Contribution of the environmental management system to improve the environmental performance of organization- a case study of The Harbor Institution of Skikda

مساهمة نظام الإدارة البيئية في تحسين الأداء البيئي للمؤسسة– دراسة حالة المؤسسة المينائية لسكيكدة

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Abstract: This study aim to show how much adopting the environmental management system (according to standard ISO 14001) contributes to improve the company's performance generally& ,the environmental performance specifically, we divided this study into 3 major parts& ,by taking environmental management system (according to standard ISO 14001) we found out that it allows the company to rationalize its consumption of energy&raw material&minimize the toxic gas emissions, also to reduce waste size caused by the production process, thus improve its environmental performance.

Keywords: The environmental management; the environmental management system; the environmental performance; the environmental standard ISO 14001.

Résumé : Cette étude vise à montrer combien l'adoption du système de management environnemental (selon la norme ISO 14001) contribue à améliorer les performances de l'entreprise en général, et la performance environnementale en particulier, En divisant cette étude en 3 parties principales, et nous avons découvert que le système de management environnemental (selon la norme ISO 14001), permet à l'entreprise de rationaliser sa consommation d'énergie et de matières premières et de minimiser les émissions de gaz toxiques, également pour réduire la taille des déchets causés par le processus de production, donc améliorer sa performance environnementale.

Mots clés: management environnemental, système de management environnemental, la norme environnementale ISO 14001, la performance environnementale.

ملخص: تهدف هذه الدراسة إلى إظهار مدى مساهمة تبني نظام الإدارة البيئية وفقا للمواصفة البيئية (ISO 14001) في تحسين الأداء العام للمؤسسة عموما والأداء البيئي خصوصا، وقد قسمنا هذه الدراسة إلى ثلاث محاور، وقد توصلنا إلى أن تبني نظام الإدارة البيئية وفقا للمواصفة (ISO 14001) يمكن المؤسسة من ترشيد استهلاكها للطاقة والمواد الأولية وتقليص الانبعاثات الغازية السامة بالإضافة إلى تقليص حجم النفايات الناتجة عن العملية الإنتاجية وبالتالي تحسين أدائها البيئي.

الكلمات المفتاحية: الإدارة البيئية، نظام الإدارة البيئية ،المواصفة البيئية (ISO 14001)، الأداء البيئي.

I- Introduction:

The industrial and technological development witnessed by most countries today, coupled with the spread of globalization and liberalization of foreign trade, contributed to the emergence of giant factories, which helped to accelerate the industrial development in many countries and meet the increasing demand for industrial goods, but in turn, this has led to damage the environment and to depletion of resources, this is why it is necessary for the countries, especially the industrialized ones, to take care of the environmental aspects. As a result, the issue of the environment has imposed itself on the national, regional and global levels.

1.1.The problematic:

Considering the challenges faced by economic institutions and which are calling for the need to work for the continuous development to reach levels of productivity and efficiency and achieve a competitive advantage under the competition increasing in the local and international markets. It has adopted the environmental management system according to the international standard (ISO 14001), which is considered as a basic pillar to increasing the production efficiency and its competitiveness on the one hand and protecting the environment and not harming it on the other hand. Where the concern for the environment has become one of the areas of competition between economic institutions, and in view of the above we can propose the following problematic:

- **To what extent does the adoption of an environmental management system in accordance with ISO 14001 contribute to the improvement of the environmental performance of the institution?**

1.2. Hypotheses:

To answer the problematic of the research, we can make the following hypotheses:

- The environmental performance of the institutions is characterized by being very weak, prior to the adoption of the environmental management system in accordance with ISO 14001;
- The environmental performance of the institutions is characterized by being very good, after the adoption of the environmental management system in accordance with ISO 14001;
- The adoption of the environmental management system in accordance with ISO 14001 enables the organization to rationalize its consumption of resources and energy.

1.3.Research goal:

The importance of the research lies on the study approach which is about one of the most important topics proposed, especially since the last decade from the last century, where the aim of this study was to highlight the significant role played by the adoption of the environmental management system according to ISO 14001 in the Algerian institution in improving the overall performance in general and the environmental performance in particular and thus contribute to the embodiment of sustainable development.

1.4.The research methodology:

To acknowledge with all aspects of the research, on the theoretical side we relyon the descriptive approach, in order to surround the various aspects of research using books, notes, magazines, reports and other references, but in the field side we rely on the descriptive analytical approach, which enables us to describe the phenomenon studied as it is in reality without depending on the personal interview to fill the list of self-assessment according to the principle of the gap that was used to measure the environmental performance in the institution under study before and after the adoption of the environmental management system.

II. Definition of the environmental management system:

The management environmental system is originally an environmental management but with certification, and in this element we will approach the definition of the environmental management system in accordance with the ISO 14001 standard and also its effective role on the competitiveness improvement of economic institutions.

II.1. The emergence of the environmental management system according to the international standard (ISO 14001):

Following the success of the International Organization for Standardization (ISO) in the field of quality management systems (ISO 9000), beside to the rise of calls for the organization by the United Nations and other international organizations, especially those related to global trade to issue a standard on environmental management, the ISOtook upon itself the responsibility to produce a standard on environmental management.

And in June 1996, the ISO published its first Environmental Management System standard (ISO 14001) and then in subsequent periods it published the rest of the standards. The ISO required the organizations wishing to adopt the ISO 14001 to define a clear policy toward environmental protection and its conservation. And to do so effectively, which provides evidence of the direction of its customers on their serious endeavor to protect and preserve the environment. And in 2004, the ISO 14001 standard was updated and issued after it was modified and improved by the International Organization for Standardization (ISO). This standard is considered the key to the preservation of the environment. And in 2015, the latest version of ISO 14001 was released and has been modified and improved to suit the current environment and conditions in the world today.

II.2. Define the environmental management system:

There are several definitions of this system, here are some of the most important:

The International Organization for Standardization (ISO) has given a definition of the system: "It is part of a comprehensive management system that includes the organizational structure, planning activities, responsibilities, practices, procedures, processes and resources related to the development, implementation, review and maintenance of environmental policy". (El AzzawiNajm and El Nakkar Abdullah Hikmat, 2010:122).

However, the United Nations Environment Program (UNEP) has defined it as: "the structure which includes a group of processes and procedures in accordance with the environmental goals of the organization, which has important responsibilities in the composition of the organization since the environmental management system is a key element in the achievement of sustainable developments, it is integrated and wide and aims to reduce pollution and prevention as far as possible from the source. It works on environmentally sustainable development of all contents, and it may at times extend to address previously affected environments". (The same previous reference: 122).

It is also knows as: "A set of procedures and activities to guide the institution in how to manage the environmental concepts, and the application on these procedures helps the management of the institution to plan, implement and monitor the extent of improvement of its environmental performance continuously". (MekimahSabri, 2010).

II.3. Objectives of the environmental management system in accordance with ISO 14001 standard:

Here are some of the objectives of the adoption of the environmental management system in accordance with ISO 14001 standard:

- Conservation of the natural resourcesand management of the interactions between them and the human resources, to have a safe and clean environment and achieve the sustainable development objectives;

- Enabling institutions to deal with the environment issues and their different elements; (Daas Azzeddine, 2011: 47)
- Regulating and controlling harmful attitudes to the environment and its resources (renewable and non-renewable) whether by individuals, groups or organizations by establishing effective environmental controls, laws, legislation and policies;
- Addressing the damage resulting from environmental pollution by securing and providing the appropriate means to face the effects of pollutants and their damages to humans and the environment;
- Contributing to the achievement of sustainable development by protecting the environment for present and future generations through voluntary projects that protect the environment; (Rashi Tarek, 2011: 148)
- Guiding institutions with requirements as well as laws and legislation related to the methods and safety of the environmental management; (DaasAzzeddine, previous reference: 47)
- Encouraging institutions to get certification of conformity from environmental safety authorities.

II.4. The impact of the adoption of the environmental management system (ISO 14001) in the institution on its competitiveness improvement:

The Environmental Management System has been developed in accordance with ISO 14001 to contribute to sustainable development to the extent that its application generates several positive effects on the environment and society in addition to improving the competitiveness of the institution. Among these impacts we mention the following:

- Contributing to meeting the needs of the community in relation to clean goods and services, and thus winning customers who care about the environment;
- Reducing or eliminating the use of toxic substances in the formulation of certain harmful products or production methods, thus preserving the health and safety of workers on the one hand and the health of consumers on the other;
- Improving the image of the institution before legal authorities, decision makers and the public; (www.iso.org)
- Promoting environmental awareness and responsibility within the institution at all levels;
- Raising the value of the shares of the Corporation in the Stock Exchange: the institutions that have the standard (ISO 14001) which have shares in the Stock Exchange that deal with the preservation of the environment and sustainable development can develop good relations with investors and venture capitalists and form a good image of them for the institution, and thus the demand is high to raise the price of their shares traded in the market;
- Reducing costs associated with the legislative aspect: The environmental management system (ISO 14001) contributes to the commitment of the institution to the legislative aspect related to the environment, thus exempting (or minimizing) the burden associated with this aspect such as taxes on pollution and others;
- Achieving the requirements of export abroad, which leads to increase the competitiveness of the institution: where the institution with the right environmental behavior competitive advantage over others in the market which are aware of the safety and protection of the environment. The application of the ISO 14001 strengthens the position of the institution in the global markets. By reviewing the production process by undertaking a number of measures, such as producing goods with specifications that meet the environmental requirements of the importing countries and meeting their environmental demands, in order to make the goods suitable for the international market, the institution can win the opportunity to compete competitively among its counterparts.

And it can also win a certain market share by attracting a new class of consumers who are interested in preserving the environment;

- Benefit from financing advantages: For its commitment to the preservation of the environment through ISO 14001, the corporation may benefit from concessional loans and credit facilities from banks or receive government subsidies;
- Reduction of the duration of injury and accidents leaves, therefore increasing productivity;
- Reducing the costs of waste management, as the institution tries to avoid or at least reduce the production of waste, thereby reducing the costs associated with this waste;
- Reducing energy consumption and raw materials;
- Reducing pollution of seas, rivers and valleys as well as soil as a result of the treatment of the institution of its waste before disposal.

III. Basic concepts about environmental performance:

As the institution strives to improve its economic performance, a set of negative impacts has resulted on the environment, which prompted institutions to pay attention to the environment and improve its environmental performance in parallel with its economic performance.

III.1. Concept of environmental performance:

Environmental performance means: “All activities and processes carried out by the Organization, whether compulsory or voluntary, that prevent or mitigate environmental damage resulting from the Organization's productive or service activities”. (Ghadir Ahmed Salima and Kihli Aicha, 2011: 711).

According to the International Organization for Standardization (ISO), environmental performance is: "Quantifiable quantitative results of an environmental management system related to environmental dimensions, which are based on the organization's environmental policy and objectives".

In order to achieve the environmental performance of the institution, it must link between economic growth and protection of the environment and the elimination of pollution and rationalize the exploitation of energy and natural resources and reduce waste, which helps them to improve their image and win new customers and get rid of the pressure imposed by laws and legislation, and to reach this a strategy must be developed to achieve sustainable development by the imposition of new production methods, including cleaner production technology, which will bring economic and health benefits to the institution and its employees, as well as other stakeholders, as well as the adoption of environmental management systems that facilitate the process of Environmental compatibility of the institution. (Ghadir Ahmed Salima and KihliAicha, previous reference: 711).

Environmental performance can be analyzed as a result of the intersection of two main axes: the internal and external environment of the institution (as shown in the following table). As a result of this intersectionwe get four dimensions: product and process improvement, build and/or strengthen relationships with stakeholders, legal compliance and financial implications, environmental impacts and institution image.

Table (1) : the environmental behavior matrix

	Internal environment	External environment
The production process	product and production process improvement	build and/or strengthen relationships with stakeholders
The result	legal complianceand financial implications	environmental impacts and institution image

The source: prepared by the two researchers, based on the parameters above.

Through this matrix we notice that the environmental performance during the production process contributes to improve the products of the institution, which leads to the formation of good relations with stakeholders such as suppliers, customers and others, while the level of outputs of the production process helps to mitigate and reduce pollution as a result of compliance with environmental laws and legislation. This helps the institution to get rid of environmental taxes, which contributes to reduce production costs and thus achieve greater financial returns, in addition to improving its image to the community thanks to its conservation of the environment.

III.2. Reasons for integrating environmental performance into the strategy of the institution:

Several factors have led the institution to integrate environmental performance into its overall strategy and consider it very important to survive in the market and achieve a competitive advantage. Among these factors we mentions the following: (Ghadir Ahmed Salima and KihliAicha, previous reference: 711)

- **Government pressures:** represented by laws and legislation related to the protection of the environment and its natural resources and the reduction of pollution, where the government plays an important role in promoting environmental performance through the enactment of laws that make institutions more committed to the protection of the environment and reduce pollution.
- **Pressures of Stakeholders:** such as customers, suppliers, Lenders, government agencies, environmental associations and other lobbyists, with increased environmental awareness and the significant role played by stakeholders in changing consumer behavior, environmentally friendly products have become one of the most attractive and popular products, which drives producers to meet the wishes of customers of these products, in addition to the increasing pressure on the institution by shareholders, investors and lenders to obtain information on environmental performance, as well as financial performance, and the need for these parties to this information as a result of their conviction that lack of interest in the environment leads to increased obligations and thus reduce profits.
- **Situational factors:** There are several factors which determine the ability of the institutions to integrate the environmental dimension, such as the age of the institution, its size, the sector in which it operates and its international affiliation. This can be understood through several approaches:
    - Young institution is more adaptable to environmental requirements and it is more flexible than older institutions;
    - Older institutions form situations and behaviors in their business management that are hard to change over time;
    - The integration of the environmental dimension in institutions requires changing in the organizational and cultural levels, which is hard to get in older institutions.

- Big institutions is more adaptable to integrate the environmental dimension and adopting environmental behavior, given their large investments and long-term goals.

III.3. Evaluating environmental performance of the institution:

The institution deals with all the received environmental information and faces challenges to intensify them in a limited number of indicators under which it can measure its environmental performance.These indicators are concerned with measuring the effect and impact of the institution on the external environment and living natural and non-living systems, and these appropriate indicators should have a set of conditions, including environmental compatibility, internationally comparability, and applicability of the parameters provided by the indicator. (El Wafi El Tayeb, 2012: 143).

There are many attempts to determine the indicators for assessing environmental performance of an institution, such as the World Business Council's Sustainable Efficiency Guidelines, which divide the indicators of the environmental performanceevaluation indicators into three main indicators as follows: (the same previous reference: 143)

- **Environmental management indicators:** Includes management efforts to influence the environmental performance of the institution, which are represented in its environmental policy and organizational structure of environmental management, management commitment related to environmental matters and coordination and communication with internal and external stakeholders;
- **Environmental situation indicators:** these are indicators that provide information about the local, regional or global situation, such as the global temperature average as well as the percentages and concentration of pollution in soil, air and water;
- **Environmental Operational Indicators:** Relates to the areas of technical product or production process, measures of product or process use and waste disposal;
- **Environmental Impact Indicators:** linked to outputs such as total solid and liquid waste, water and energy consumption and atmospheric emissions.

IV. Field study and its tools:

IV.1. Introduction of the Harbor Institution of Skikda

- **The name:** The Harbor Institution of Skikda;
- **Legal status:** Economical Public Institution and is a stock company managed by laws and regulations relating to the autonomy of institutions;
- **Date of creation:** Created by Decree No. 82-284 in August 1982 and amending the structures in the stock company on March 21st, 1989;
- **Social headquarters:**Small industrial zone near the mouth of SAFSAF valley, mailbox 65, 21 000 Skikda, Algeria;
- **Share capital:** 9,000,000,000 Algerian Dinar held by a single shareholder, the State management company "Harbor" (SOGEPORTS);
- **Field of activity:** Within the framework of the national economic development plan for import and export, the harborof Skikda, in cooperation with the Customs and Police Authorities, distributes goods and resources to all eastern regions and as a service institution in the first place we can limit its services as follows:
    - Exploiting the means and equipment of the harbor, put them in customers of and users service and do the process of loading and unloading;

- Maintaining security within the sea or land harbors through the Internal Security and Prevention Cell within the framework of the protection of the geographical boundaries of the country;
- Receiving fuel carriers inside the new harbor;
- Receiving ships loaded with goods and commodities such as soja, wood and others at the level of the old harbor, which is located in the center of the city.

IV.2. Study tool:

The study tool consisted of an interview with the General Deputy Director of the harbor of Skikda and the head of the Quality Department. A list was designed and developed according to the principle of gap for the environmental management system and the environmental performance of the institution, after reviewing the theoretical literature and previous studies and the modification of some terms to suit the current study.

According to the principal of gap, the list contains 20 paragraphs, it was designed to measure the impactof the independent variable (Environmental Management System in accordance with ISO 14001 standard) on the dependent variable (the environmental performance), where the environmental performance of the institution before adopting the Environmental Management System (before 2009) was compared to its performance after the adoption of the system (from 2009 to 2019), the paragraphs were of the closed type according to the tripartite Likert scale as shown in the following table:

Table (2) : The tripartite Likert scale for the domain percentages

The estimation	Not fully implemented	Average implementation	Fully implemented
The weighting	0	1	2
Domain of percentages	[0% - 33.33%]	[33.33% - 66.66%[	[66.66% - 100%]

The source: prepared by the two researchers

After replying to all the paragraphs of the list, the results of the environmental performance measurement before and after the adoption of the environmental management system have been calculated as follows:

$$\text{The percentage of the paragraphs applied} = \frac{\sum(Ni \times Zi)}{\sum(\text{Ni} \times \text{Z3})}$$

Where:

- (Ni): refers to Duplicates;
- (Zi): refers to Weighting;
- (Z3): refers to the biggest Weighting (2).

Table (3) - Self-Assessment Form according to the principal of gap

Environmental performance of the Harbor institution of Skikda	Before the adoption of EMS (before 2009)			After the adoption of the EMS (2009-2019)		
Paragraphs of the environmental performance measuring	**Not implemented at all**	**Partially applied**	**Completely applicable**	**Not implemented at all**	**Partially applied**	**Completely applicable**
The institution managed to reduce its waste and prevent pollution		X	X			XX
The Harbor of Skikda is constantly improving its environmental performance and improving the quality of its services		XX				XX
The institution has achieved optimal environmental effectiveness by developing its activities	X	X			X	X
The environmental performance of the harbor of Skikda is greatly improved		XX				XX
Identify activities that have an impact on the institution's ability to achieve its environmental objectives	X	X			X	X
The institution quickly treats imbalances and prevents accidents		X	X			X X
The harborinstitution has highly efficient framework formed in the environmental field		XX				XX
The institution is fully responsible for the environmental impacts resulting from its activities		XX				XX
The institution treats its waste before disposal	X X			X	X	
The institution sorts and arranges the waste resulting from its daily activities	X	X				XX
The institution was able to recover significant amounts of waste	X	X			X	X
Continuously rely on the principle of continuous improvement in activities and processes with environmental impact by relying on the environmental results achieved and analyzed them against the expected results	X	X				XX
The extent to which the directors of the institution are interested in integrating strategic options related to the preservation of the environment in the strategies of the institution	X	X			X	X
The institution was able to efficiently use its resources.		X X			X	X
The harbor institution was able to	X	X			X	X

reduce its water consumption						
The harbor institution was able to reduce its electricity consumption	X	X			X	X
The harbor institution was able to reduce its gas consumption	X	X			X	X
The institution was able to reduce atmospheric emissions that harm the environment	X	X		X		X
The Foundation was able to reduce or reduce environmental pollution at the perimeter of the institution	X	X		X		X
The institution was able to reduce water pollution from ships		XX				XX
Zi (Weighting)	0	1	2	0	1	2
Duplicates (Ni)	13	25	2	3	9	28
(Zi x Ni)	0	25	4	0	9	56
∑(Zi x Ni)	29			65		
(Z3 x Ni)	26	50	4	6	18	56
∑(Z3 x Ni)	80			80		
Percentage of paragraphs applied	36,25%			81,25%		

The source: prepared by the two researchers

V. Results and discussion:

Based on the self-assessment form for measuring the environmental performance of Skikda Harbor before adopting the environmental management system in accordance with ISO 14001 (before 2009), the institution obtained an application rate of the paragraphs of 36.25% and when compared with the percentage areas from table 02 usingthe tripartite Likert scale for the application areas, we find it between [33.33% - 66.66%[, thus, the paragraphs of the self-assessment form are medium in application, which means that the environmental performance of the harbor institution before adopting the environmental management system is somewhat average, **and this is what denies the validity of the first hypothesis**.

After the adoption of the environmental management system by the harbor institution (according to the ISO 14001 standard), it has obtained an application rate of the paragraphs of 81.25%. This result belongs to the domain of percentages [66.66% - 100%] (the tripartite Likert scale) which means that the paragraphs are totally implemented. Thus the environmental performance of the harbor institution of Skikda after the adoption of the EMS according to ISO 14001 is very good. **And this is what verifies the validity of the second hypothesis**.

Table (4) : Measure the extent to which the institution rationalizes its consumption of resources and energy

Measuring paragraphs of the degree of resource and energy consumption	Before the adoption of EMS (2009-2019)			After the adoption of the EMS (before 2009)		
	Not implemented at all	Partially applied	Completely applicable	Not implemented at all	Partially applied	Completely applicable
The institution was able to efficiently use its resources		X X			X	X
The harbor institution was able to reduce its water consumption	X	X			X	X
The harbor institution was able to	X	X			X	X

reduce its electricity consumption						
The harbor institution was able to reduce its gas consumption	X	X			X	X
Zi (Weighting)	0	1	2	0	1	2
Duplicates (Ni)	3	5	0	0	4	4
(Zi x Ni)	0	5	0	0	4	8
∑(Zi x Ni)	5			12		
(Z3 x Ni)	6	10	0	0	8	8
∑(Z3 x Ni)	16			16		
Percentage of paragraphs applied	31,25%			75%		

The source: prepared by the two researchers

Focusing on energy consumption and resources paragraphs, we find that the studied institution before its adoption of the EMS got an application percentage of 31.25% which indicates that the degree of rationalization of consumption of resources and energy of the institution was very weak.While after the adoption,the percentage become 75% which reflects the good application of the paragraphs, thus the degree of rationalization of consumption of resources and energy of the institution is high in the harbor institution of SKIKDA. **And this is what verifies the validity of the third hypothesis**.

VI. Conclusion:

The environmental management system in accordance with the international standard (ISO 14001) is one of the most famous and most used environmental management systems since its requirements are universal in any institution in the world in addition to being easy to implement. ISO 14001) contributes significantly to improving its environmental performance, and this study led us to the following conclusions also:

- The EMS enables the institution to reduce its waste and to prevent pollution;
- The EMS helps the institution to improve its environmental performance continuously and the quality of its services;
- The EMS enables the institution to treat fast the imbalances and prevents accidents;
- The EMS stimulates the institution to get highly efficient frameworks formed in the environmental field;
- The ISO 14001 certified institution is fully responsible for the environmental impacts resulting from its activities;
- The ISO 14001 certified institution sorts and arranges wastes resulting from its daily activities;
- The EMS (in accordance with ISO 14001) enables the institution to consistently rely on the principle of continuous improvement in activities and processes with environmental impact by using the environmental results achieved and analyzing them against the expected results;
- Thanks to the adoption of the EMS by Skikda harbor, the institution could reduce water pollution from ships.

According to this study we can develop the following suggestions:

- Provide significant encouragements and subsidies to assist Algerian enterprises in the adoption of the environmental management system in accordance with ISO 14001;
- Intensification of education days and training courses in institutions on the importance of adopting the environmental management system in protecting the environment and workers and achieving a competitive advantage;

- The need for permanent cooperation between the various administrative levels of the institution in order to successfully implement the environmental management system in accordance with ISO 14001 and achieve its objectives;
- Establishing internships for institutional responsible at the Ministry of Environment and Regional Development level;
- Encouraging partnerships by the State with the large foreign institutions certified with the ISO 14001 standard and working for environmental protection;
- The institution should pay attention to the treatment of its waste before disposal;
- The institution should intensify efforts to reduce atmospheric emissions and prevent or reduce environmental pollution at the enterprise level.

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