & Ng, Y. F. (2008) to achieve a successful implementation of ISO 14001 will require commitment from employees where environmental responsibilities must be clearly defined and communicated to them.

Hypothesis 8 posits that environmental performance tracking has a positive and significant relationship with ISO 14001 EMS implementation. This study has proven that the relationship was positively and significantly associated with ISO 14001 EMS implementation. The result is consistent with case study research by Matthews, T. H. (2003), where organizations seek environmental benchmarking to compare performance both across industries and among their own facilities is essential to move business leaders closer to implementing ISO 14001 EMS.

Chapter Five

Conclusions and Recommendations

5.1. Conclusions

In recent years a large number of companies implement ISO 14001- based EMS to guide environmental improvements in worldwide through a systematic approach. But in our country most companies implemented ISO 14001 EMS for export market purpose not for the improvement and effective utilization of resources.

This study tried out to assessment the implementation process of Environmental Management system by considering the critical success factors in Ethiopian liquors industry. As discussed in the introduction and as it was shown through the statement of the problem and literature review, awareness and implementation of on environmental management system is not satisfactory. This research aims to help managers understand of the importance and values of critical success factors in ISO 14001 EMS implementation.

Organizational infrastructure has been found one of the most important critical success factors in the implementation process of ISO-14001 EMS in liquor industry. The availability sufficient land and waste treatment equipments are the determining aspects in the implementation. Without proper infrastructure it is not possible to implement ISO14001 EMS practically.

Top management support and commitment is the second critical success factor in the implementation of ISO -14001 EMS in liquor industry. The study indicates that top managements sets official environmental policies and taken a self-motivated role in leading the

EMS implementation. They have been committed to allocate all the required resources (time, budget and money) for EMS implementation.

Training and education is the third critical success factor in ISO 14001EMS implementation of liquors factory. All of the respondents mentioned that the availability of readymade training manuals and allocation of enough time made the training and education process effective and efficient. But some respondents mentioned that training manuals were not specific regard to their operation.

Organizational communications is the forth critical factor important to in EMS implementation. Since most of the company's already implemented ISO-9001 quality management system before EMS, interdepartmental communication were conducted in organized and peaceful manner. The existing communicational channel was used to collect system improvement suggestions, support functional users and solve any departmental conflicts.

5.2. Recommendations

As explained in this research, EMS is important and brings competitive advantages to organizations. Due to increase in environmental control regulatory and growth of export items the demand of implementing EMS has also coming to many organizations in Ethiopia. In order to overcome the existing challenges that enterprises face and enable them to attain EMS certification, many activities have to be undertaken by all the relevant stakeholders at different levels. The major activities that need to be undertaken are:

➤ **Creating and increasing awareness of companies on the benefit of EMS certification;**

The implementation of EMS hinges on the concept of protecting the environment, but businesses exist for the purpose of making profits and creating wealth. Accordingly, when one approaches leaders of businesses to implement environmental tools, the first reaction is that implementation requires incurring additional costs. The counterargument is rather that environmental technical tool EMS is meant to reduce costs through resource efficiency and thereby achieve also environmental sustainability.

➤ **Enhance environmental technical support provides capacity ;**

As mentioned earlier consultant capacity has limitation especially in technical area. Besides that at present, there are no Ethiopian certifying bodies for EMS implementation. So far, companies who implement or maintain EMS systems rely on foreign auditors for certification and recertification. This involves high costs in foreign exchange and lengthy time frames for auditing the system in the enterprises.

➤ **Building capacity of employees for implementing EMS in enterprises on a continuous basis;**

Top management of organization should strengthen supporting the project from the very beginning and should inform and motivate employees of the company in all stages of EMS implementation. Companies should provide training to the project team and other employees in order to increase their knowledge and expertise.

Further Research Recommendation

Based on the reported findings of this research and the limited number of ISO 14001 EMS implemented companies; it is necessary to provide several directions for further research. The following topic is recommended for further study.

1. Why only few number of companies implemented ISO 14001 environmental management system in Ethiopia?
2. Does implementing ISO 14001 EMS will ensure the safety the environment?

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Appendices

Appendix I: Questionnaire related to ISO-14001 EMS implementation

Addis Ababa University SCHOOL OF COMMERCE

Project management department

SURVEY QUESTIONNAIRE

This questionnaire is designed to collect first-hand information for a project conducted in partial fulfillment of Master Degree of Project management under the title **Environmental Management system implementation challenges in Ethiopian industry**. The completion of the research substantially depends on your cooperation and of the information you give in this questionnaire. Furthermore, the information you provide will be solely used for academic purpose. Therefore you are requested to give a genuine response to the questions.

The survey will be confidential and will not be used for other purpose other than this paper. Thank you for taking your treasured time to fill out the questionnaire. I appreciate your collaboration in advance.

Section 1: Personal information:

1. Gender:

Male

Female

2. Age:

Less than 30 years

between 40 and 50 years

Between 30 and 40 years

between 50 and 60 years

3. Qualification:

Diploma

Masters

PhD

Degree

4. Company Name _____ Department: _____ Role: _____

5. Since how many years have you been working with this organization?

0-3 years 3-5 years 5 -8 years more than 8 years

6. How long did it take to implement the EMS until certification?

- A. Less than 3 months
- B. 3 to 6 months
- C. 6 months to 1 year
- D. 1-2 years
- E. More than 2 years

7. What was the purpose for implementing ISO 14001 EMS in the organization

- A. increase productivity
- B. reduce waste
- C. For export market
- D. Not sure

Section 2: Questions:

The research questions on these topics are operationalized through a series of statements, to which participants are required to respond using a five point format. 1 represent strongly disagree, 2 disagree, 3 represent neutral, 4 represent agree and 5 represent strongly agree

1 Top Management commitment and support						
To what extent do you agree on the following statements regarding top management commitment and support?						
	Item	1	2	3	4	5
1	Top management has allocated all the required resources (time, budget and money) for ISO 14001 implementation.					
2	Top management has delegated capable person as management representative to lead the project .					
3	Top management has understood the objectives of ISO 14001.					
4	Top management had a good knowledge of ISO 14001					
5	Top management had taken a self-motivated role in leading ISO 14001 implementation					
6	Top management had taken all the necessary risk and responsibilities during ISO 14001 implementation.					
7	Top management has set official Environmental policy.					
2 Project Team Competency (capability)						
To what extent do you agree on the following statements regarding project team competences?						
	Item	1	2	3	4	5
1	The team members were skilled or qualified.					
2	The ISO 14001 project has been the top and only priority for the team.					
3	The team members had effective training before engaged to ISO 14001 implementation.					
4	The project team had experience in previous about ISO implementations.					
5	The team members had safety and environmental impact assessment knowledge					
6	The team members has carefully been selected based on their knowledge and ability to accept change.					
3 Training and education						
To what extent do you agree on the following statements regarding training and Education?						
	Item	1	2	3	4	5

1	Organization has provided all resources required for training.					
2	Training programs were properly and well designed for project team members.					
3	Training materials (manual) have been customized for each specific Jobs.					
4	An organization-wide training program has been placed and all employees where involved					
5	Training materials target the benefit of implementing ISO 14001					
6	Enough time was allocated for ISO 14001 training.					
7	Training program was handled by highly qualified consultants and trainers.					
4	organizational communication					
	To what extent do you agree on the following statements regarding organizational?					
	Item	1	2	3	4	5
1	There were regular cross functional meeting to discuss about the ISO 14001 implementation progress					
2	There were regular internal group meeting to analysis environmental impact.					
3	improvement suggestions had been regularly collected from multiple employees levels					
4	Production staff fully support environmental activities of ISO 14001 implementation.					
5	Communication was set to solve disagreement during impact assessment variation during the implementation.					
5	Consultant capacity					
	To what extent do you agree on the following statements regarding Consultant capacity?					
	Item	1	2	3	4	5
1	Consultants had in-depth knowledge of ISO 14001					
2	Consultant had involved in different stages of implementation.					
3	Consultants had multiple skills covering functional, technical, business knowledge					
4	Consultant had given quick response during error occurred in environmental impact assessment					
5	Consultant had given required ISO training efficiently.					
6	Recognition & Reward					
	To what extent do you agree on the following statements regarding Consultant?					
	Item	1	2	3	4	5
1	company improved working conditions by recognize employee					

	achievement					
2	Company provided incentive to motivate the project team Iso 14001 improvement.					
3	Employees' rewards and penalties were clearly stated.					
4	Recognition and reward activities shortened the ISO 14001 implementation duration					
7	Environmental performance tracking					
	To what extent do you agree on the following statements regarding environmental performance tracking?					
	Item	1	2	3	4	5
1	effective Performance tracking measuring program were developed.					
2	Weekly and monthly performance assessing records were filled properly					
3	Internal audit conducted according to the schedule					
4	Corrective action plane were developed after analyzing the audit					
5	Corrective actions were conducted according to the plan					
6	Effectiveness of the corrective actions taken was analyzed and documented.					
8	Organizational Infrastructure					
	To what extent do you agree on the following statements regarding the evaluation of ERP Implementation?					
	Item	1	2	3	4	5
1	Sufficient land provided for waste treatment purpose					
2	Untreated Waste collected safely in separate place/tank					
3	waste treatment equipments are installed and functional					
4	Utility and chemicals provided for continuous waste treating					
9	ISO 14001 Implementation Evaluation					
	To what extent do you agree on the following statements regarding the evaluation of ERP Implementation?					
	Item	1	2	3	4	5
1	Product quality improved					
2	Iso 14001 implementation increased company profit					
3	productivity is improved after implementing ISO 14001					
4	It ensures regulatory compliance					
5	It allows for waste and environmental impact reduction					
6	ISO 14001 implementation has improved customer satisfaction					