

# Impact of Standardised Management Systems on Companies' Environmental Performance. The Case of Algerian Companies Certified to ISO 14001/2015

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## Abstract

Businesses make a significant contribution to development and quality of life through the creation of wealth, jobs and added value, but not without consequences for the environment. Voices were immediately raised to curb the perverse effects of this development. To this end, the World Standards Organisation (ISO) has launched the international standard ISO 14001 "environmental management" to provide a reference framework for the implementation of effective environmental management. A number of studies have been carried out around the world to assess the impact of the implementation of this standard on business performance, but very few have been carried out in developing countries, such as Algeria. This contribution therefore aims to enrich the debate on this issue. In this paper, we present the results of empirical research carried out on a sample of Algerian companies certified to the ISO 14001/2015 standard. Overall, the results show that this impact is effective in terms of controlling environmental aspects, but remains questionable when it comes to companies' economic imperatives.

**Keywords:** *Environmental Performance - ISO 14000 - Environmental Management - Environmental Standard - Environmental Aspect - Environmental Impact – EMS.*

## INTRODUCTION

The environmental dimension has received considerable attention at both international and regional level. Today, the focus on environmental protection is constantly increasing. Environmental movements have become more organised, more powerful and more influential, and pose a growing threat to the business community (Newell, 2013). Individuals, both members of society and potential consumers, are becoming increasingly aware of the importance of preserving the environment and natural resources, and are also a source of pressure on companies (Rootes, 2022).

In response, companies have added a new dimension to their management processes, the environmental dimension, which aims to control the impact on the natural environment (Cagno, E., Neri, A., Howard, M., Brenna, G., & Trianni, A, 2019) (Hristov, I., Appolloni, A., Chirico, A., & Cheng, W, 2021). To this end, companies are turning to the various solutions offered by environmental technologies and implementing environmental management systems such as ISO 14001.

Moreover, recent literature has attempted to demonstrate the beneficial returns to performance for companies that agree to embark on this path (Fernandez, D. B., Petit, I., & LANCINI, A, 2014) (Psomas, E. L., Fotopoulos, C. V., & Kafetzopoulos, D. P, 2011). Nevertheless, many managers and shareholders remain unconvinced that economic interests can be reconciled with environmental efforts. It is in this context that we place this empirical

research contribution, carried out on a sample of Algerian companies, through which we seek to answer the question of the impact of environmental management systems on the overall performance of the company, specifically in the Algerian context. The main objective is therefore to enrich the debate on this issue with the Algerian case.

“To what extent does the application of the ISO 14001 standard affect the environmental performance of Algerian companies?”

The study attempts to shed light on the ISO 14001 standard, which is considered to be the most effective environmental management system to help companies meet their environmental obligations. It also attempts to identify the reality of environmental performance in companies certified to this "ISO 14001" standard.

## I. ENVIRONMENTAL PERFORMANCE AND ISO 14001

### 1. Environmental performance

The emergence of the term "environmental performance" is the result of the development of the concept of performance at a time when the importance of the dimensions of social responsibility and development were spreading, accentuated by strong pressure from stakeholders (Tang, Z., & Tang, J, 2018).

As far as performance is concerned, most definitions point out that it is closely related to the concepts of effectiveness and efficiency. Effectiveness in this case is the ability to achieve set objectives, while efficiency is the ability to achieve those objectives at the lowest cost. “*Effectiveness is the power to produce the desired result. Efficiency is defined as the ability to do something or produce something without wasting materials, time, or energy: the quality or degree of being efficient (technical), but also as the power to produce the desired result causing some ambiguity between the two terms*”. (Wilson, M., Wnuk, K., Silvander, J., & Gorschek, T, 2018).

Environmental performance can therefore be defined in terms of environmental efficiency as the ability of a company to reconcile economic, social and environmental imperatives. In other words, to provide products and services that are profitable and socially useful while continuously reducing their environmental impact.

The OECD defines environmental performance as "eco-efficiency" - the effectiveness with which ecological resources are used to meet human needs. From this perspective, eco-efficiency is equivalent to resource productivity (OCDE, 2008).

In addition, the term "eco-efficiency" refers to the idea of progressively improving the environmental impact of goods production by progressively reducing the inputs used in production, their toxicity to living organisms and the associated greenhouse gas emissions. It is a key word in the sustainable development paradigm. It is the term that seeks to put into practice the central promise of this paradigm, which is that the economy can continue on a path of continuous growth provided it modifies - somewhat - its impact on the environment. So it's easy to see why eco-efficiency is a prime target for critical ecological approaches (Gautreau, 2020).

In turn, ISO standard 14000 defines environmental performance as "*performance related to the management of environmental aspects. For an environmental management system, results can be measured against the organization's environmental policy, environmental objectives or other criteria, using indicators*" ("ISO", 2021) .

## 2. ISO 14001 requirements for environmental performance

By the end of 2022, the number of companies certified to this standard will be 528903 worldwide ("ISO" i. s., 2024). That makes it in second place only to ISO 9001. According to the same source, Algeria has 116, putting it in the top ten of African countries. *“The adoption by companies of ISO 14001-compliant environmental management system (EMS) certification is one of the most significant developments in voluntary initiatives to protect the environment and promote sustainable development”* (Reverdy, 2005).

The ISO 14000 series of standards, developed by the International Organisation for Standardisation (ISO), provides a framework to help organisations reduce their environmental impact, comply with environmental laws and regulations, and continually improve their environmental performance. ISO 14001 is the most widely recognised of these standards and sets out the criteria for an environmental management system (EMS) that enables organisations to identify, monitor and improve their environmental performance (Morrow, D., & Rondinelli, D, 2002).

According to ISO, implementing an EMS that complies with the latest version of ISO 14001 (2015) has multiple benefits. As well as enabling organisations to demonstrate their commitment to environmental protection, it provides a framework for regulatory compliance, builds stakeholder confidence and can lead to improved operational efficiency with reduced costs. It also helps to:

- Demonstrate compliance with current and future legal and regulatory requirements;
- Strengthen management involvement and employee engagement;
- Improve corporate reputation and stakeholder confidence through strategic communication;
- Achieve strategic objectives by integrating environmental issues into business management;
- Gain a competitive and financial advantage by improving efficiency and reducing costs;
- Encourage better environmental performance from suppliers by integrating them into the organisation's business systems.

In addition, other standards in the 14000 family are proposed by ISO to complement ISO 14001. These include:

- ISO 14004, which provides guidance on how to establish, implement, maintain and improve an environmental management system, including how to coordinate it with other existing management systems.
- ISO 14006, which is intended for use by organisations that have implemented an ISO 14001 environmental management system, but can also help to integrate eco-design into other management systems.
- ISO 14064-1, which sets out the principles and requirements for quantifying and reporting greenhouse gas (GHG) emissions and removals at the organisational level.

The ISO 14001 certification process consists of several stages, including a needs analysis, the preparation and conduct of an on-site audit, the evaluation of corrective actions, and the decision of the certification committee. Once certified, the organisation receives a certificate that is valid for three years.

## II. METHODOLOGY AND RESULTS OF THE EMPIRICAL STUDY

In this second part of our work, we will try to answer the main problem, namely the impact of the implementation of an environmental management system according to the ISO 14001/2015 standard on the performance of Algerian companies. This study is based on a field survey of managers and employees of 5 Algerian companies in four different regions of the country between 2021 and 2023:

Company (name & registered capital) <sup>1</sup>	Field of activity (Products and services)	Location	Number of employees	Certification
<b>Adwan Chemicals</b> Eurl 743741 USD	Inorganic chemicals	Fornaka (Mostaganem)	≈ 350	ISO 9001 ISO 14001 ISO 45001
<b>La Câblerie Algérienne</b> 3718705 USD	Manufacture and marketing of electrical wires and cables	Masra (Mostaganem)	800	ISO 14001 ISO 17025
<b>Sovac</b> 12795111 USD	Vehicle assembly and maintenance	Oued rhiou (Relizane)	2000	ISO 9001 ISO 14001 ISO 45001
<b>Cimenterie hhasna</b> 7809280 USD	Cement production and drivers	Hhasna (Saïda)	380	ISO 9001 ISO 14001
<b>SOMIPHOS</b> 1234610 USD	Phosphate mining and marketing	Bir el ater (Tebessa)	1970	ISO 9001 ISO 14001 ISO 45001

### 1. Environmental aspects of the companies sampled

After analysing the different activities of the companies included in the study, it was found that they share all potential environmental aspects, the most important of which are as follows

**Solid pollutants:** These are solid particles and particles resulting from different stages of the production process.

- **Particulate matter:** These are particles with a diameter of more than 10 microns that settle in areas close to where they are emitted.
- **Suspended dust:** These are particles less than 10 microns in diameter, which are light and remain suspended in the air for long periods, settling slowly.
- **Gaseous pollutants:** Gases are produced by fuel combustion processes, mainly in furnaces.
- **Carbon dioxide CO<sub>2</sub>CO ;**
- **Sulphur dioxide gas 2SO ;**
- **Nitric oxide NOX ;**
- **Carbon monoxide CO- Noise:** Noise is an environmental pollutant, as are loud sounds, which are also annoying.
- **Explosions:** close to home we know that cement plants are often set up in the presence of % and because of the need for limestone, which is used in the raw mix to 80% of these large quantities of materials, blasting operations, which result in the emission of loud noise disturbs residents of neighbouring areas.
- **Noise from plant and machinery:** The use of crushers and grinders in the cement industry to grind raw materials results in noise emissions.

## 2. Methodological framework of the study

Our research approach is essentially based on a simultaneously realist and relativist approach, in that we base our analysis on respondents' perceptions obtained from both closed and open-ended questions. To some extent, it is partly inspired by the Q method (McKeown, B., & Thomas, D. B, 2013), without strictly following all of its requirements.

This research method, developed by William Stephenson, is used in the humanities and social sciences to analyse the subjective points of view of individuals. The methodology combines qualitative and quantitative approaches, making it possible to study a topic based on people's perceptions of it.

### ➤ Data collection method

We administered the questionnaire to 175 managers and employees of 5 Algerian companies involved in environmental management. We received 150 usable responses. In other words, 86% of the responses were usable. The questionnaire made it possible to collect two types of data:

- Numerical data: Firstly, the answers obtained from the closed multiple choice questions, indicating the respondents' perception of the criteria asked (C1, C2, etc.). The results obtained in this section were used to calculate the scores for each of the criteria.
- Textual data: this consists of the free expression of the respondents in a special open space left after each closed question. These responses proved to be very useful as they moderated, supported and/or explained certain closed answers.
- In addition, the reading of certain works in the same field (T. Trirat, Amamra Karim, Badji Mokhtar, Nadiia Dovbash, Aissa Bensehoub, 2022), carried out in the Algerian context, certainly consolidated the conception of the content of the study.

### ➤ Study population

The population of the study is represented by the managers and employees of the companies covered by the study, at different levels and in different functions (directors, multilevel managers, technicians and technical managers, workshop foremen, etc.) and with a secondary or higher level of education. Content of the questionnaire:

The questionnaire consisted of two parts:

- Information about the study sample
- Questions related to the research topic and divided into two axes:

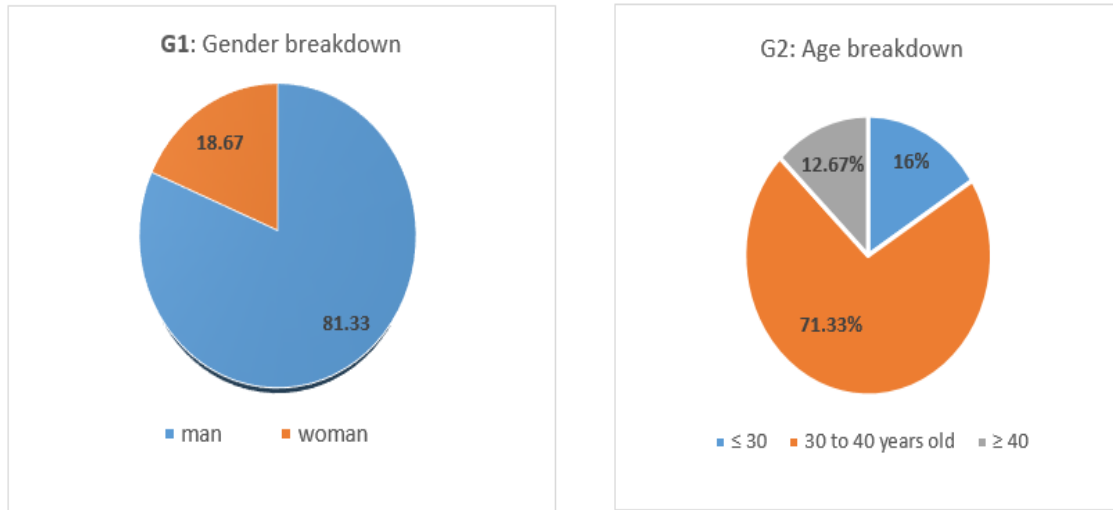
Axis 1: Impact of the implementation of the ISO 14001/2015 standard on the internal aspects of the company

Axis 2: Impact of the implementation of the ISO 14001/2015 standard on the company's external aspects.

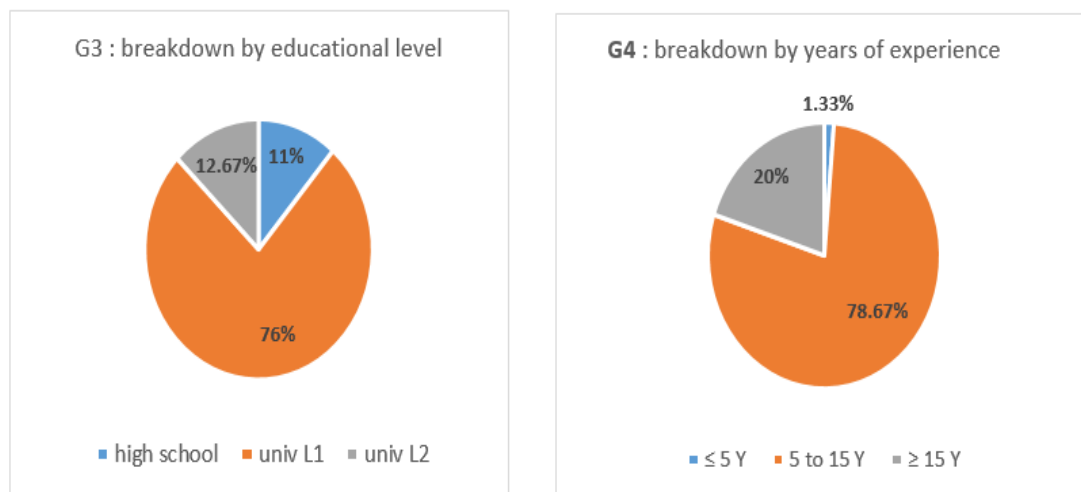
### 3. Results of the study

#### 3.1 Data processing

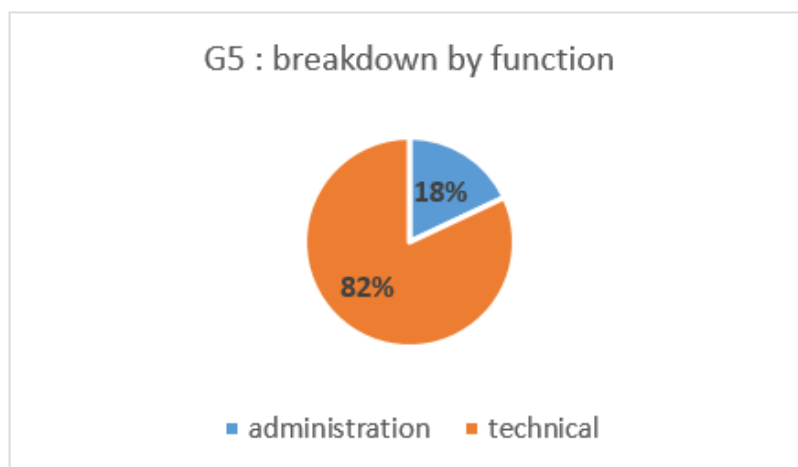
##### ➤ Sample presentation



Comment: We can see from the graphs "G1&G2" above that the sample is essentially made up of 122 men and only 28 women. In addition, these data show that the age group "30 to 40" remains dominant. This observation may be justified by the nature of the activities of the sampled companies. On the whole, these require a strong person, a sturdy build and, in some cases, night work.



Comment: We can see from graphs G3&G4 above that the sample is essentially made up of a majority of university educated people (76%) and a majority of people with between 5 and 15 years of experience (78.67%). These figures are mainly the result of our selection of respondents. The research topic required at least an intermediate level of education and a sufficient number of years of experience to be able to answer the questionnaire.



Comment: The graph above (G5) shows that the vast majority of the responses received were from staff involved in the technical activities of the enterprises. 82% of the staff were technical or related to these activities, compared to only 18% of the administrative staff. This is also a result of the focus of our questionnaires. Given the nature of the questions and the data sought, 80% of our questionnaires were sent to technical staff. The administrative staff clearly includes members of the management of the company.

#### ➤ Investigation criteria (C)

As part of this field survey and following the literature review, we based our investigation on 08 criteria divided into internal and external criteria (see table below):

N°	Location	Survey criterion	Impact sought
C1	Internal impact	Top management	Impact on business strategy, policies, authority and direction
C2		Internal environment	Impact on the infrastructure and working environment
C3		Employees	Impact on their perception, involvement and commitment to the company project
C4		Internal environmental aspects	Control of internal environmental aspects, e.g. the degree of recycling and energy consumption
C5	External impact	Marketing	Impact on reputation, brand image and relations with interested parties
C6		Compliance	Impact on legal and regulatory compliance
C7		Business performance	Impact on the market, access to markets, particularly public markets, and competitive advantages
C8		External environmental aspects	Control of external aspects such as the treatment of discharges, waste, etc.

#### ➤ Measurement criteria

The measurement of the data collected in our survey is essentially based on the perceptions of the respondents. The perception of impact was measured using a 5-point scale (see table below). It is also important to note that the questionnaire was administered in two languages (Arabic and French).<sup>2</sup>

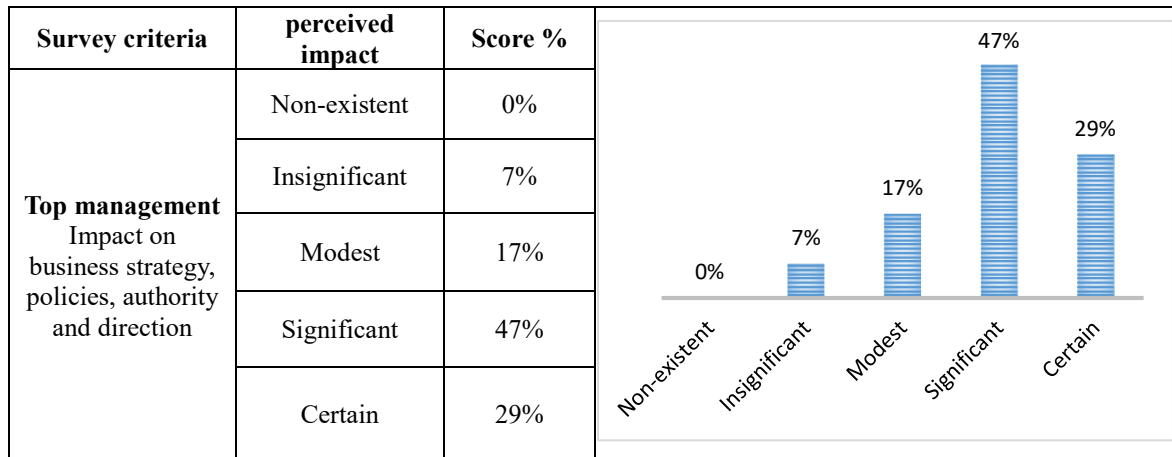
Perception intensity	1	2	3	4	5
Meaning	Non-existent	Insignificant	Modest	Significant	Certain



### 3.2 Results analysis

The following sections present the results of our survey by criterion. The scores obtained for the various criteria are as follows:

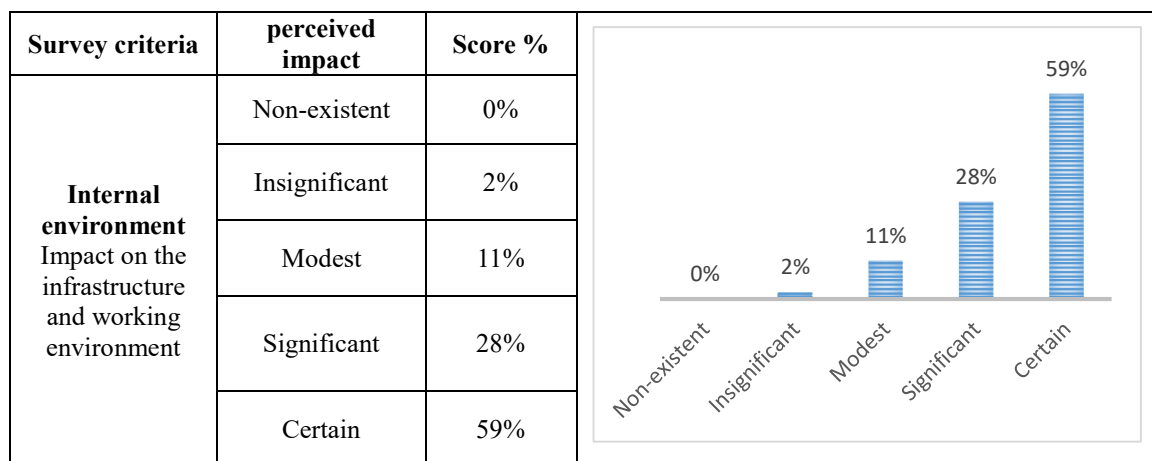
- Criteria « C1 » :



It is clear from the scores obtained that the majority of respondents are convinced of the positive impact of the implementation of the ISO 14001 EMS on the activities of the general management of the companies surveyed. This score is represented by the sum of the two intensity levels (significant and certain). This is 76%.

In the "open question" section, some respondents expressed this conviction, particularly with regard to the strengthening of strategic visibility and its orientations, which has clearly improved, the development of policies where they did not exist, and greater clarity in the designation of responsibilities.

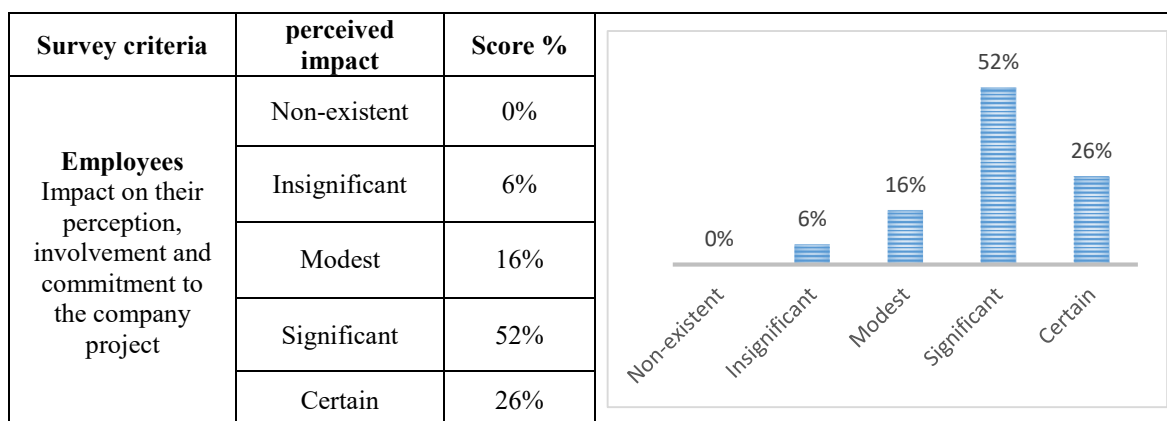
- Criteria « C2 » :



This criterion received one of the highest scores, with 87% between significant and certain. The vast majority of respondents were therefore confident about the impact of the EMS on their internal environment. According to some respondents, working conditions and infrastructure are the most visible and beneficial impact of the EMS implementation project. The workplaces are much better than before, as in this statement: "the premises, but especially the toilets, are cleaner... everything has become nicer".

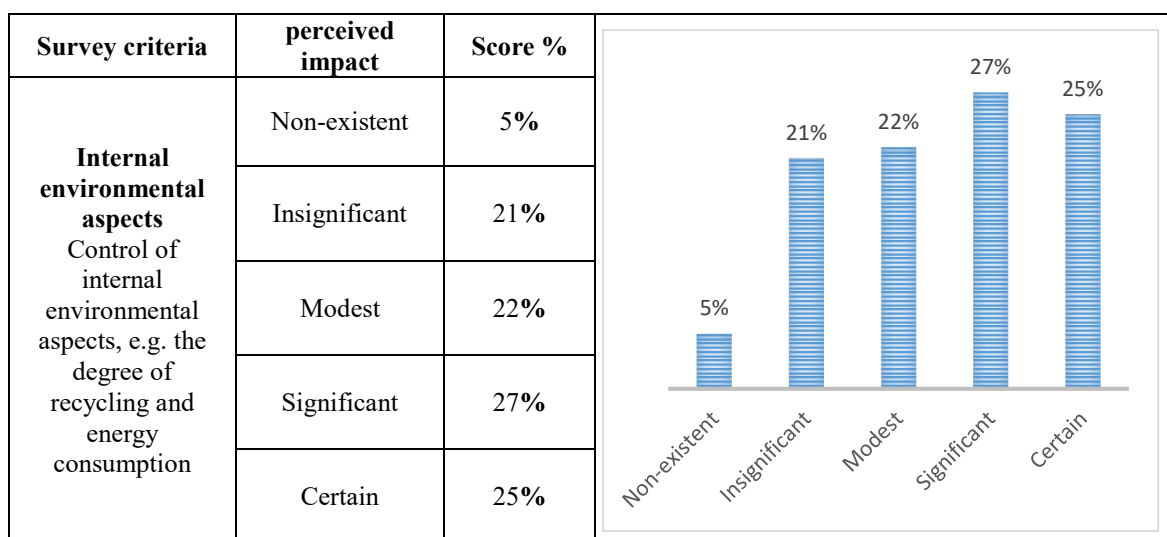


▪ Criteria « C3 » :



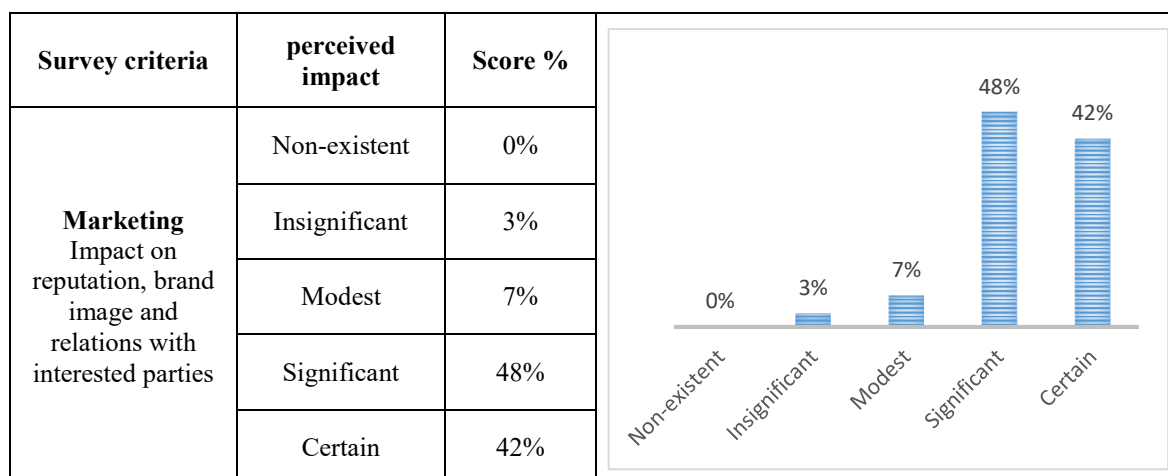
According to the results obtained, the impact of the EMS on the human aspect is visible. 78% of the respondents confirmed the reality of this impact. According to one of the technical managers interviewed, the various awareness-raising campaigns aimed at employees and the improvement of working conditions have had a noticeable impact on their behaviour, making them more aware of the importance of protecting the environment. Another interviewee said that, as an employee of the company, he felt a certain pride in working for a company that was committed to improving its management practices, particularly in relation to the environment.

▪ Criteria « C4 » :



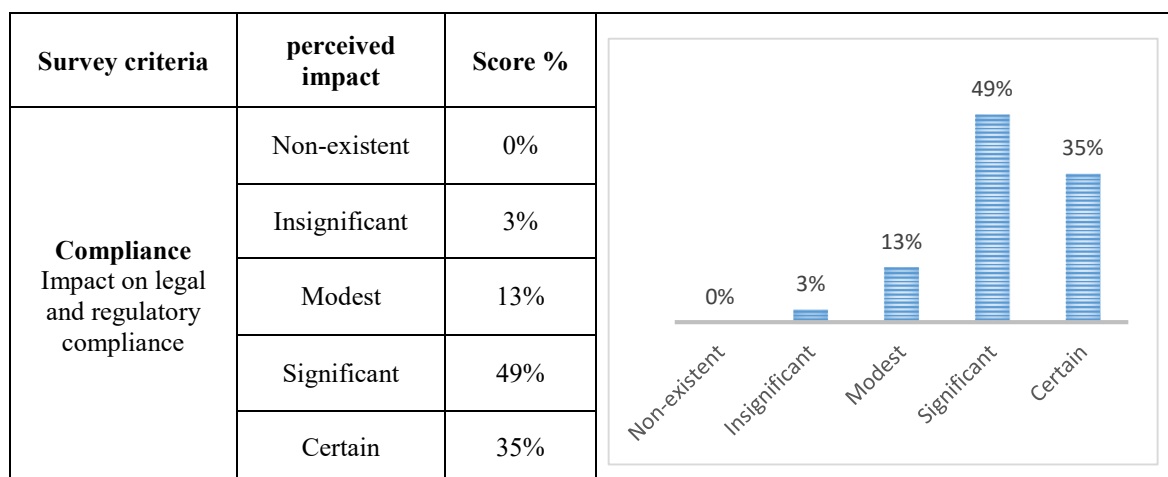
For this criterion, the score recorded shows that 52% of respondents are convinced of this impact. This may seem low compared to previous results, but it is still significant at over 50%. In addition, 22% of respondents consider this impact to be modest and 21% consider it to be insignificant. It is clear from these results that there is no real conviction about the reality of this impact. Some explanations can be found in the open-ended responses, such as one senior manager's attempt to explain that this aspect is a return on investment that takes time..

▪ Criteria « C5 » :



The impact of the EMS on the marketing aspects of the business scored highly with 90% between "significant and certain". The vast majority expressed a strong belief in the visible impact of the EMS on the marketing aspects of the business. According to most of these respondents, this impact is particularly evident in the improvement of their company's image and reputation with customers and suppliers, and in the improvement of their reputation with public authorities and certain partners (banks, insurance companies, etc.). "This is the most important effect we have felt after ISO 14001 certification," says one of the respondents.

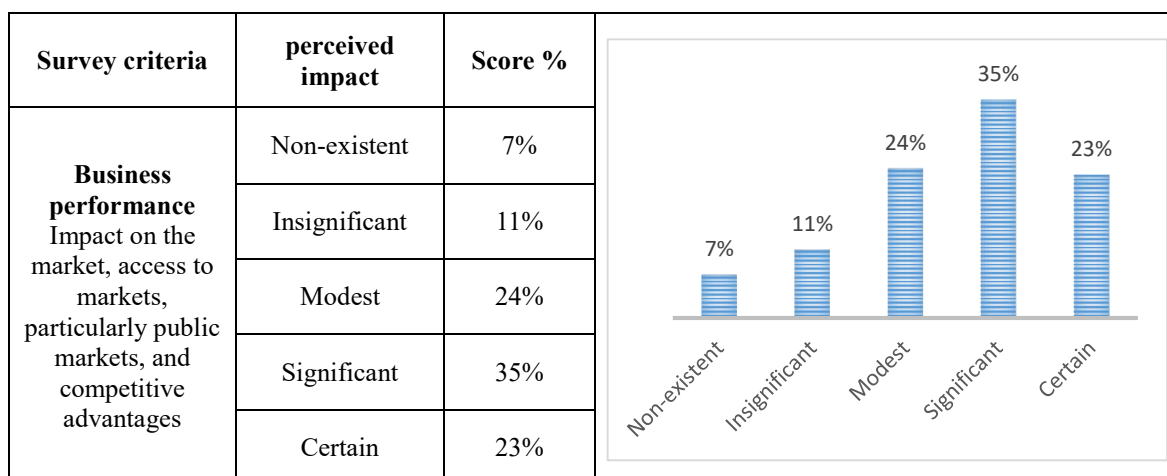
▪ Criteria « C6 » :



According to the scores recorded in this section (84%) between significant and certain, the implementation of the EMS has had a significant impact on the legal and regulatory aspect. In fact, the majority of respondents stated that this process had enabled the company not only to improve its legal and regulatory compliance, but also to monitor the development of this aspect through the application of the legal and regulatory monitoring procedure.

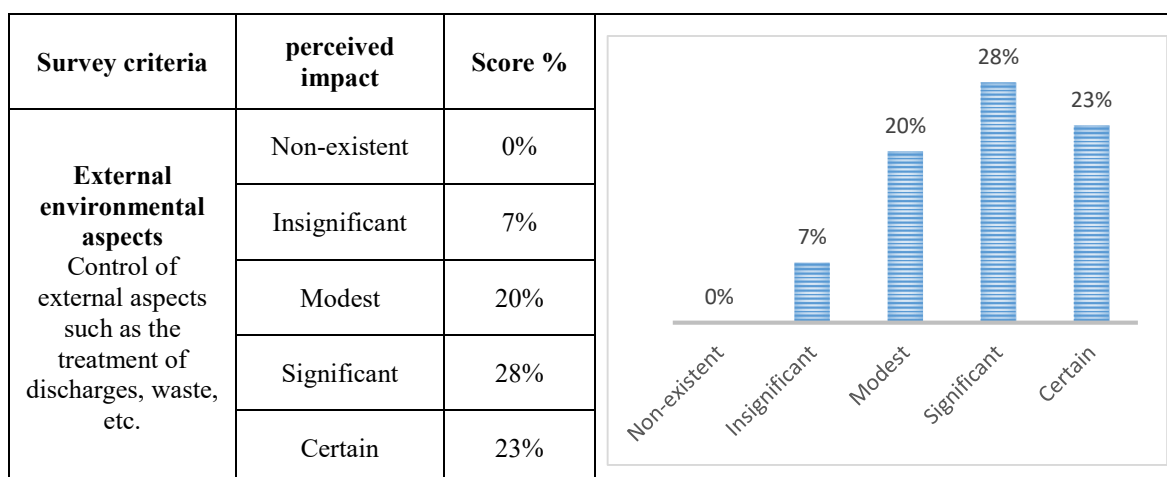
This confirms the aspirations of the International Organisation for Standardisation (ISO) regarding the positive impact of implementing the requirements of ISO 14001, in particular the chapter on this criterion.

▪ Criteria « C7 » :



The score of 58% between significant and certain does not express a strong conviction. Moreover, according to the various statements made, respondents seem to distinguish between two levels of impact of the EMS. Indeed, their response shows that they are convinced about the aspects of "access to markets, especially public markets, and competitive advantages", but only moderately convinced about the impact of the EMS on turnover. We can also understand from their response that the EMS provides the company with a certificate that is useful when bidding for contracts, but that the impact on sales returns or commercial contracts is not yet fully concrete.

▪ Criteria « C8 » :



This criterion scored almost as high as the C4 criterion. The score of 51% between "significant" and "certain" indicates the conviction of a part of the respondents, but not of the majority. On the other hand, 49% is the score of respondents who are little or not convinced of the veracity of this impact.

The respondents who openly expressed their opinion gave almost the same reasons as for the "C4" criterion, i.e. that in this area we need to be patient and continue to work to achieve a tangible impact.

## CONCLUSION

The recognition of ISO 14001 in international markets and its acceptance as a new contractual requirement depends mainly on the results expected from its implementation. This is the expectation of positive returns following its integration as a management system within companies. Like most International Standards Organisation standards, ISO 14001 has been developed to contribute to the internal and external performance of companies. It is in this context that we carry out our research, which aims to identify the impact of environmental certification on the environmental performance of companies in Ales.

We have attempted to provide some answers to this question through a field survey conducted on a sample of Algerian companies. Our conclusions are summarised below:

For criteria C1, C2 and C3, the scores reached levels above 70% and even 80%. These results allow us to conclude, at least partially, on the veracity of the impact of the implementation of the ISO 14001 EMS on the company's strategy, policies, responsibilities and orientations, infrastructures and working environment, as well as on the level of commitment and involvement of the employees in the company's project.

Criteria C5 and C6 also received high scores of 90% and 84% respectively. For the legal and regulatory compliance criterion, the impact appears to be tangible in the sense that it has enabled companies to better identify the environmental laws and regulations that affect them and to work towards complying with them. The marketing criterion scored highest. The impact on reputation, brand image and stakeholder relations appears to be real and very tangible for companies. This has been widely demonstrated (BOIRAL, 2003), in the sense that certification is seen as a strong marketing signal that can be perceived by interested parties (customers, suppliers, partners, etc.). It demonstrates the efforts made by the company and its laudable performance ambitions.

On the other hand, this effect seems to be less visible for criteria C4 and C8. On the For these aspects, the survey shows that the EMS does not directly contribute to the reduction of environmental aspects. This finding confirms many of the results obtained in other similar studies (Turki, 2014).

As for the impact of the EMS on sales performance. The results are questionable and not convincing. The survey does not show a link between the implementation of the EMS and commercial results, but it does show that the EMS contributes to improving competitive advantages, so the benefits may take time to materialise.

Finally, this research may have limitations, such as the small size of the samples and the potential for bias in the responses.

### Footnotes:

- 1) For ease of reading, we have converted the amount of capital into US dollars (the local currency is the Algerian dinar).
- 2) The Algerian population is either French-speaking or Arabic-speaking. The questionnaire was sent out in both languages.

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