

1. Introduction

1.1 Introduction

Environmental management system (EMS) is one of the most important tools available for the purpose of making the organizations more environmentally proactive and efficient. Through the establishing of an EMS, the company can demonstrate to clients and the public that they take environmental impacts seriously. In addition, an efficient EMS also can improve company's operation process and brings economic benefits. Nowadays more and more companies have realized the importance of the EMS and engaged in the EMS implementation practice (Emilsson, *et al.* 2002).

ISO 14001 EMS specifies requirements for an environmental management system, to enable an organization to formulate a policy and objectives taking into account legislative requirements and information about significant environmental impacts. Thus, to formulate an effective environmental policy, the organizations can incorporate all the requirements of the ISO (International organization ofstandarization) 14001 into their own environmental management systems (ISO, 1996).

ISO 14001 standards on environmental management provide a system for tracking, managing and improving performance regarding the environmental requirements. Conformance to the ISO standard requires policy commitments to compliance with all regulatory requirements and other mandates such as pollution prevention and EMS continual improvement which can be verified by an external auditor (Gallagher *et al.*, 2004).

ISO 14001 provides the framework to allow such controls to be exercised in a structured and controlled way. By documenting such a system, personnel operating

it have a framework to: work around, hang ideas onto, follow what is documented, record what was done and learn from any mistakes that were made (Ken white law, 2004)

1.2 Research problem:

The importance of Implementing ISO 14001 in petroleum field reflect mainly top management level commitment to save the environment and keep it clean, suitable to life and minimize the percentage of pollution that may happen during the petroleum oil processes in Sudan, so it will improve the performance indicators.

This study was tried to answer some questions:

1. What is the impact of application of ISO14001 on customer satisfaction?
2. What is the impact of application of ISO14001 on employee satisfaction?
3. Can ISO 14001 improve the quality of services provided by Sudanese petroleum pipelines CO. LTD.?

1.3 Objectives of research:

1. To identifying the relation between the application of ISO 14001 and customer satisfaction.
2. To identifying the relation between the application of ISO 14001 and employee performance.
3. To examine if the Top management of Sudanese petroleum pipelines CO. LTD can help to enhance environmental performance indicators results.

1.4 Hypothesis of Research:

1. There is a relation between implementing ISO 14001 and customer satisfaction.
2. There is a relation between implementing ISO 14001 and employee satisfaction
3. The implementing of ISO 14001 need support from top management.

2. Literature Review

2.1. ISO 14000 series

The ISO 14000 Series is a set of international standards for voluntary environmental management that has the potential to significantly impact global environmental policy-making. It is the first set of standards for environmental management applicable to both private and public organizations worldwide. The Series is based upon the premise that sound environmental management strategies can improve an organization's performance –which a greening of business pays in a competitive world. This seemingly paradoxical premise is the result of a significant shift in environmental policy-making over the past decade (ISO, 1997)

During the 1990s, market-based regulatory approaches, such as tradable emission permits, have gained increasing popularity over traditional command-and-control approaches to environmental problems. Market-based approaches allow managers greater flexibility in choosing how to meet regulatory requirements. Freed from often inefficient mandated command-and-control actions, market-based solutions challenge businesses to employ innovative means for complying with specific criteria set by regulatory authorities. This allows firms to incorporate environmental philosophies into their corporate strategies and decision-making processes. The ISO 14000 Series guidelines represent the next step in this cultural evolution from reactive-curative to proactive-preventative environmental management (Cascio *et al.*, 1996)

In short, the ISO 14000 Series is designed to promote environmental compliance, ensure a commitment to pollution prevention, and foster continual improvement of environmental performance through efficient environmental

management. It is important to note that ISO 14000 does not impose specific performance targets or emission levels, nor does it replace environmental regulations. Rather it proposes a framework for effective environmental management that promotes commitment to environmental improvement above and beyond compliance with governmental regulations.

Organizations worldwide in both public and private sectors are beginning to embrace the ISO 14000 guidelines, specifically the certifiable ISO 14001 standard for Environmental Management Systems (EMSs) (ISO, 1997). Literature suggests that firms are interested in pursuing ISO 14001 for a variety of environmental, organizational, and financial reasons, including (Johnson, 1997):

- Improved compliance and environmental performance
- Increased access to new and international markets
- Reduced regulatory compliance costs, environmental liabilities, and insurance costs
- Improved industry-government relations
- Enhanced public image and competitive advantage

While the above are powerful incentives for implementing an ISO 14001 EMS, there remains a high degree of uncertainty and ambiguity associated with the ISO 14000 Series, not least because there is little supporting data available.

2.2. Environmental Management system (EMS)

Over the past twenty years, with the creation of complex environmental regulations, and mankind's increasingly heavier impact on Earth's resources, businesses have begun to monitor their environmental impacts. Historically, managing environmental issues was not part of a company's strategic decision-making process, but businesses have increasingly realized that environmental management is a critical aspect of overall business strategy and success.

Today, an EMS is an integral “part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy (ISO, 1996).” EMSs range from informal components of corporate management systems focused on environmental compliance to formal management systems designed to comply with the ISO 14001 standard, or another EMS standard.

As EMSs have grown in importance, so has the variety of EMS approaches. Worldwide, there are currently three major EMS standards:

1. ISO 14001 Standard of the ISO 14000 Series (ISO,1996a)
2. British Standard 7750 (ISO,1996a)
3. The EU’s Eco-Management and Audit Scheme (EMAS) (ISO, 1997)

Comparison of ISO 14000 to BS 7750 and EMAS

	ISO 14001	BS 7750	EMAS
Geographic scope	Worldwide National (Britain) and other	countries	European Union
Type of standard	Voluntary	Voluntary	Requirement
Applicability	<ul style="list-style-type: none"> • Whole or part of an organization • Activities, products, and services in any sector • Industrial and Non industrial organizations, including government agencies and NGOs 	<ul style="list-style-type: none"> • Whole or part of an organization • All activities and sectors • Industrial and nonindustrial organizations, including government agencies and NGOs 	<ul style="list-style-type: none"> • Individual facilities • Site-specific industrial activities
Focus	<ul style="list-style-type: none"> • Environmental management system • Indirect link to environmental improvements 	<ul style="list-style-type: none"> • Environmental management system • Environmental improvements emerge from system 	<ul style="list-style-type: none"> • Environmental performance improvements at site • Communication of improvements to public
Initial environmental review	<ul style="list-style-type: none"> • Suggested, but not required by standard 	<ul style="list-style-type: none"> • Suggested, but not required in standard 	<ul style="list-style-type: none"> • Required
Policy commitments	<ul style="list-style-type: none"> • Continual improvement of EMS • Prevention of pollution • Compliance to applicable environmental regulations and voluntary commitments 	<ul style="list-style-type: none"> • Continual improvement of environmental performance 	<ul style="list-style-type: none"> • Continual improvement of environmental performance • Compliance to applicable environmental regulations
Audits	<ul style="list-style-type: none"> • EMS audits required • Monitoring and measuring of key environmental characteristics required • Audit frequency not specified 	<ul style="list-style-type: none"> • EMS audits required • Compliance or environmental performance audits not required • Audit frequency not specified 	<ul style="list-style-type: none"> • Audits of EMS, processes, data, and environmental performance required • Audit frequency at least every 3 years
Public communication	<ul style="list-style-type: none"> • Only company environmental policy must be made public • Other external communications left to management 	<ul style="list-style-type: none"> • Only company environmental policy must be made public • Other external communications left to management 	<ul style="list-style-type: none"> • Description of environmental policy, program, and management system must be made public • Public statement and annual simplified statement with supporting data required

Comparison of ISO 14000 to BS 7750 and EMAS (Source: Cascio, et. al.,1996)

2. 3. ISO 14001 Environmental Management System (EMS)

In the early 1990s, with rising concern over environmental barriers to trade and the growth of increasingly stringent environmental regulations at national levels, representatives from business, industry, and governments came together to craft a set of voluntary environmental management system standards (ISO14000). The International Organization for Standardization (ISO) proposed a set of environmental management system (EMS) guidelines that seek to constantly improve environmental management by industry (Clapp Jennifer, 1998).

ISO 14001 has been written to be applicable to all types and sizes of organizations and to accommodate diverse geographical, cultural and social conditions. The success of this system depends on commitment from all levels and functions, especially from top management. A system of this kind enables an organization to establish, and assess the effectiveness of, procedures to set an environmental policy and objectives, achieve conformance with them, and demonstrate such conformance to others. The overall aim of the standard is to support environmental protection and prevention of pollution in balance with socio-economic needs (ISO.,1996)

2.4. Background information of ISO 14001

ISO 14000 is a series of international standards for environmental management. In order to satisfy the increasing demand of establishing international environmental management standard, International Organization for Standardization (ISO) started to develop it in 1993 and after nearly three year's development, ISO published this series of standards (ISO 14001 and ISO 14004) in October 1996. It is the first such series of standards that allows organizations from

around the world to pursue environmental efforts and measure performance according to internationally accepted criteria (Roberts *et al.*, 1998).

The 14000 series consists of over a dozen separate standards. But all these standards are fallen under two categories: specification standards and guidance standards. ISO specification standards are prescriptive documents: they describe what a company must do or not do in order to get certification. ISO 14001 is a blueprint for the company's environmental management system, and it is the only specification standard in the ISO 14000 series. It describes how a company might manage and control its organizational system so that it measures, controls and continually improves the environmental aspects of its operations (Krut *et al.*, 1998).

ISO 14001 is intended to be applicable to 'all types and sizes of organizations and to accommodate diverse geographical, cultural and social conditions' (ISO, 1996). The overall aim of both ISO 14001 and the other standards in the 14000 series is to support environmental protection and the prevention of pollution in harmony with socio-economic needs. ISO 14001 applies to any organization that wishes to improve and demonstrate its environmental performance to others through the presence of a certified environmental management system (Roberts *et al.*, 1998).

With the exception of requiring the commitment to continual improvement and commitment to comply with relevant legislation and regulation, ISO 14001 does not prescribe environmental performance requirements. ISO 14001 specifies the requirements of the management system itself, which, if maintained properly, will improvement environmental performance by reducing impacts such as air emissions and wastewater effluents (Roberts *et al.*, 1998).

2.4.1 Stages for implementing ISO 14001

The elements of ISO 14001 are organized around five steps (Welford, 1998):

1. Environmental policy
2. Planning
3. Implementation and operation
4. Checking and corrective action
5. Management review

Each step is briefly described below.

Environmental policy

Environmental policy is a formal and documented set of principles and intentions with respect to the environment. Essentially, the environmental policy is the guiding document for corporate environmental improvement and adherence to it is fundamental to the integrity and success of the entire EMS (Roberts *et al.*, 1998). A policy must contain commitments to:

- * Continual improvement;
- * Prevention of pollution; and
- * Complying with relevant environmental legislation and other relevant requirements.

Planning

The company must then set itself objectives and targets relating to its three policy commitments and devise a plan to meet these objectives and targets. Here the environmental objectives are the broad goals that your organization sets in order to improve environmental performance while environmental targets are set performance measurements that must be met to realize a given objective. All environmental objectives must have at least one target (usually more) and all targets must relate directly to a stated objective (Bo, 2004).

Implementation and operation

Having devised its plan, the organization must then put in place the various elements necessary for its successful implementation and operation.

Checking and corrective action

Having implemented its plan, the organization must then check to see whether it has been successful in meeting its objectives and targets. If any have not been met, then corrective action must be taken. The entire management system must be periodically audited to see that it meets the requirements of the standard (Welford, 1998).

Management review

Management must periodically review the system to ensure its continuing effectiveness and suitability. Changes are made to the system as and when necessary (Bo,2004).

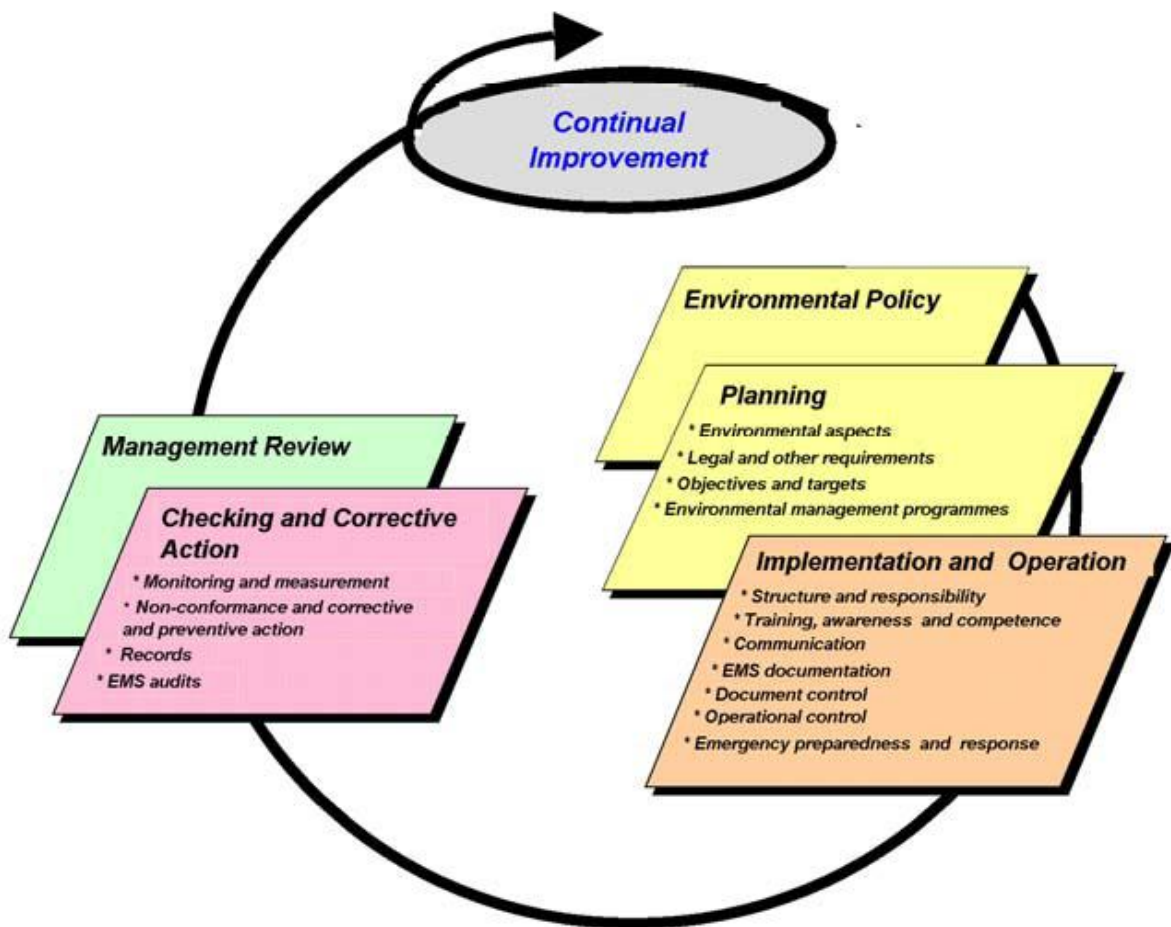


Figure (1) Environmental management system model for ISO 14001
 Source: courtesy of ISO14001 international standard

2.4.2 Current situation of ISO 14001

ISO 14001 is a specification standard, i.e. it consists of a set of requirements for establishing and maintaining an environmental management system. By complying with these requirements an organization can demonstrate to the outside world that it has an appropriate and effective management system in place. One way in which a company can demonstrate that is by 'self-declaration'. This means that the company checks its own compliance with the requirements. However, a company may feel that it carries more weight with the outside world if its

compliance with the requirements of ISO 14001 is checked by an independent third party. This third checking is known as ‘certification’ (Welford, 1998).

2.5. Environmental management systems

Many companies have adopted environmental policies and carried out environmental audits or reviews in response to legislative pressures, green marketing opportunities, increased public pressure, ethical concerns and the commitment of local and central government (Netherwood, 1998).

Environmental management systems:

A large quantity of activities that an organisation does has some environmental impact, not only the pollution that its activities may cause, but also in the way it uses natural resources, manages its business and produces waste. An Environmental Management System (EMS) is one of the tools an organisation can use to improve environmental performance. It consists of “a number of interrelated elements that function together to help a company manage, measure, and improve the environmental aspects of its operations” (Welford, 1998).

ISO defines an EMS as "the part of the overall management system that includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy." (WWW.ISO.Org)

EMS is a part of an organisation’s general management and it helps to deal more easily with environmental questions as stated in environmental policy. EMS should also help an organisation to increase efficiency of using natural resources and reduce their impact to the environment. In general, this means voluntary control and preventive action over the company’s products, processes, services, actions etc. that may influence the environment.

The organisation has a number of choices as it approaches the decision: it may choose to certify its EMS through an independent agent: it may choose to self-declare its adherence to ISO14001; it may pick or choose only certain elements of an ISO 14001 EMS (Bansal, 2002).

The establishment of an environmental management system and its continuous improvements is a process towards a reduction of the company's and the products environmental impact (Jorgensen, 2000).

Although environmental management systems were developed to meet the needs of large industrial companies, they can be implemented in all kinds of organisation (Belman *et al.*, 2002).

If every organisation starts to use its own environmental management system to meet its own particular needs, it can be seen that resulting systems may be very different between organisations. It makes it difficult to compare their results especially on an international level. In the past ten years the number of international standards in the field of environmental management has increased. The first environmental management standard BS 7750 (British Standard for EMS) was established in 1992 in United Kingdom (Belmane *et al.*, 2002).

The International Organisation prepares most of the standards for Standardization (ISO). It was founded in 1947 in Switzerland (Welford, 1998). These standards give a set of elements that all EMS should contain. They are frameworks, for supporting organisations in establishing structured and effective environmental activities. The most frequently used guidelines for EMS development and implementation are the international standard- ISO 14001 and the European regulation - the Eco- Management and Audit Scheme (EMAS). Standards do not obligate a particular organisation's optimum environmental performance level but describe a system to help an organisation achieve its own environmental objectives. ISO 14001 requires companies to perform continual

improvement and prevent pollution as part of the normal management cycle (Welford,1998)

Market demand is one of the dominant forces driving ISO 14001 registrations in the world. For the foreseeable future, customer demand and business competition will be the dominant reason for implementing ISO 14001. (Roberts,1998) reports that improved environmental management could have several benefits: reduce company's cost; procedures are in place to ensure legislative compliance; improved public image and increased market opportunities.

2.6 ISO 14001:1996

In the early 1990s, the International Organisation for Standardization (ISO) began to work on a series of environmental management standards. The ISO 14001 series environmental management standards were introduced on the coattails of the success of ISO 9000, which is a series of quality management system standards (Mergit, 2005).

The ISO 14001 is now becoming the dominant international standard for assessing environmental management processes all over the world. It was first published in September 1996 (Morrow, 2002) and the latest version of ISO 14001:2004 came out in November 2004 (Sistok, 2005).

The standard allows an organisation to focus on the issues most important to its business. ISO 14001 requires an organisation to commit to the prevention of pollution and continual improvement as part of the normal management cycle (Ammenberg, 2003). According to Hillary (2001) it can be used for all types and sizes of organisations and accommodates diverse geographical, cultural and social conditions.

The Environmental Management System (EMS) is a continuous cycle that follows the model "Plan, Do, Check, Act"- the Deming circle

An organisation that starts to implement ISO 14001 may be a company, corporation, firm or enterprise. It can be incorporated or not, public or private and has its own function and administration.

According to this model the EMS can be divided into the four stages: plan, do, check and act (Mergit,2005)

Planning includes identifying environmental problems, establishing goals, aims and environmental policy. An organisation should set aim to move EMS forward. When drafting a plan, different aspects should be considered:

- Technological options;
- Financial, operational and business requirements;
- Views of interested parties;
- Significant environmental aspects, environmental policy.

It starts with a small review about organisation activities to identify their environmental aspects. An organisation that implements EMS should first point out objectives and targets with the aim of obtaining environmental performance improvements. Then, environmental management programmes should be established to support the process described above. In these programmes responsibilities and time frames will be specified. The main purpose of an EMS is to steer and control significant environmental aspects, which should be regarded as cornerstones for a company using an EMS (Edwards, 2004).

An organisation should establish an environmental policy document that gives an overview of their priorities according to the environment. The policy statement must be defined by top management, be appropriate for the nature, scale and aspects of the organisation, set a framework for objectives and targets, be documented and available to the general public (Strachan *et al.*, 2003). In the planning process it is required to have procedures that make sure that applicable

legal and other requirements of environmental relevance are identified and available.

Do refer to implementation and operation. An organisation must establish various elements necessary for the implementation and operation of the plan. To create effective EMS roles, responsibilities should be defined; documentation and good communication flows between employees should be established. In order to get ISO14001 certified, environmental training should be defined and carried out among all employees that have a significant impact on the environment in their work. Communication and documentation is a part of implementation and should be managed as well. Procedures to identify possible accidents and emergency situations and emergency preparedness are required (Edwards, 2004).

Checking includes monitoring, measurements, and EMS auditing. This part of the standard should define how the performance of the EMS is checked and weaknesses strengthened.

Checking has to be carried out on a regular basis and will be needed for periodical evaluation of completing corrective and preventive action. To ensure that EMS has been successful in meeting its environmental objectives and targets, it must be audited periodically.

Audits can be divided into the three parts:

- Members of the company or environmental consultants carry out first party audits;
- Second party audits may be carried out by a closely related company, for example a supplier;
- Independent auditors make third party audits or external audits (Mergit,2005)

Act includes management reviews. Top management and appropriate staff must periodically review the management system once a year based on information

from measurements, monitoring and audits. Where needed, the programme is renewed; new objectives and aspects are established and policy is changed etc.

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. Organizations prefer to implement ISO14001 mainly because ISO standards are well known and widely accepted (Mergit,2005).

2.7 Potential Trade impacts of EMS Standard

There has been an increased level of concern that the ISO 14001 standard is likely to pose a barrier to trade, particularly for small and medium enterprises and for companies in developing countries. Some of the trade issues relevant to the EMS standards are:

1. There is a concern that the ISO 14001 standard will be adopted as a mandatory requirement by some countries and therefore may pose a barrier to trade.
2. There is a possibility that some countries may adopt/maintain laws more stringent than the ISO 14001 standard thereby affecting the global trade and also negating the process of harmonization of global standards.
3. It is possible that in future, government procurement practices will give preferential treatment to ISO 14001 certified supplier.
4. Providing training.
5. Participation in ISO committee meetings
6. Improved transparency in terms of early notification, information and communication about the ISO 14000 standards (Thorton,2003 ; MacArthur,1998).

2.8 Previous studies:

Study no. 1:

Entitled “The Effect of ISO 14001 Environmental Management System Implementation on SMEs Performance: An Empirical Study in Malaysia “By Goh Yen Nee and Nabsiah Abdul Wahid

Despite the growing interest in examining ISO 14001 Environmental Management System (EMS) implementation and firm’s performance, little attention has been devoted especially among the Small and Medium Enterprises (SMEs) in Malaysia. Based upon 61 responses questionnaire survey, this study examines the relationship of ISO 14001 EMS implementation to Malaysian SMEs performances. The findings of this study confirm that ISO 14001 EMS implementation has a positive and significant relationship with SMEs’s performance. This finding is consistent with the environmental management literature mostly published in the developed countries. This study is important as the empirical results provide an indicator to encourage other SMEs which has no EMS in place to consider joining the bandwagon. Since the ISO 14001 standard is still on a voluntary basis in Malaysia, this study able to give empirical evidence on SMEs performance appears to be critical at this juncture noting the fact that SMEs contributes to the largest business establishments in Malaysia.

Study no. 2:

Entitled “ Impact of ISO 14001 Certification on the environmental performance of organizations: Case study of industries in the republic of Colombia. “By Carlos Hernando Vargas Bejarano

Impact of ISO 14001 certification on the environmental performance of the organizations: Case study of industries in the Republic of Colombia. This preliminary study of an exploratory-descriptive nature compares attitude towards

environmental management and administration expressed by companies (large, medium and small) from the industrial sector in Colombia since 1999; emphasis was made on analyzing the current relation between adopting an ISO 14001 Environmental Management System and the companies' environmental performance. The study reveals the state of development of the Environmental Management System of Colombian industries one year after having been certified and analyses how adopting the ISO 14001 Environmental Management System model has impacted their environmental performance. Proposals regarding the discrepancies found in the current Environmental Management System and the industries' environmental performance are presented herein. In addition, the study explains how actions that prove compliance with the environmental legislation, appropriate community relations and the evolution of elements that are typical in an Environmental Management System have been incorporated in the environmental culture of the organization; analysis is focused on establishing whether the incorporation of these practices has been demonstrative or not of the positive influence that certification has on environmental administration. Some differences came about in the behavior of the companies that expressed a change in environmental culture after having received ISO 14001 certification. In some cases, a significant change was observed. In others it was not possible to carry out the analyses due to the lack of information.

Study no.3:

Entitled “ ISO 14001, Emas, or BS 8555: an assessment of the environmental management systems for UK businesses “ By Bo Chen

The number of companies certified an Environmental Management System (EMS) in the UK is continuously increased in the last few years. Most of the participants choose the international standard ISO 14001 or the EU regulation EMAS as their EMS.

However, with the appearance of the new British standard - BS8555, UK businesses need to think about which one of these three EMSs is most applicable. Ten criteria have been created in order to identify the most applicable EMS for UK businesses. These criteria include the costs and benefits of the EMS implementation, whether it is easy to start for companies and easy to be control during the implementation process, legal compliance, environmental performance evaluation, and compatibility of the EMS etc. Through the comparison between three EMSs, advantages and disadvantages of each EMS were defined. Simply EMAS is more difficult for small and medium-sized enterprise (SME) to implement. ISO 14001 is relatively easier to implement but it has fewer requirements and may cause potential problem in the implementation process. The BS 8555 combines some of the advantages from the other two EMSs and with its staged approach makes the SMEs easier to start implementing and finally achieve ISO 14001 certification or the EMAS registration.

Study no.4:

**Entitled “Strategic sustainable development using the ISO 14001 Standard “
By Jamie P. MacDonald.**

The ISO 14001 Environmental Management System Standard has become a widespread administrative tool in the field of corporate responses to sustainability. As a framework for the administering of sustainable development in firms, ISO 14001 in itself does not speak of strategic planning for sustainability, nor of upstream solutions of problems at their source. Furthermore, confusion exists with respect to where ISO 14001 fits in relation to a complex array of tools for sustainable development. This research proposes the integration of a “backcasting” method that embodies a five-level approach to planning in complex systems, with the ISO 14001 planning process requirements. The result is a strategic planning framework

that focuses on the minimum requirements for a sustainable society and embeds them in a process to assist firms in their sustainability initiatives.

2.9 Information Sources:

- **Primary sources:**

Questionnaire as a key tool to search, designed specifically for this purpose.

- **Secondary sources:**

- Books.
- Researches and academic studies and references.
- Reports and records of the institutions and relevant authorities.
- Specialized studies in the study field.
- Web sites relevant.

2.10 Study limits:

- **Time limits:**

Aug-2014 to June- 2015

- **Place limits:**

Sudanese petroleum pipelines CO. LTD

2.11 Study population:

Sample of Sudanese petroleum pipelines CO. LTD customers, employees and top management.

2.12 Sudanese Petroleum pipelines CO. LTD (SPPC):

2.12.1 Historical Background

Sudanese company Pipelines has a long and strong history, which began in 1976 and began her story when the expansion of the Project Island and protractors and increase the scope of the factories began bringing the demand for energy is

increasing, particularly in central Sudan has been the transfer of petroleum products by railway trains. In 1973 happened to cut railway led to stop those trains, which led to the transfer of petroleum products stopped and therefore had to be thinking about building for the transfer of petroleum products line shoved put the necessary studies for the establishment of this line to transport petroleum products from the port of Port Sudan to storage depots in the tree area of Khartoum. In 1976 was the opening line, which was created with a loan from the State of Kuwait. Since then, the company's name more than once has changed, but we always had to keep in the spirit of our founding fathers, innovation and perseverance.

3. Material and Methods

This chapter contains a description of the materials and methods followed by the researcher for determining the study population and sample, the study tool, the verification steps of the accuracy and stability of the search tool, also a description of the study design and statistical methods that used in data analysis.

3.1Material

3.1.1 Study population:

The study population consisted of a sample of Sudanese petroleum pipelines CO. LTD

3.1.2 Study sample:

The study sample consisted of (28) customer, (37) employee and (25) top management Sudanese petroleum pipelines CO. LTD, were selected as the stratified random method. The tables below show the distribution of the sample according to the variables.

3.1.3 Study tool:

The researcher has developed a study tool to become a tool for data collection in this study, and that a review of previous literature on the subject of the Impact of Implementing of ISO 14001 environmental Management system on key environmental performance indicators of selected Petroleum Company (Sudanese petroleum pipelines CO. LTD. The study tool include on the three main parts are (Appendix 1,2,3):

The first: deals with the general demographic information about the respondent on the questionnaire.

The second: was devoted to measure the Impact of Implementing of ISO 14001 environmental Management system on key environmental performance indicators of selected Petroleum Company (Sudanese petroleum pipelines CO. LTD) from a customer perspective has included study tool is sufficient to cover all the paragraphs of the object of study.

The third: The researcher used the Likert scale, which calculates the weights of those paragraphs.

3.2 Methodology

This study based on theoretical background of methodology and the quantitative design using a hypothesis testing approach. In this study we will use descriptive analytical method because it fits with nature of the subject that we are discussing.

I have been conducting this study, according to the following steps:

1. Preparation of the study measurements of the final image.
2. Identify the study sample.
3. Distribute the study tool on the study sample, and retrieval, where distributed (100) questionnaires, have been retrieved (90), which formed the study sample.
4. Enter the data into the computer and processed statistically using the Statistical Package for Social Sciences (SPSS).
5. Extracting, analyzing and discussing the results.

3.2.1 Statistical Processing:

Data are encoded and processed statistically using the Statistical Package for Social Sciences (SPSS).

Statistically processors used:

1. Frequencies and percentages to determine the characteristics of the study sample in the light of demographic characteristics and all with regard to the study.
2. The arithmetic mean to calculate the average sample responses to each paragraph of the study tool.
3. Alpha correlation to determine the reliability of study tool coefficient.
4. Chi-square test .

4. Results Analysis

This study aimed to identify the Impact of Implementing of ISO 14001 environmental Management system on key environmental performance indicators of selected Petroleum Company (Sudanese petroleum pipelines CO. LTD) from the perspective of customers, Employees and Top management view point, also aimed to identify the impact of the study variables (category, gender, education level) on the Impact of Implementing of ISO 14001 environmental Management system on key environmental performance indicators of Sudanese petroleum pipelines CO. LTD from the customers, Employees and Top management view point.

To achieve the objective of the study, questionnaire was prepared and to ensure its sincerity, and the coefficient of stability, and after the data collection process, are encoded and entered a computer and processed statistically using the Statistical Package for Social Sciences (SPSS), Likert scale:

(80 - 100)%	Very high
(70 – 79.9)%	High
(60 – 69.9)%	Medium
(50 – 59.9)%	Low
(Less than 50%)	Very low

Here are the results of the study according to the sequence of questions, and hypotheses:

4.1 Results concerning the study variables:

4.1.1 Customer

Table: no.(1)The frequency distribution of the study sample according to the education level

Education level	Frequencies	Percentage %
Secondary or less	10	35.7%
College	16	57.1%
Graduate	2	7.2%
Sum	28	100%

Source: The researcher from applied study 2015

4.2 Results concerning the customer questions:

Question text: “What is your Impression of the following?”

Table no.(2) Impression of customers about questions

No.	Paragraph	Average	Standard Deviation	%	Degree
1	Way to get rid of waste resulting from fuel dumps	3.79	1.258	75.8	H
2	Actions during a fuel delivery to the consumer reassuring safe	4.43	0.959	88.6	VH
3	Responsiveness speed to customer complaints	4.25	1.005	85	VH
4	The activity of the company does not affect environment negatively	3.89	1.066	77.8	H
5	The presence of posters and instructions within the company helped to avoid risks	4.61	0.629	92.2	VH
6	The degree of completion of the transactions and procedures in the company is easy and simplified	4.64	0.678	92.8	VH
7	Preparedness and Response to Emergencies	4.46	0.838	89.2	VH

H= HIGH, VH= VERY HIGH,

Source: The researcher from applied study 2015

4.1.2 EMPLOYEE

Table: no.(3)The frequency distribution of the study sample according to the education Level

Education level	Frequencies	Percentage %
Secondary or less	11	29.7%
College	20	54.1%
Graduate	6	16.2%
Sum	37	100%

Source: The researcher from applied study 2015

4.2 Results concerning the employees questions:

Question text: “What is your opinion on the following?”

Table: no(4) Opinion of Employees about questions

No.	Paragraph	Average	Standard Deviation	%	Degree
1	The implementation of 14001 create continuous Training for employees	3.7	1.077	74	H
2	Have standard environmental objectives and targets been fulfilled	3.51	1.170	70.2	H
3	The existence of a system for initiatives related to the environment	3.78	1.004	75.6	H
4	The existence of procedures for an emergency	4.49	0.559	89.8	VH
5	There is interest and follow up of individual operation	4.08	0.722	81.6	VH
6	The work environment inside the company is enhance the overall performance	3.86	0.855	77.2	H
7	Internal and external EMS communication take place	3.49	0.804	69.8	M

H= HIGH, VH= VERY HIGH, M=MEDUIM

Source: The researcher from applied study 2015

4.1.3 Top Management

Table: no.(5)The frequency distribution of the study sample according to the education level

Education level	Frequencies	Percentage %
College	18	72%
Graduate	7	28%
Sum	25	100%

Source: The researcher from applied study 2015

4.3 Results concerning the customer questions:

Question text: “**Top management do?**”

Table: no.(6) Results of Top management

No.	Paragraph	Average	Standard Deviation	%	Degree
1	Environmental policy is appropriate to the nature of the environmental effects arising from activities, products and services offered by the company	4.56	0.507	91.2	VH
2	environmental policy for the company reviewed and updated	4.56	0.507	91.2	VH
3	The existence of ways to communicate and interact with the community	4.76	0.436	95.2	VH
4	Legal aspects represent new commitments	4.44	0.712	88.8	VH
5	Management review cover the scope of the environmental management system	4.76	0.436	95.2	VH
6	Create and apply corrective actions and preventive actions and verify their effectiveness	4.84	0.374	96.8	VH
7	The senior management to reward employees who discover problems and solve them or they provide useful suggestions	1.56	1.003	31.2	VL

H= HIGH, VH= VERY HIGH, L=VERY LOW

Source: The researcher from applied study 2015

Test the study Hypothesis

Results of the First Hypothesis:

The first Hypothesis: There is a relation between implementing ISO 14001 and customer satisfaction.

Table: no.(7)Chi square test results for respondents' answers about the questions of the first hypothesis

N	Mean	St. Deviation	Chi-square	d.f	sig	alpha
196	4.296	0.9788	195.939	4	0.000	0.83

Source: The researcher from applied study 2015

We note from the table no.(7) that the value of chi-square (**195.939**)of the significantly value is (**0.000**) which less than the probability value is (**0.05**) this means that there is customer satisfaction in Sudanese petroleum pipelines company (Ltd), an average (**4.296**) and the std. Deviation is (**0.9788**) .

Validity and reliability equation:

Cronbach Alpha = 0.83

Which an excellent indication of validity and reliability of the scale.

The Second Hypothesis: There is a relation between implementing ISO 14001 and employee satisfaction.

Table: no.(8)Chi square test results for respondents' answers about the questions of the Second hypothesis

N	Mean	St. Deviation	Chi-square	d.f	sig	alpha
259	3.846	0.9520	166.463	4	0.000	0.72

Source: The researcher from applied study 2015

We note from the table no.(8) that the value of chi-square (**166.463**)of the significantly value is (**0.000**) which less than the probability value is (**0.05**) this means that there is employee satisfaction in Sudanese petroleum pipelines company (Ltd), an average (**3.846**) and the std. Deviation is (**0.9520**) .

Validity and reliability equation :

Cronbach Alpha = 0.72

Which an excellent indication of validity and reliability of the scale.

The third Hypothesis : There is a relation between implementing ISO 14001 and employee satisfaction.

Table: no.(9)Chi square test results for respondents' answers about the questions of the Second hypothesis

N	Mean	St. Deviation	Chi-square	d.f	sig	alpha
259	3.846	0.9520	166.463	4	0.000	0.72

Source: The researcher from applied study 2015

We note from the table no.(9) that the value of chi-square (**166.463**) of the significantly value is (**0.000**) which less than the probability value is (**0.05**) this means that there is employee satisfaction in Sudanese petroleum pipelines company (Ltd), an average (**3.846**) and the std. Deviation is (**0.9520**) .

Validity and reliability equation :

Cronbach Alpha = 0.72

Which an excellent indication of validity and reliability of the scale .

5. Discussion

This chapter includes a presentation and discussion of the most important findings of the study and providing the conclusion and a set of recommendations that came out from the study results. The study was conducted on a sample of Sudanese petroleum pipelines CO. LTD customers, employees and top management. The researcher distributed the questionnaires to (100) customers, employees and top management, retrieved (90), which formed the study sample. The data were input into the computer and processed statistically using the Statistical Package for Social Sciences (SPSS). After extracting and analyzing the results have been interpreted as the following:

Observed from the study that the important of commitment of top management to improve the environmental system and the degree was very high (table no.(6)), also the degree of customer satisfaction is very high (Table no.(2)) as well as employee satisfaction and that reflect the Sudanese petroleum pipelines CO. LTD take care about the important of implementing ISO 14001 and the benefits that may gain.

According to Chi-square results which results which result sig.value <0.05 for all hypotheses approved that all hypothesis are true and that is give indication the implementing of ISO 14001 enhanced the environmental performance in the Sudanese petroleum pipelines CO. LTD.

Conclusion and Recommendations

Conclusion

From this study we can conclude that:

Applying of ISO 14001 enhanced the environmental performance of Sudanese petroleum pipelines CO. LTD, also there is customer satisfaction about environmental aspects in the Sudanese petroleum pipelines CO. LTD.

There is employee satisfaction about environmental aspects in the Sudanese petroleum pipelines CO. LTD, beside that top management is committed to improve of environmental key performance.

Furthermore, Work performance in line with the requirement of continuous improvement.

Recommendations

1. Top management should focus on the line of training to enhanced overall performance of employees.
2. Use the latest technologies in handling of waste.
3. Work performance should go in line with the requirements of continuous improvement of environmental system.
4. Engage and motivate the employees to participate in environmental programs.
5. Top Management should create ways to rewards the employees.

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Appendix 1

Sudan University of science & Technology

College of Graduate Studies

MSC in Managing Quality and Excellence

**Impact of Implementing of ISO 14001 environmental
Management system on key environmental performance
indicators of selected Petroleum Company**

Subject: Questionnaire

The questionnaire designed to enable the researcher to complete the research requirements to award MSC in Managing quality and excellence by complete the research of Impact of Implementing ISO 14001 in petroleum company

To achieve the objectives and goals of research your complete reply to all questions in accurate and credible to add values and more benefits to the research.

To be remind that all information's in the questionnaire are use just for research

Thanks for support and cooperation

Questionnaire no.(1)

Type: Male () Female ()

Qualification: Secondary or less () Graduate () Post Graduate ()

(1) What is your Impression of the following?

No	Expression	Excellent	V.good	Good	Satisfy	Poor
1	Way to get rid of waste resulting from fuel dumps					
2	Actions during a fuel delivery to the consumer reassuring safe					
3	Responsiveness speed to customer complaints					
4	The activity of the company does not affect environment negatively					
5	The presence of posters and instructions within the company helped to avoid risks					
6	The degree of completion of the transactions and procedures in the company is easy and simplified					
7	Preparedness and Response to Emergencies					

Appendix 2

Questionnaire no.(2)

Type: Male () Female ()

Qualification: Secondary or less () Graduate () Post Graduate ()

(1) **What is your opinion on the following?**

No.	Expression	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1	The implementation of 14001 create continuous Training for employees					
2	Have standard environmental objectives and targets been fulfilled					
3	The existence of a system for initiatives related to the environment					
4	The existence of procedures for an emergency					
5	There is interest and follow up of individual operation					
6	The work environment inside the company is enhance the overall performance					
7	Internal and external EMS communication take place					

Appendix 3

Questionnaire no.(3)

Type: Male () Female ()

Qualification: Graduate () Post Graduate ()

(3)Top management:

No.	Expression	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1	Environmental policy is appropriate to the nature of the environmental effects arising from activities, products and services offered by the company					
2	environmental policy for the company reviewed and updated					
3	The existence of ways to communicate and interact with the community					
4	Legal aspects represent new commitments					
5	Management review cover the scope of the environmental management system					
6	Create and apply corrective actions and preventive actions and verify their effectiveness					
7	The senior management to reward employees who discover problems and solve them or they provide useful suggestions					

Appendix 4

Sudanese company Pipelines profile

The past and the future and monuments on the road

Sudanese Company for Pipelines is one of the Department of Energy companies and one of the pillars of the oil industry in Sudan are set multifaceted companies as they follow the ethical rules at work and motivation in that our success in getting the best results and put them in the right way and that by working responsibly. We are feeling the way in growth through the acquisition of new business opportunities. We are involved in almost every aspect of the oil industry.

Of the most prominent areas of the Sudanese company Pipelines Construction of pipelines and reservoirs and pumping stations, preparation of feasibility studies and engineering designs, in addition to the operation and maintenance services. All of this is through the Sudanese cadres highly qualified.

Sudanese company exclusively for Pipelines transfer of all imports and exports of the country's oil derivatives and that after the establishment of the first to move petroleum materials in line in 1976 and amended Line 8 "(inches) to perform his duties in the export and import of petroleum products process then established an additional line diameter 12" (inches) to export surplus gasoline increased after Khartoum refinery capacity in the year 2005. Because the Sudanese trap for Pipelines are house expertise and excellence has become a growing demand for them day after day, making the oil companies rely on them in the launch of pipelines and pumping stations inside Sudan since 1999 by the company staff. Company acquired through its laboratory ISO certificate 17025 in the analysis of petroleum products as the first plant in Sudan receives such high global

certificate Since the Sudanese Company for Pipelines company specializing in the calibration of valves counters operations became the first company operating in this area in the service of others, and won the confidence of body Specifications and Standards.

Principles that drive us forward:

Values

Strong leadership, decision-ambitious ideas and application on the ground, all factors that contribute to the creation of large companies, our company is built mainly on the values that distinguish us and guide our actions. These values are what we manage by our socially and morally responsible manner and are the foundation on which they are presented to our success. Of course this has played a role in the development the company. We respect our employees and stakeholders, as well as the environment and benefit the communities in which we operate. All of these things played a role in the past and continue to denote the future.

Vision

In the heart of our methodology is our vision .. Our company to be one of the largest energy services companies and most admired through the use of our resources and run safely and high efficient Our vision means our commitment to the following:

- High efficiency in the management, maintenance and operation of the transfer of petroleum product lines.
- Maintaining the environment, health and safety and quality
- Implementation of projects, delivery and take advantage of the benefits of corporation and participation.

- Continuous development of performance.
- Gain appreciation and satisfaction of stakeholders and partners and communities

Certificates:

ISO / 200517025 ISO / IEC /

Is the global standard recognized was developed specifically for testing and calibration laboratories seeking accreditation from the global accreditation bodies to keep this recognition, are re-laboratory evaluation periodically by the accreditation body to ensure continued compliance with certification requirements, check continuity in maintain the operating parameters has. May be asked to participate in the laboratory related software testing efficiency during periods of re-evaluation, as another way to demonstrate technical competence.

The laboratory for certification complying 17025 can lead its activities in accordance with sound management practices and has needed to perform testing and calibration measurements of technical competence, which confirms the accuracy and validity of the results of technically covered by the scope of accreditation.

QualityISO9001:2008Certification:

Is an international specification obtained confirms that the organization's operations meet the needs of internal and external customers with the organization's commitment to the best international standards of quality.

Certification ISO 14001:2004:

Certification is designed to protect and manage the environment from external influences resulting from various operations of the organization, through the commitment by different criteria requires the organization adopted for protection.

ISO 2008/18001

Aims to protect workers from occupational hazards and risk assessment and management and control, according to international standards to ensure the work environment.

Subsidiaries

More than 6 companies dedicated to providing quality and innovative services in the field of oil.

Sudanese company Pipelines has an integrated range of services in the oil sector through its subsidiaries, which holds the different tasks in the areas of transport petroleum products, construction of oil, Ship chandlers, the establishment and maintenance of petroleum storage depots, maintenance and cleanliness of oil pipelines.

1. Sudanese Petroleum Products Transport:

Specialized in conducting, operation and maintenance of petroleum products transport pipelines and owner of first (valve Service Center) in Sudan, inaugurated in 2012 for maintenance &reconditioning of different types of valves (Gate valves, ball valves, Globe valves, Safety relief valves, Check valves) from 2'' to 24'' diameter. The center adopts international standard API-6D & API-598 for valves maintenance & quality control.

The center nestles trained technical staff specialized in this domain and acquired high skill & training at international consulting firms.

2. Sudanese construction and oil services:

Provides services in the field of oil works construction, advisory services and industries like the oil industry in Sudan, such as the quality control of ethanol and create fresh water networks transmission services.

3. SPP- Final:

It specializes in the construction and maintenance of warehouses and in addition to the provision of machinery and spare parts and equipment and provides specialized services and engineering consultancy to other companies.

4. Coral Services Company Limited and Ship chandlers:

Coral services company and supply vessels is the first leading company in Sudan that specializes in the field of finance refueling ships in the port of Port Sudan and the Sudanese ports.

5. Pipelines scan Company:

Working in the field of inspection and cleaning of oil pipelines and reservoirs.