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## September 25-27, 2019

Edited by:
L. Zadnik Stirn • M. KljajiæBorštnar • J. Žerovnik • S. Drobne • J. Povh

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# SUSTAINABLE PRACTICES: AN ANALYSIS OF PORTUGUESE COMPANIES

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**Abstract:** The high level of industrialization of companies contributed to the increase of the environmental impacts on the environment and society. Aiming at evaluating the level environmental practices of a set of companies from the North of Portugal conducted the research based on questionnaires. The initial results show that most of the companies are in a progress stage regarding the implementation of measures and practices related to sustainability. The study allowed suggesting some implications for consulted companies, namely the need for effective mechanics to ensure compulsory but expedite environmental procedures along with its control which is a key factor to ensure sustainable and green practices.

**Keywords:** Green practices, sustainability, eco-growth, companies, Portugal, statistical analysis.

## 1 INTRODUCTION

In response to the urgent for sustainability in the industrial sector, strategies for environmental and social impacts must be considered. The sustainability strategies are traditionally based on the identification and evaluation of criteria which expose potential impacts on the three dimensions of sustainable development: social, economic and environmental [1]. On account, the globalization, advanced supply chains have become increasingly complex over the years. The sustainability concept has been launched in the green agenda for all industrial sector, aiming to incorporate sustainable strategies with a focus on reduction, or even elimination of the negative impacts generated by products and operational process on the environment [2].

Following the agenda of sustainability, environmental practices have been posted as an important player in companies to the development of sustainable strategies. For instance, a work developed by Rashidi and Cullinane [3] has investigated the sustainability of the operational logistics performance of different countries using the OCDE database as a sample. Also, Dey et al. [4] have investigated the development of initiatives towards sustainability in the field of the supply chain operations, identifying opportunities and providing recommendations for companies regarding the implementation of sustainability in the logistics.

Having in mind the importance of the company's activities as well their significant environmental, social and economic impacts attributed to these activities, the need for sustainable strategies to reduce these impacts emerge as a fundamental research topic. This paper aims to analyze the level of implementation of environmental practices in a set of companies from the North of Portugal.

To achieve the objective of this research, a review of the relevant existing literature related to sustainability and environmental practices was conducted. Then, the case of companies in the North region of Portugal was taken as a sample.

The paper is organized in five main sections, as outlined next. A review of the relevant literature related to sustainability and environmental practices was conducted in Section 2. Then, a method was chosen in order to assess the environmental management practices of the selected companies in the North of Portugal, in Section 3. Section 4 presents and discusses the main results; highlighting aspects such as enterprise category (micro, small, medium or large) environmental policies were analysed. Section 5 presents conclusions and identifies a direction for future work.

## 2 LITERATURE OVERVIEW

In recent decades, environmental assessment has become commonplace in planning and evaluation at all levels in different organizations. In manufacturing process industries attention has been paid to the environmental impacts of their processes and resulting products. At the forefront, as a pioneer with the scope of sustainability the well-known Bruntland Commission Report [5] defines sustainable development as the capacity of the current generations to meet their needs without compromising the capacity of achieving the same by the future.

Sustainability issues are mostly integrated with different functions of companies which already perceived these concerns as important aspects for their performance [6]. In the last few years, sustainability awareness has been introduced as a forefront subject for companies worldwide; it has been supporting companies towards addressing economic, social and environmental goals for society, additionally adopting common practices for the elaboration of sustainable practices [7].

The relationship between sustainable development and green business growth has gained increasing importance in the literature in the last years. The discussion about environmental strategies in industrial activities is growing in both academia and industries. For instance, the work developed by Aldakhil *et al.* [9] investigates the main determinants of integrated supply chain management for green business growth for BRICS (Brazil, Russia, India, and China) countries, considering some aspects such as economic growth and environmental policies.

Notwithstanding, the development of sustainable practices by companies has not been accomplished similarly by all industrial sector and countries worldwide. In spite of all these concerns, one of the main challenges to sustainable development in the industrial sector remains as how to apply this concept on their activities, contributing positively to environmental, social, and economic aspects.

Under such a background, this research aims to investigate the level of environmental practices implemented by a set of Portuguese companies, which could contribute to understand the actual scenario of sustainable practices in these companies.

## 3 METHODOLOGY

In order to achieve the objective of this research several stages were considered, namely (1) an analysis of the current literature on sustainable practices; (2) based on the literature review a questionnaire was designed in order to address the issue of sustainable practices; (3) a case study was chosen as a strategy to asses a set of companies; (4) one hundred and two companies were consulted through an online questionnaire (the sample was defined for convenience, due to time and budget constraints); then (5) a statistical was performed to and results and draw results and conclusions.

The steps carried out in this research was inspired in a previous work developed by Jabbour *et al*. [10], where quantitative methods were used to investigate primary data, which support

clear benefits to describe and to explore variables as well constructs of interest [11]. The design of the questionnaire is divided into two parts: one related to the companies' characterization, another concerning the measurement of environmental practices (Table 1). For the second part of the questionnaire, a five-point Likert scale was adopted as a tool to assess the company's performance. The scale comprises five levels of agreement, ranging from (1) "Not implemented" to (5) "Completely implemented".

*Table 1:* Level of implementation in the company of the practices of "Environmental Management"

| ***Question*** | ***Description*** |
|---|---|
| ***EM1*** | Clear environmental management policy |
| ***EM2*** | Environmental training for all employees |
| ***EM3*** | 3Rs (Reduction, Reuse and Recycling applied in water, electricity and paper) |
| ***EM4*** | Development of products with lower environmental impacts |
| ***EM5*** | Development of productive process with lower environmental impacts |
| ***EM6*** | Selection of suppliers based on environmental criteria |
| ***EM7*** | Environmental management system (ISO 14001 or others) |
| ***EM8*** | Voluntary disclosure of environmental performance information |

Regarding the sample, from the invited companies, 102 of them agreed to participate. They were asked to fill out the questionnaire designed through Google Docs forms, and all of them were completed without any irregularity.

## 4 ANALYSIS OF THE RESULTS

The main findings in this research are discussed below, considering a statistical approach using the software IBM SPSS version 24.

### 4.1 Sample characterization

The results related to the characterization of the companies are summarized in Table 2. The sample was made up of micro companies (up to10 employees, 32.35%), small companies (between 10 and 50 employees, 25.49%), medium size (between 50 and 250 employees, 16.67%) and large companies (more than 250 employees, 25.49%).

*Table 2:* Technical record of participating companies

| ***Dimension on the company*** | ***Percent*** | | ***Number of employees associated with logistics*** | ***Percent*** | | ***Turnover (in euros)*** | ***Percent*** |
|---|---|---|---|---|---|---|---|
| Micro | 32.35 | | [0;3) | 34.31 | | [0;100k) | 13.7 |
| Small | 25.49 | | [3;6) | 20.59 | | [100k; 250k) | 10.8 |
| Medium | 16.67 | | [6;9) | 5.88 | | [250k 500k) | 9.8 |
| Large | 25.49 | | [9;12) | 9.80 | | [500k; 1M) | 10.8 |
| | | | [12;15) | 1.96 | | [1M; 5M) | 18.6 |
| | | | 15 or more | 27.45 | | 5M or more | 36.3 |

Regarding the number of works associated, it is possible to observe that a large number of companies have up to three workers. The results also showed that a great number of companies had a turnover (by year), more than five million euros (36.3%).

### 4.2 Environmental management practices

Environmental impacts are one of the most important issues related to the production process in the industrial sector. In this direction, green practices are considered as key instruments to ensure the minimization of these impacts. The results presented in Table 3 compile a summary

of descriptive statistics associated with eight environmental practices proposed in this research. Results showed that all items were answered using the entire scale, meaning that the level of implementation of the environmental practices from the consulted companies are in different stages.

*Table 3:* Descriptive statistics for environment management practices

| *Environment managment practices* | *Min* | *Max* | *Mean* | *St. Dev.* |
|---|---|---|---|---|
| ***EM1*** | 1 | 5 | 3.45 | 1.087 |
| ***EM2*** | 1 | 5 | 3.28 | 1.146 |
| ***EM3*** | 1 | 5 | 3.40 | 1.017 |
| ***EM4*** | 1 | 5 | 2.77 | 1.342 |
| ***EM5*** | 1 | 5 | 2.78 | 1.302 |
| ***EM6*** | 1 | 5 | 2.51 | 1.391 |
| ***EM7*** | 1 | 5 | 2.45 | 1.558 |
| ***EM8*** | 1 | 5 | 2.61 | 1.415 |

The results also showed that the lowest averages are related to the environmental management system (EM7) and the selection of suppliers based on environmental criteria (EM6). These values can be explained by the fact of these measures carry a huge financial burden for businesses.

Nonetheless, for the first three items (EM1, EM2, and EM3), the highest means, which means that they are relevant to achieve environmental management practices. The standard deviation does not present great discrepancies between items.

Following this analysis, the results showed in Figure 1 present the intervals of 95% of confidence for the average answers of the companies. It confirms the results from Table 3, showing that the first measures have a higher level of implementation, while the latter is still starting.

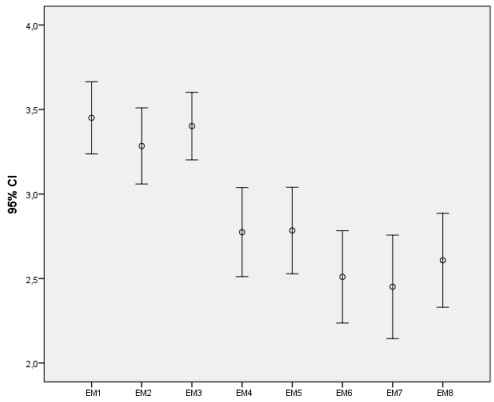


*Figure 1* - Confidence interval for environment management practices

Table 4 shows the correlation between environmental practices. For the cases of EM4 and EM5, they achieved the highest correlation coefficient (0.816). These relationships are considered as important measures for companies, because if the company take into account environmental concerns the design of product/service, the production process should takes into account green practices. For the case of EM1 and EM2, the results also show a high correlation (0.778). It can be justified by the fact of these companies have a clear environmental policy in place, also employees are involved in the company's policies.

*Table 4* - Matrix correlation between environment management practices

| Item | EM1 | EM2 | EM3 | EM4 | EM5 | EM6 | EM7 | EM8 |
|---|---|---|---|---|---|---|---|---|
| **EM1** | 1.000 | | | | | | | |
| **EM2** | .778 | 1.000 | | | | | | |
| **EM3** | .578 | .674 | 1.000 | | | | | |
| **EM4** | .403 | .467 | .553 | 1.000 | | | | |
| **EM5** | .468 | .565 | .619 | .816 | 1.000 | | | |
| **EM6** | .436 | .548 | .497 | .635 | .662 | 1.000 | | |
| **EM7** | .621 | .570 | .390 | .385 | .380 | .372 | 1.000 | |
| **EM8** | .425 | .478 | .558 | .511 | .620 | .615 | .350 | 1,000 |

For the environmental practices, the results show that it was considered as an important dimension to be addressed by companies, in order to develop strategic/finance policies, including green practices.

## 4.3 Environmental management practices by companies

Figure 2 presents the level of environmental management practices of the consulted companies, by the dimension. The results showed that the large ones are at the forefront regarding the implementation of environmental practices.

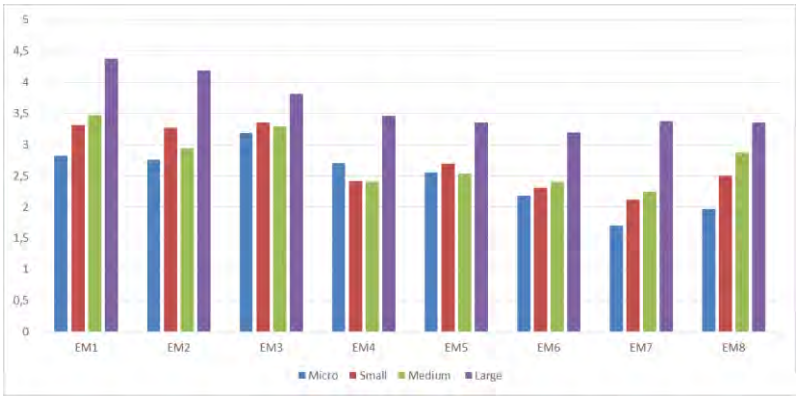


*Figure 2*- Average level of environment management practices, by companies' dimension

At the same time, it is possible to observe that for all companies, the last three environmental practices present the lowest scores; this fact could be associated with two important aspects, namely the lack of awareness about the benefits of implementing these practices; and also the lack of financial support to allow companies to be connected with green procedures.

To ensure the impact of these measures, a Kruskal Wallis test was conducted to examine the differences in environmental practices according to the types of companies inquired. All the assumptions of the test are assured [12]. The test showed that was a statistically significant difference exists in all the measures except in EM3 and EM5, with $p<0.05$, which means that there are significant differences of the stages of companies related with green issues, taking into account the dimension of them (Table 5).

*Table 5:* Kruskal Wallis Test (group variable: dimension of the company)

| | ***EM1*** | ***EM2*** | ***EM3*** | ***EM4*** | ***EM5*** | ***EM6*** | ***EM7*** | ***EM8*** |
|---|---|---|---|---|---|---|---|---|
| ***Chi-Square*** | 32,201 | 25,775 | 6,519 | 9,157 | 6,696 | 8,827 | 29,325 | 13,428 |
| ***df*** | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| ***Asymp. Sig.*** | ,000 | ,000 | ,089 | ,027 | ,082 | ,032 | ,000 | ,004 |

However, the 3Rs policy (EM3) is already a measure very common and the development of productive process with lower environment impacts (EM5) is also a huge concern related to the reduction of waste.

## 5 CONCLUSIONS

In this work, we addressed the contribution of sustainable practices for companies and sustainability. Recognizing the importance of these initiatives we proposed an analysis of the implementation of these practices taking a set of companies as a sample. Results from the literature confirmed that sustainable practices have led companies to develop environmental strategies, such as Green initiatives which have been contributing to companies save costs, meet compliance requirements, and also to create a sustainable network among customers.

From the companies consulted, the research showed that they have a long path to go toward implementation of sustainable practices, with few exceptions for large companies which have well-defined policies on sustainability field as economic resources to implement it.

Despite being an initial analysis, the results showed that for the consulted companies, environmental issues are not properly addressed and formalized by those. Finally, the results indicate that small companies face several berries to implement green actions, particularly the ones related to certification.

The study allowed suggesting some implications for Portuguese' companies. For instance, the need for effective mechanics to ensure compulsory but expedite environmental procedures along with its control is key factors to ensure sustainable and green practices of companies.

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