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RESEARCH ARTICLE - MANAGEMENT

The Extent of Applying ISO 14001 Requirements in the Environmental Auditing Practices of Iraq

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Abstract

The research aims to evaluate the environmental auditing practices in the petroleum sector of Kurdistan Region of Iraq by measuring the application of ISO 14001 requirements, diagnosing the main environmental auditing practices, reducing the negative effects of the organization's activities on the environment and complying with local and international laws related to the environment. Also, determining the most important weaknesses in environmental auditing practices of the petroleum companies in Kurdistan region of Iraq. Therefore, the importance of this research stems from the value of applying the requirements of ISO 14001 in environmental auditing practices to enhance sustainability, reduce pollution, conserve the environment, and reduce the negative effects of the organization's activities. The researcher designs a questionnaire according to the ISO 14001 requirements in order to evaluate the quality of environmental auditing practices in a sample of petroleum companies. The researcher concludes that the level of environmental auditing practices in Iraq is acceptable, and the ISO 14001 requirement can be applied easily with some instructions, institutional awareness, governmental follow-up and public review.

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Keywords: Environmental; Auditing; ISO 14001; Petroleum Companies

1. Introduction

The environment is considered one of the most important elements that contributed to the emergence of civilizations, the development of humanity, and the progress of societies, as it contributes economically by providing natural resources to organizations as factors of production and a market for the disposal of these products, in addition to being a large warehouse of waste of all kinds resulting from the activities of the organization.

As a result of the ever increasing consumption of the environment and its resources and the growth of environmental awareness among society and organizations, several practices have emerged in order to preserve and protect the environment and strive for its sustainability, such as environmental auditing practices.

Environmental auditing practices seek to achieve a sustainability of the environment surrounding the organization in order to consume existing resources in a manner that does not affect future generations and to preserve the environment from the pollutant emissions and liquid and solid waste of organizations.

In order to supervise these practices, it was necessary to agree globally on internationally accepted standards as ISO 14001 to be applied fairly in organizations to achieve the goals of environmental auditing practices and enhance the sustainability.

2. Problem Statement

The evaluation of environmental auditing practices in Iraqi petroleum companies and the measurement of applying the requirements of ISO 14001 can be the main problem for this research.

Nomenclature

ISO	International Organization for Standardization	MR	Management Review
EAP	Environmental Auditing Practice	EC	Environmental Compliance
EP	Environmental Policy	EI	Environmental Issues
PL	Planning	WM	Waste Management
IO	Implementation and Operation	NP	Environmental Performance
CC	Checking and Corrective Action	PI	Environmental Impact of Planned Investments

3. Research Objectives

The research aims to achieve the following objectives:

1. Evaluating the environmental auditing practices in Iraq according to the requirements of ISO 14001.
2. Reducing the negative effects of the organization's activities on the environment, and compliance with local and international laws related to the environment.
3. Determining the most important weaknesses in environmental auditing practices.

4. Research Importance

The importance of this research stems from the value of applying the requirements of ISO 14001 in environmental auditing practices to enhance sustainability, reduce pollution, conserve the environment, and reduce the negative effects of the organization's activities.

5. Research Hypotheses

Mainly, this research based on the following hypotheses:
1st Hypothesis:
H0: There is no significant effect of the environmental auditing practices in Iraq on the environmental policy.
H1: There is a significant effect of the environmental auditing practices in Iraq on the environmental policy.
2nd Hypothesis:
H0: There is no significant effect of the environmental auditing practices in Iraq on the planning.
H1: There is a significant effect of the environmental auditing practices in Iraq on the planning.
3rd Hypothesis:
H0: There is no significant effect of the environmental auditing practices in Iraq on the implementation and operation.
H1: There is a significant effect of the environmental auditing practices in Iraq on the implementation and operation.
4th Hypothesis:
H0: There is no significant effect of the environmental auditing practices in Iraq on the checking and corrective action.
H1: There is a significant effect of the environmental auditing practices in Iraq on the checking and corrective action.
5th Hypothesis:
H0: There is no significant effect of the environmental auditing practices in Iraq on the management review.
H1: There is a significant effect of the environmental auditing practices in Iraq on the management review.

6. Literature Review

6.1. The Environmental Auditing Practices

Environmental Auditing is a general term that can reflect different types of assessments aimed to identify gaps in the implementation of the environmental compliance system and environmental management, along with related corrective actions [1]. It began in response to the requirements of external parties to obtain more information about the environmental practices of organizations [2]. So, Environmental Auditing can be defined as “regular evaluation to determine whether or not environmental performance is in line with the planned arrangements, and whether or not these arrangements have been effectively implemented, and are appropriate to achieve the environmental policy of the organization” [3].
Based on accounting literature and the previous definitions, it is clear that environmental auditing is an organized, objective and periodic process carried out by persons with scientific and practical experience in the field of auditing and who have knowledge in the environmental field in order to ensure that the environmental costs and obligations have been identified, evaluated, disclosed and reported according to the recognized accounting principles[4-6]. The importance of environmental auditing arose due to the growing interest in the environment and the negative impacts of organizations' practices in the surrounding environment [7]. So, the importance of environmental auditing stems from the importance of achieving environmental sustainability by providing the needs of present generations without negatively affecting the needs of future generations and achieving a balance between the environmental, social and economic systems [8].
There are also other reasons that have made the environmental audit more important, such as [9-11]:

1. The Risks of exposure to penalties of environmental protection legislation.
2. The growing pressure of environmental organizations.
3. The Increasing environmental awareness of consumers, investors, financial institutions and suppliers.
4. The issuance of environmental protection laws.

The most important objectives of environmental auditing can be identified as follows [12-13]:

1. Examining the organization's commitment to treat the negative impacts on the environment by comparing planned programs with what has already been implemented under laws and administrative policies.
2. Submitting an environmental report on the results of what has been reached, either separately or by attaching it to the final auditing report of the organization
3. Reducing the risk of exposure to environmental problems to a minimum, by making sure that there are no environmental violations that threaten the safety of the organization's survival.
4. Verifying of the impact of the compliance with environmental standards on the current and future results of the organization's activities.
5. Providing the important and sufficient information that contributes to improve the environment.
6. Evaluating the initiatives to prevent, investigate, and treat or deal with environmental damage, to conserve renewable resources, to diagnose the consequences of environmental damage occurring to others or to natural resources, and to assess their financial impact.

However, the practices of environmental auditing can be categorized as follows [14-15]:

1. The auditing of environmental compliance
2. The auditing of environmental issues
3. The auditing of waste management
4. The auditing of environmental performance
5. The auditing of environmental impact of planned investments.

6.2. The ISO 14001 Requirements

At the end of 2015, a new edition of the Environmental Management Standard ISO 14001 was issued [16]. This edition has been developed to be suitable with the complexities of the labor market these days [17]. ISO 14001 provides an integrated approach to environmental management system that focuses primarily on business sustainability [18].

ISO 14001 is the most internationally recognized standard for environmental management system [19]. As this standard specifies the best way to put in place an effective environmental management system, it has been developed to help organizations sustain their commercial success while taking environmental conservation into consideration [20]. It belongs to the family of international standards for environmental systems management ISO 14000, where the ISO 14001 standard provides a framework for the institution that helps it to meet the expectations of customers on an ongoing basis in addition to conforming to legal and regulatory requirements [21].

There are many benefits can be obtained by applying ISO 14001, such as [22-23]:

1. Improving the environmental management, which will help to reduce wastage.
2. Reducing unnecessary expenses and costs.
3. Increasing the organizations' ability to expand their business.
4. Increasing the chances of obtaining new clients
5. Increasing the ability to adapt to variables at work with confidence and effectiveness.

The applying of ISO 14001 requires the organization to provide an environmental management system consisting of fundamental and subsidiary components, as follows [24], [25]:

6.2.1. Environmental policy - This fundamental requirement includes many subsidiary components as follows:

1. The organization’s environmental policy must be suitable to the nature, scale and environmental effects of its activities, products or services.
2. The organization’s environmental policy must include a commitment to continual improvement and prevention of pollution.
3. The organization’s environmental policy must include a commitment to comply with relevant environmental legislation and regulations, and with other requirements to which the organization subscribes.
4. The organization’s environmental policy must provide the framework for setting and reviewing environmental objectives and targets
5. The organization’s environmental policy must be documented, implemented and maintained and communicated to all employees.
6. The organization’s environmental policy must be available to the public.

6.2.2. Planning – This fundamental requirement includes many subsidiary components as follows:

1. Environmental aspects
2. Legal and other requirements
3. Objectives and targets
4. Environmental management programs

6.2.3. Implementation and operation - This fundamental requirement includes many subsidiary components as follows:

1. Structure and responsibility
2. Training, awareness and competence
3. Communication
4. Environmental management system documentation
5. Document control
6. Operational control
7. Emergency preparedness and response

6.2.4. Checking and corrective action - This fundamental requirement includes many subsidiary components as follows:

1. Monitoring and measurement
2. Non-conformance and corrective and preventive action
3. Records
4. Environmental management system audit

6.2.5. Management review - This fundamental requirement includes many subsidiary components as follows:

1. The organization's top management shall review the environmental management system to ensure its continuing suitability, adequacy and effectiveness.
2. The management review process shall ensure that the necessary information is collected to allow management to carry out this evaluation.
3. This review shall be documented.
4. The management review shall address the possible need for changes to policy, objectives and other elements of the environmental management audit results, changing circumstances and the commitment to continual improvement.

7. Research Methodology

7.1. The Population and Sample of the Research

In fact, there is no accurate statistics for the number of the employees in petroleum companies in Kurdistan Region of Iraq oil, Therefore, 4 companies were selected due to the availability of their data on the Internet and the cooperation of their employees in answering the questionnaire. So, the population of this research includes the accountants, auditors, and administrative employees in four main petroleum companies in Kurdistan Region of Iraq as shown in table (1).

Table 1 The Number of Respondents for Each Petroleum Company

The Company	No. of Respondents
Kar Group	82
ShaMaran Petroleum Corp.	57
Hunt Oil Company	63
TAQA Energy	71
Total	**273**

The researcher sent number of questionnaires to each company to collect the respondents' opinion about the extent of applying ISO 14001 requirements in the environmental auditing practices of the sample petroleum companies.
Table (2) shows the number of distributed questionnaire, the sample respondents according to the Yard equation, and the distributed questionnaires for each company.

Table 2 The details of distributed questionnaires

The Company	No. of Distributed Questionnaires	No. of Yard Eq.	No. of Valid Questionnaires
Kar Group	75	68	39
ShaMaran Petroleum Corp.	50	44	28
Hunt Oil Company	60	52	24
TAQA Energy	60	52	27
Total	**245**	**216**	**118**

So, the valid questionnaires for analyzing were (118) of (48.2%) of the research sample.

7.2. Research Tool

A questionnaire designed by the researcher based on literature review and related studies, it included two main parts. The first one included the respondents' demographic variables (age, educational qualification, position, and years of experience), and the second part included the main research's variables, therefore it divided into 2 axes as following:

1. The independent variable which represented by ISO 14001 requirements that included 5 dimensions.
2. The dependent variable which represented by the environmental auditing practices that included 5 dimensions.

Table (3) shows the main dimensions of the second part of the questionnaire.

Table 3 The axes, dimensions, number of paragraphs, and codes of the questionnaire

Axis	Dimensions	Para.	Codes
ISO 14001 Requirements	Environmental Policy	9	EP
	Planning	10	PL
	Implementation and Operation	10	IO
	Checking and Corrective Action	10	CC
	Management Review	4	MR
Environmental Auditing Practices	Environmental Compliance	5	EC
	Environmental Issues	5	EI
	Waste Management	5	WM
	Environmental Performance	5	NP

	Environmental Impact of Planned Investments	5	PI
The total of paragraphs		**65**	

7.3. Data Analyzing

The researcher used Cronbach's Alpha to test the stability of the questionnaire's paragraphs, also he used scales statistical tools (mean, variance, standard deviations, and analysis of variance) to analyze the collected data and test the research hypotheses.

7.3.1. The Stability Analyzing

Based on the results of reliability statistics (Cronbach's Alpha analysis), as shown in table (4), all the values were within the acceptable range which means the paragraphs are accurate and consistent because $\alpha \geq 0.6$.

Table 4 Reliability Statistics

Variables	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
EP	0.799	0.799	9
PL	0.861	0.862	10
IO	0.875	0.875	10
CC	0.860	0.859	10
MR	0.776	0.775	4
EAP	0.925	0.926	22

7.3.2. Data Analysis and Hypotheses Test

The demographic variables of the respondents:
Tables (5) to (7) show the frequencies and percentages of the demographic variables of the respondents.

Table 5 The age

Variable	Range	Frequency	%
Age	Less than 30 years	23	19%
	30 years – less than 40 years	37	31%
	40 years – less than 50 years	38	32%
	More than 50 years	20	17%
Total		**118**	**100%**

Table 5 shows that the age range (More than 50 years) has formed the smallest percentage of the respondents as (17%) while other age categories have formed greater percentages. So, this corresponds to the government's tendencies to benefit from the young experiences.

Table 6 The educational qualification

Variable	Range	Frequency	%
Educational qualification	B.Sc. or B.A.	65	55%
	M.Sc. or MBA	21	18%
	Ph.D.	4	3%
	Others	28	24%
Total		**118**	**100%**

Table 6 shows that the educational qualification (B.Sc. or B.A.) has formed the largest percentage of the respondents as (55%). So, this indicates that most of the employees in the petroleum companies in Iraq possess the necessary scientific knowledge and qualifications.

Table 7 The position

Variable	Category	Frequency	%
Position	Director or deputy director	20	16.95%
	Director of the department	23	19.5%
	Head of the department	31	26.27%
	Team Manager	44	37.28%
Total		**118**	**100%**

Table 7 shows that the position category (Team Manager) has formed the largest percentage of the respondents as (37.28%), while the position category (Director or deputy director) has formed the smallest percentage of the respondents as (16.95%). So, this corresponds to the nature of the work in oil companies that rely on work teams to accomplish their work.
The Hypotheses Test

Table 8 Variables Statistics

Variables	Mean	Variance	Std. Deviation	No. of Items
EP	38.12	19.353	4.399	9
PL	41.95	29.895	5.468	10
IO	41.77	35.614	5.968	10
CC	42.34	30.072	5.484	10
MR	16.88	6.892	2.625	4

EAP	92.53	135.140	11.625	22

Table 9 Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
Environmental Policy (EP)	**Between Groups**	19.656	39	0.517		
	Within Groups	8.299	79	0.105	4.924	0.000
	Total	27.955	118			
Planning (PL)	**Between Groups**	29.536	39	0.777		
	Within Groups	5.440	79	0.069	11.287	0.000
	Total	34.977	118			
Implementation and Operation (IO)	**Between Groups**	31.062	39	0.817		
	Within Groups	10.606	79	0.134	6.088	0.000
	Total	41.668	118			
Checking and Corrective Action (CC)	**Between Groups**	23.382	39	0.615		
	Within Groups	11.613	79	0.149	4.133	0.000
	Total	34.995	118			
Management Review (MR)	**Between Groups**	40.144	39	1.056		
	Within Groups	10.252	79	0.130	8.141	0.000
	Total	50.396	118			
Environmental Auditing Practices (EPA)	**Between Groups**	17.049	20	0.897		
	Within Groups	15.620	98	0.159	5.630	0.000
	Total	32.668	118.000			

1st Hypothesis:
As shown in tables (8) and (9), the standard deviation value of the environmental policy (EP) equals (4.399), and the observed value of F equals (4.924). The F value of the environmental policy (EP) is higher than F Critical, so the H_0 is rejected. Which means that the environment auditing practices EAPs can significantly effect on environmental policy (EP).

2nd Hypothesis:
As shown in tables (8) and (9), the standard deviation value of the planning (PL) equals (5.468), and the observed value of F equals (11.287). The F value of the planning (PL) is higher than F Critical, so the H_0 is rejected. This means that H_1 is accepted. Which means that the environment auditing practices EAPs can significantly effect on planning (PL).

3rd Hypothesis:
As shown in tables (8) and (9), the standard deviation value of the implementation and operation (IO) equals (5.968), and the observed value of F equals (6.088). The F value of the implementation and operation (IO) is higher than F Critical, so the H_0 is rejected. This means that H_1 is accepted. Which means that the environment auditing practices EAPs can significantly effect on implementation and operation (IO).

4th Hypothesis:
As shown in tables (8) and (9), the standard deviation value of the checking and corrective action (CC) equals (5.484), and the observed value of F equals (4.133). The F value of the checking and corrective action (CC) is higher than F Critical, so the H_0 is rejected. This means that H_1 is accepted. This means that H1 is accepted. Which means that the environment auditing practices EAPs can significantly effect on checking and corrective action (CC).

5th Hypothesis:
As shown in tables (8) and (9), the standard deviation value of the management review (MR) equals (2.625), and the observed value of F equals (8.141). The F value of the management review (MR) is higher than F Critical, so the H_0 is rejected. This means that H_1 is accepted. Which means that the environment auditing practices EAPs can significantly effect on management review (MR).

8. Conclusions and Recommendations

1. The results of analyzing the variables of the research show that there is high level of interest by respondents in Iraq to apply ISO 14001 Requirements in the Environmental Auditing Practices of Iraq.
2. Planning (PL) can be the most effected ISO 14001 requirements items on the environmental auditing practices. So, the petroleum companies in Iraq can enhance their environmental auditing practices by focusing on the planning to achieve the ISO 14001 requirements.
3. Checking and corrective action (CC) can be the least effected ISO 14001 requirements items on the environmental auditing practices. So, the government or the related organizations can increase the awareness of the petroleum companies in Iraq for checking and corrective action (CC) which can enhance their environmental auditing practices to achieve the ISO 14001 requirements.
4. The level of environmental auditing practices in Iraq is acceptable, and the ISO 14001 requirement can be applied easily with some instructions, institutional awareness, governmental follow-up and public review.
5. There is a growing awareness among employees of the petroleum companies in Iraq about the strengthening of environmental auditing practices by adopting ISO 14001 requirements.
6. The importance of environmental auditing practices stems from the International trend towards sustainable development by providing the needs of present generations without negatively affecting the needs of future generations and achieving a balance between the environmental, social and economic systems.

7. The government and the related organizations must strengthen the environmental auditing practices in all sectors, especially industrial sectors, by issuing instructions to implement international environmental standards.

References

[1] Ingole, S. (2012). Environmental Auditing: Its Benefits and Counterance, International Journal of Science Innovations and Discoveries 2(5), 152 -156.

[2] Cook, W., Bommel, S., Turnhout, E. (2016). Inside Environmental Auditing: Effectiveness, Objectivity, and Transparency, Current Opinion in Environmental Sustainability, Vol.18, 33-39.

[3] Todea, N., Stanciu, I., and Joldoş, Ana M. (2011). Environmental Audit, a Possible Source of Information for Financial Auditors, Annales Universitatis Apulensis Series Oeconomica, 13(1), 66-74.

[4] Leal, L. (2016). Opportunities for the Implementation of Good Practices of Governance and Accountability for Tracking and Auditing Sustainable Development Goals in Latin America, AC-Colombia.

[5] Toepfer, K. (2004). Environmental Auditing and Sustainable Development: SAI Matter, International Journal of Audit, 32(2), 1- 4.

[6] Thabit, Thabit H., Aldabbagh, Lukman M., and Ibrahim, Laith K. (2019), The Auditing of Sustainable Development Practices in Developing Countries: Case of Iraq, Revista AUS, 26(3), 12-19.

[7] Yusoff, H., Mohamed, A., and Hadi, A. (2016). Sustainable Development: What Is the Role of Audit?, Journal of Sustainability Science and Management, 11(1), 99-112.

[8] GAO (1995). Environmental Auditing: A Useful Tool That Can Improve Environmental Performance and Reduce Costs, Washington: RCED, United States General Accounting Office.

[9] Strange, T., and Bayley, A. (2008). Sustainable Development: Linking Economy, Society, Environment, OECD publications.

[10] Thabit, Thabit H., Ishhadat, Heba S., and Abdulrahman, Omar T. (2020). Data Governance Based on COBIT2019 Framework to achieve Sustainable Development Goals, Journal of Techniques, 2(3), 9-18.

[11] Maletic, M., Maletic, D., and Gomiscek, B. (2012). An Organizational Sustainability Performance Measurement Framework, the 8th WSEAS International Conference on Energy, Environment, Ecosystems and Sustainable Development, University of Algarve, Faro, Portugal.

[12] Marwa, M., Salhi, B., and Jarboui, A. (2020). Environmental Audit and Environmental Disclosure Quality, Scientific Annals of Economics and Business, 67(1), 1-23.

[13] Iatridis, G. (2013). Environmental Disclosure Quality: Evidence on Environmental Performance, Corporate Governance and Value Relevance, Emerging Markets Review, 14, 55-75.

[14] Abba, M., Said, R., Abdullah, A., and Mahat, F. (2018). The Relationship between Environment Operational Performance and Environmental Disclosure of Nigerian Listed Companies. Journal of Environmental Accounting and Management, 6(1), 1-15.

[15] Braam, G., and Peeters, R. (2018). Corporate Sustainability Performance and Assurance on Sustainability Reports: Diffusion of Accounting Practices in the Realm of Sustainable Development, Corporate Social Responsibility and Environmental Management, 25(2), 164-181.

[16] Dos Santos, C., and Aguiar, A. (2019). ISO 14001 and International Trade, Independent Journal of Management & Production, 10(1), 22-40.

[17] Arena, M., Azzone, G., Platti, M. (2012). ISO14001: Motivations and Benefits in the Italian Metal Industry, International Journal of Engineering Business Management, 4(41), 1-9.

[18] Arimura, T., Darnall, N., Ganguli, R., and Katayama, H. (2016). The Effect of ISO 14001 on Environmental Performance: Resolving Equivocal Findings, Journal of Environmental Management, Vol. 166, 556-566.

[19] Bansal, P., and Hunter, T. (2003). Strategic Explanations for the Early Adoption of ISO 14001, Journal of Business Ethics, 46(3), 289-299.

[20] Bellesi, F., Lehrer, D., and Tal, A. (2005). Comparative Advantage: The Impact of ISO 14001 Environmental Certification on Exports.

[21] Chung, S., Fryxell, G., and Lo, C. (2005). Corporate Environmental Policy Statements in Mainland China: To What Extent Do They Conform to ISO 14000 Documentation?. Environmental Management, 35(4), 468-482.

[22] Daddi, T., Frey, M., De Giacomo, M., Testa, F., and Iraldo, F. (2015). Macroeconomic and Development Indexes and ISO 14001 Certificates: A Cross National Analysis, Journal of Cleaner Production, Vol. 108, 1239-1248.

[23] De Oliveira, O., Serra, J., and Salgado, M. (2010). Does ISO 14001 Work in Brazil?. Journal of Cleaner Production, 18(18), 1797-1806.

[24] Djekic, I., Rajkovic, A., Tomic, N., Smigic, N., and Radovanovic, R. (2014). Environmental Management Effects in Certified Serbian Food Companies. Journal of Cleaner Production, Vol.76, 196-199.

[25] ISO (2014). International Organization for Standartization, ISO 14001 Continual Improvement Survey, Survey Design.