

The environmental management system and its application impacts on the business economy in the eastern region of Morocco

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ABSTRACT

Nowadays, the environment occupies more and more a priority thought for the public opinion as well as for the local authorities, the administrations and the companies. Environmental management improves the performance of any organization towards the environment. In this perspective, our work consists in developing a dashboard grouping all the environmental indicators and which can have a direct or indirect impact on the economic performance of the company starting from the implementation of an environmental management system based on the ISO 14001 standard. This table can serve as an environmental decision support tool while also analyzing the results of monitoring. This approach, key for sustainable development, is encouraged by public authorities and Moroccan economic actors.

Keywords: Company, Environmental management system, ISO 14001 standard, Environmental scoreboard, Economic performance.

INTRODUCTION

Management solutions were proposed in recent decades for improving the enterprises' working and behavior regarding their relations to the natural environment (NE) (Alibeli & Johnson 2009; Potocan *et al.* 2016, Gonzalez-Rodriguez *et al.* 2016; Zhou *et al.* 2019). In the modern business world the integration of management standards, such as an environmental management system (EMS), has been widely regarded as an effective way for organizations to achieve social, environmental and economic business goals (Karapetrovic & Willborn 1998; Haddach *et al.* 2016; Gianni *et al.* 2017). The development of human activity modifies the environment, and these modifications directly threaten human activity: to protect the environment, and by the same to protect ourselves, we must be able to control the consequences of our activity on the environment. Companies, which are one of the links in the chain of human activity, must thus incorporate new criteria for protecting the environment in their operation. In the immediate future, this requires them to acquire new skills, to modify their organization, by integrating environmental concerns that until then have not existed. Ultimately, this implies a change in the culture of the company, which, from exclusively productive, must also become a citizen (Inyinbor Adejumoke *et al.* 2018; Jin *et al.* 2019). In Morocco as well as in Maghreb countries, researchers are developed to identify a totally human activity respectful of the environment. However, we can find ways to limit the environmental impact of certain economic activities or companies. The environmental management system is a process that allows to consider the interactions between business and the environment comprehensively (Daddi *et al.* 2011; El Hour *et al.* 2016; Laaraifi *et al.* 2017; Moisseron *et al.* 2018; Sahouane *et al.* 2019; Karmaoui 2019). The eastern region of Morocco is the second largest one of the kingdom in terms of surface size. It covers an area of 82,820 km² which means 11.6% of the country's total area. The region consists of Oujda-Angad prefecture and 6 provinces: Jerada, Berkane,

Taourirt, Figuig, Nador and Driouch. The population of the Oriental region amounts to 3,114,781 inhabitants according to the national census in 2014, of those, 2,314,346 inhabitants live in urban areas (Ministry of Energy, Water Mines and Environment, Department of the Environment, Report of the mission 1, 2 3-Study of the Integrated Environmental Assessment at the regional level Oriental-Morocco 2009, 2011, 2012, 2013). Our study presents the current context linking, companies to the environment, in Morocco. We present a case study in which we expose the experience of the EMS implementation within a company specialized in rail transport (ONCF) and in accordance with the ISO 14001 standard for the protection and enhancement of the environment.

Company / Environment Context

The environmental constraint on companies is no longer restricted to regulatory limitations, but is being extended to financial, economic or local pressures. In fact, these pressures are exerted by a multitude of interested parts as shown in Fig. 1. (Person M. 1998. Contribution to the methodology of environmental integration in SME: Assessment of environmental performance. Doctoral thesis, University of Lyon).

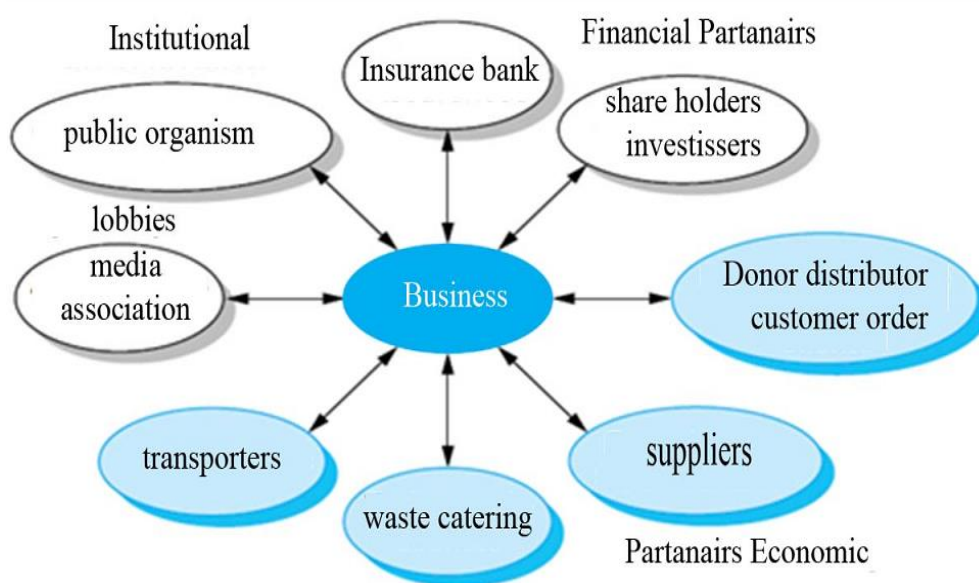


Fig. 1. Interested parties in relation to the company.

These are mainly: Economic partners: upstream (suppliers, subcontractors, carriers, etc.) or downstream (principals, customers, distributors, transporters, consumers, etc.).

Financial partners: investors, shareholders, banks, insurance companies.

Institutions: public authorities, tax authorities, local authorities, water agencies, etc.

Pressure groups: local associations, local residents' associations, consumer associations, environmental protection associations, media.

We must therefore consider the company as a complex system that exchanges, with these interested parties, certainly its products, but also flows of material, cash flow and information. These extended partners of the company have very different expectations (or requirements) for taking into account the environment and the information they wish to have. These requirements translate for the company as constraints, but also by opportunities. The stakes are of three types: regulatory, economic and strategic.

Regulatory issues

The company is subject to regulations defining standards on discharges, nuisances, sampling limits, requirements for controlling risks in hazardous installations.

The parties interested in these regulatory challenges are of an institutional nature, the main ones being the local authorities responsible for the inspection of classified installations. But other actors are also concerned by the respect of the regulation, without being in charge of its control, including shareholders, insurance companies, banks, local residents, nature protection associations.

Economic issues

The economic impact of the environment on business takes three forms: the cost of access to resources (consumption of raw materials and energy), the cost of compliance with regulations (risk reduction, storage facilities, process modification, effluent treatment, landfill, etc.), and environmental taxation (fees on water, waste, air emissions, etc). The interested parties concerned differ for each category. The entire eco-industry sector is concerned by the first two. The collection of taxes, or certain subsidies, is in the field of agencies. Local authorities can set fines for non-compliance. Of course, economic and financial partners are concerned with controlling environmental costs in the company.

Strategic issues

For the company, it about to integrate the environment so as to differentiate its products as well as its image, in order to gain market share. Economic partners and lobby groups are actors because the company's position in the market depends on them. All the other interested parties are concerned, the taking into account of the strategic stakes being guarantor of the durability of the company. Notably, the types of stakes are interlinked (Fig. 2): regulatory issues are parts of the economic stakes (non-compliance with the regulations involves fines or a work obligation), and the economic and regulatory issues are themselves strategic implications (non-compliance with regulations and lack of cost control invalidate the sustainability of the company).

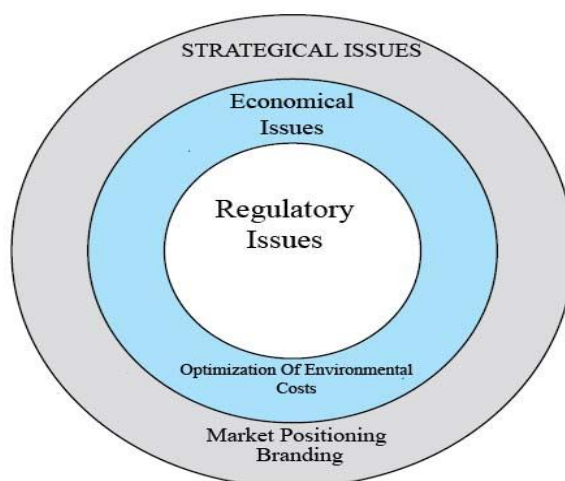


Fig. 2. Nesting Environmental issues.

Regulatory Policy

The company's relations with its stakeholders are regulated by four types of policies (Table 1) that play an interface role. The first two (regulatory and economic) are mandatory and the company cannot avoid them. The last two (contractual and managerial) are voluntary and often reflect the search for opportunities by the company; they are nowadays, a factor of differentiation in the market, but it is possible, in the long term, that they become conditions of access to the market.

Table 1. Regulatory Policy and Environmental Issues.

Kind of actions	Régulation politics	Application tools	Issues
Compulsory	Regulatory policy	Regulation	Regulatory : fines, penalties, operating license
	Economical policy	Taxation	Economic: cost control, competitiveness
Voluntary	Contractual policy	Labels produced (LCA)	Strategic: market share, branding, sustainability of the company
	Managerial policy	Site certification: ISO 14001 EMAS	Strategic: market share, branding, sustainability of the company

The four types of regulatory policies employed are different ways to achieve the same goal: bring environmental concern into the company. Mandatory policies and institutional actors are most present today for companies, but

the growing enlargement of stakeholders to financial and economic partners is leading to the emergence of policies of voluntary application. Table 1 summarizes the tools, issues and actors associated with each policy.

Application and case-study

As part of a case-study, we implemented an environmental management system (ISO 14001) through the following steps:

Site exploration;

The functions of the EMS;

Collection of environmental data;

Identification of Environmental Aspects (EA);

Evaluation and prioritization of EA;

Evaluation of regulatory compliance of EA;

The development of the environment manual;

Drafting procedures;

The elaboration of the environmental management project;

The elaboration of the environmental action plan;

The development and implementation of the training plan for the entire company staff.

Statement of the economic indicators of the company 1;

Application of procedures;

Implementation of the action plan; and

We finally studied the evolution of economic indicators before and after the implementation of the EMS.

RESULTS

Application and results

After developing the environmental indicators, we noticed a positive impact on the company's economic performance, particularly in terms of excessive expenditure reported at the energy level in this case: City water bill: 95% reduction in drinking water consumption (Fig. 3). Well water consumption: 10% reduction (Fig. 4). Electricity bill: 15% reduction (Fig. 5). The impact has been reported even in terms of solid waste thanks to the sorting operation that was adopted as well as liquid waste through the installation of a hydrocarbon separator to trap hydrocarbons suspended in wastewater that made it possible to decant the heavy materials and preserve the groundwater thereafter. Noise disturbance in the workshops comes mainly from the tests on locomotive engines stationed in front of the workshops. So that, a companion for measuring the noise emitted has been carried out in the surrounding environment of aforementioned workshops, which led to changes in engine test modes to reduce exceeding recorded in P1 and P2 areas as indicated in the aerial photo of the site (Fig. 6).

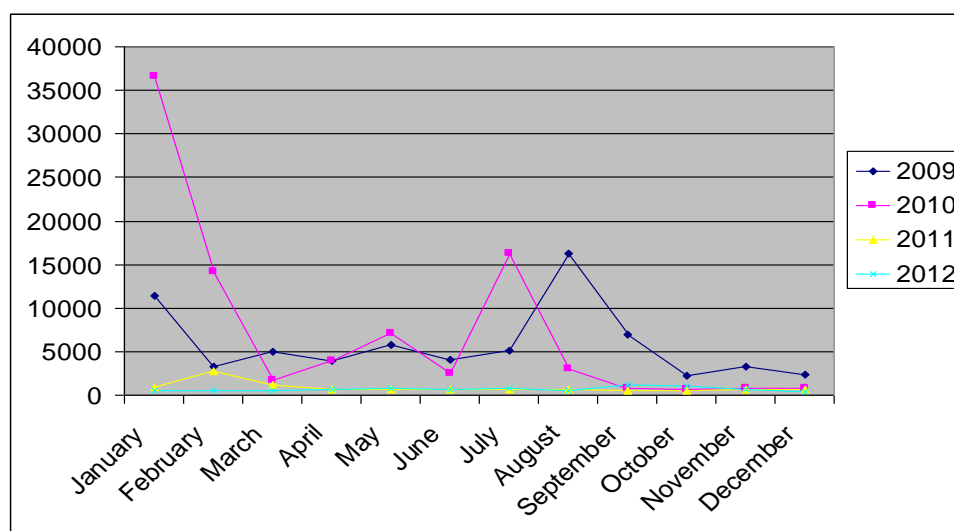


Fig. 3. City water consumption in m³ in different months.

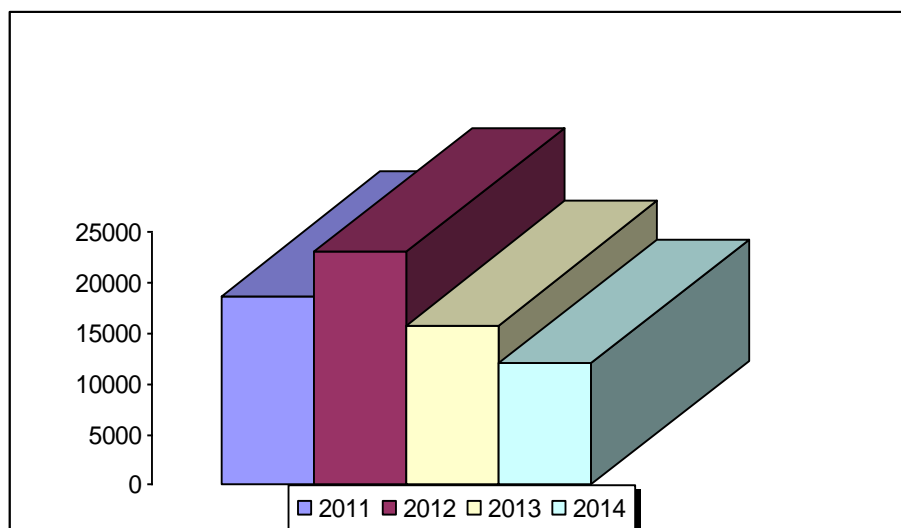


Fig. 4. Well water consumption in m³ during different years.

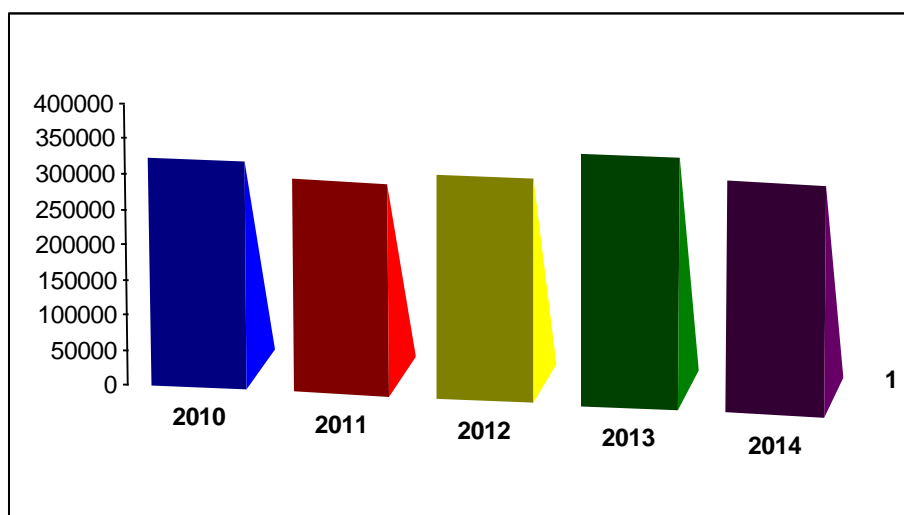


Fig. 5. Electricity consumption in KW during different years.

CONCLUSION

The environmental categories that have the greatest impact on society include: primarily water pollution, the lack of adequate drinking water and sanitation services as well as their impact on health (and particularly on diarrheal diseases in children) and secondarily, outdoor air pollution in major urban centers and indoor air pollution (and its particular impact on the health of women and young children).

In addition, the degradation of the coastline and the soil, as well as the less satisfactory waste management, also have an impact on the quality of life of the Moroccan citizens as well as on the natural resources of the country, hence the need to install a system guaranteeing a good management of the environment especially with companies. In 1995, the cost of environmental degradation in Morocco was estimated at 20 billion dirhams per year (20 million dirhams), a loss of GDP of 8.2%. For the Oriental region, this cost is estimated at 1.3 billion dirhams per year. This degradation is due to the many pressures on the environment generated by demography, industrial development, agricultural modernization and urban expansion, all compounded by the compartmentalization of environmental policies and sometimes inadequate legislation, unsuitable and obsolete. This is a situation which constitutes a real constraint for the general economic and social development of the country and the Eastern region in particular. The approach employed in our study is highly multidisciplinary and concerns the different industrial sectors of the Eastern region. It will enable companies to develop solid skills in the field of the environment notably in terms of rational use of resources, control of energy consumption, evaluation of environmental aspects, reduction and recycling of waste, use of renewable energies.

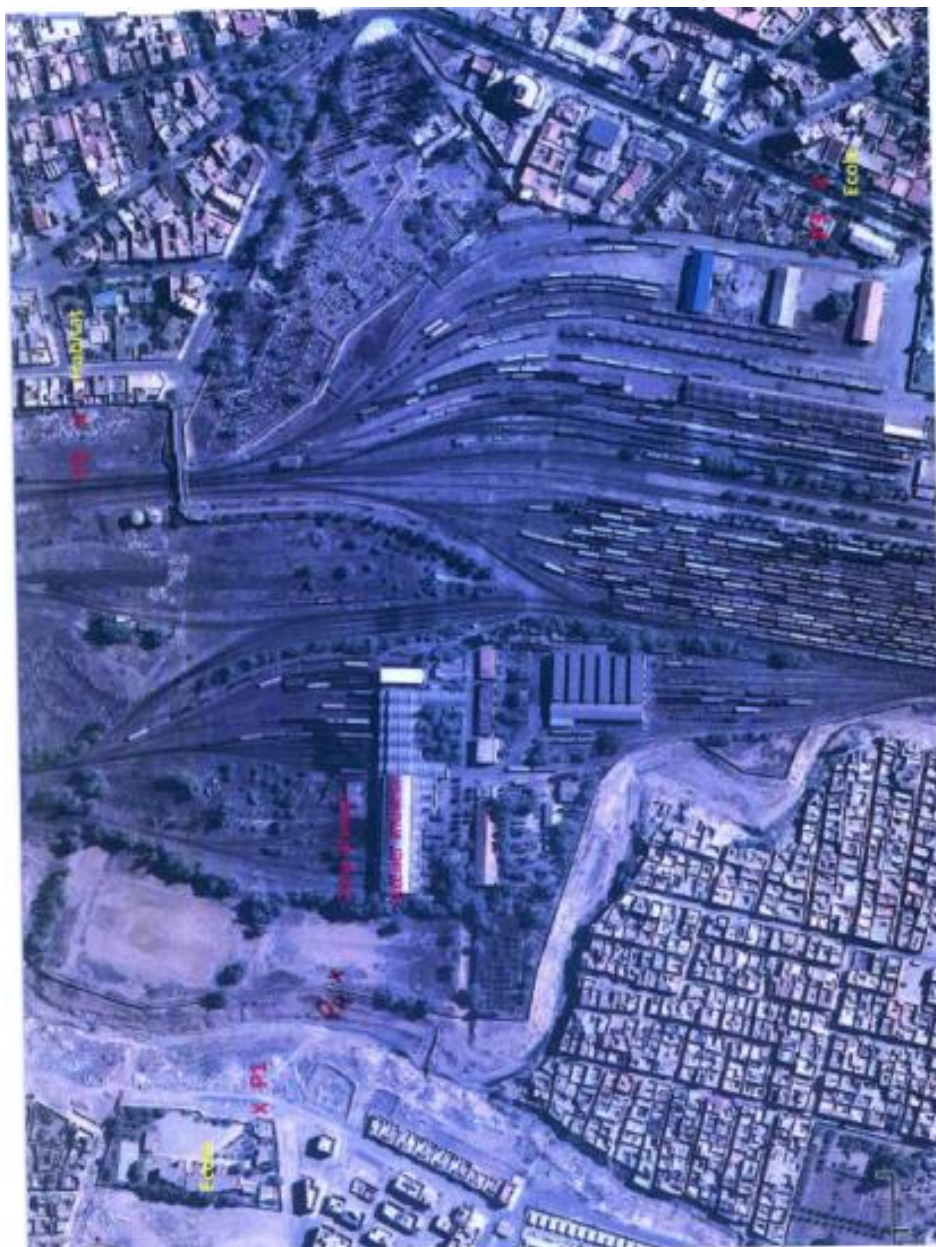


Fig. 6. Aerial photo showing areas of P1 and P2 sound overruns.

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روش مدیریت زیست محیطی و اثرات کارکرد آن بر اقتصاد تجاری در منطقه شرقی مراکش

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(تاریخ دریافت: ۹۸/۰۷/۱۰ تاریخ پذیرش: ۹۸/۱۱/۲۰)

چکیده

امروزه محیط زیست در ذهن افکار عمومی و همچنین، مقامات محلی، وزارتخانه‌ها و کمپانی‌ها اولویت بیشتر و بیشتری پیدا می‌کند. مدیریت زیست محیطی عملکرد هر سازمانی را به سمت محیط زیست بهبود می‌بخشد. از این نقطه نظر، مطالعه ما شامل توسعه یک داشبورد است که همه شاخص‌های زیست محیطی را گروه‌بندی می‌کند و می‌تواند تاثیر مستقیم یا غیرمستقیمی بر عملکرد اقتصادی کمپانی‌هایی داشته باشد که از شروع به اجرای یک روش مدیریت زیست محیطی بر اساس استاندارد ISO 14001 کرده‌اند. این تابلو به عنوان ابزاری حمایتی برای تصمیمات زیست محیطی عمل می‌کند و همچنین نتایج پایش را تجزیه و تحلیل می‌کند. این رهیافت به عنوان کلیدی برای توسعه پایدار توسط مقامات عمومی و فعالان عرصه اقتصادی تشویق می‌شود.

*مؤلف مسئول

Bibliographic information of this paper for citing:

Mdehheb, Z, Elkihel, B, Bouamama, M, Hammouti, B, Delaunois, F 2020, The environmental management system and its application impacts on the business economy in the eastern region of Morocco. *Caspian Journal of Environmental Sciences*, 18: 13_20

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