

Article

Environmental Management Systems in Micro and Small Enterprises: Case Study of Minimarkets in Federal District, Brazil

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ABSTRACT

The achievement of sustainable development depends on the actions taken by companies. Micro and small enterprises (MSEs) require special attention due to their large number and financial limitations for the adoption of green technologies. The objective of the study is to analyze the main difficulties of minimarkets in implementing an Environmental Management System (EMS), as well as to identify the benefits of this tool. This study collected data through personal interviews with the owners of 19 minimarkets in Federal District, Brazil. For data analysis, the following techniques were used: 1) Correspondence Analysis and 2) Content Analysis. Financial difficulties, lack of qualified human resources and lack of information about the EMS were the main difficulties of the mini-markets in Federal District to implement an EMS. The main benefits of this system were related to water and energy savings, reduction of waste of goods and improvement of the business image by customers. The main contribution of the work comes from the diagnosis carried out in minimarkets, which can support effective interventions for the environment.

Keywords: environmental impact; sustainable practices; oligopoly.

RESUMO

O alcance do desenvolvimento sustentável depende das ações adotadas pelas empresas. As micro e pequenas empresas (MPEs) demandam atenção especial devido ao seu grande número e limitações financeiras para a adoção de tecnologias verdes. O objetivo do estudo é analisar as principais dificuldades de minimercados para implementar um Sistema de Gestão Ambiental (SGA), bem como identificar os benefícios dessa ferramenta. Os dados foram obtidos a partir de entrevistas pessoais junto aos proprietários de 19 minimercados no Distrito Federal, Brasil. Para análise dos dados empregaram-se as técnicas: 1) Análise de Correspondência e 2) Análise de Conteúdo. Dificuldades financeiras, falta de recursos humanos qualificados e falta de informação sobre o SGA foram as principais dificuldades dos minimercados do Distrito Federal para implementar um SGA. Os principais benefícios desse sistema estiveram relacionados com a economia de água e energia, diminuição dos desperdícios de mercadorias e melhoria da imagem do negócio pelos clientes. A principal contribuição do trabalho decorre do diagnóstico realizado nos minimercados, podendo subsidiar intervenções efetivas em favor do meio ambiente.

Palavras-chave: impacto ambiental; práticas sustentáveis; oligopólio.



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Introduction

One of the greatest challenges that humanity has gone through is trying to reconcile economic development with environmental conservation. The urgency to address the issue led society to hold several meetings to debate and find possible paths, with the Stockholm Conference in 1972, promoted by the United Nations (Japiassú & Guerra, 2017). The way to address this problem has been the implementation of Environmental Management Systems (EMS) (Deb et al. 2022). EMS is an instrument that facilitates environmental performance management in firms (Lutfi et al. 2022), including energy accounting, water management accounting, material flow accounting, biodiversity accounting and carbon management accounting with the aim of enhanced financial and environmental performance (Shahzad et al. 2022). The challenge is to achieve environmental performance, not greenwashing, through economically viable actions.

Companies are mainly responsible for negative impacts on the environment, excessively using natural resources, deforesting forests and polluting soils, water and air, resulting in various consequences, including global warming (Barbieri 2015). Based on this problem the EMS were developed to try to lead firms to a healthier relationship with the environment, following the concept of sustainable development.

Sustainable development is that which seeks to meet the needs of the present generation, without compromising the well-being of future generations. For this, corporate environmental management is necessary, seeking to identify, understand and solve (manage/dominate) environmental problems, using science and technology, generating solutions and being able to apply them in the midst of political, economic, social and cultural contexts. According to Barbieri (2015, p. 18), "environmental management comprises the guidelines and activities carried out to achieve positive effects on the environment, that is, to reduce, eliminate or compensate for environmental problems and prevent others from occurring in the future".

To apply environmental management within companies, the EMS was created, which is a set of administrative and operational activities to address environmental issues related to companies. It involves a process of continuous improvement based on the PDCA (plan, do, check, and act) cycle. The EMS can be certified, including under international standards such as the International Organization for Standardization (ISO) 14.001 (Brazilian Association of Technical Standards – ABNT 2004). Given the uncertainty of the results of the EMS according to ISO 14.001:2015, Bravi et al. (2020, p. 2599) proposed the following research questions: "Which are the main motivations that pushed companies to implement an EMS based on ISO 14.001? Which are the main benefits and barriers encountered when adopting the standard ISO 14.001:2015?"

The EMS arose from society's reaction to the problems caused by organizations to the environment. The EMS is voluntary and can be applied to any organization, regardless of its size or industry. It is a tool for the entrepreneur to identify opportunities to reduce the impacts of the activities on the environment, bringing several benefits, including financial benefits to the company (Campos 2012).

In the current scenario, the EMS is more applied in large organizations, which generate more significant environmental impacts and have higher financial revenue, which facilitates its implementation and continuity. However, Micro and Small Enterprises (MSEs) are very numerous and, if added together, also have significant impacts on the environment. Introducing environmental management practices and tools, such as EMS, in MSEs can provide great advances for sustainable development (Aghelie 2017; Lutfi et al. 2023a; Voza et al. 2022).

The EMS in MSEs, in addition to improving the relationship between the company and the environment, can provide a change in the social culture on how we should deal with nature, given the capillarity and influence of these companies. Many benefits are foreseen with the implementation of the EMS in MSEs, but they present many difficulties in the implementation of the EMS, and its economic viability is questioned at first (Oliveira & Rigotti 2018).



Nowadays, “focus has been laid on SMEs and the promotion of practices that are environmentally friendly” (Lutfi et al. 2023b, p. 2). Consequently, much remains to be known about the type and nature of sustainability control in SMEs (Ghosh et al. 2019), reflecting the lack of empirical research on how SMEs use EMS (Gibassier & Alcouffe 2018). Based on a systematic literature review, Johnstone (2020, p. 2) points to the lack of studies about the implementation of EMS in SMEs and suggests research questions: “Why do SMEs adopt EMS? How are the internal management accounting and control processes affected by this? What are the performance effects in relation to EMS adoption and implementation?”

The objective of this study is to analyze the barriers to adopting an EMS in MSEs, specifically identifying the main difficulties of mini-markets in Federal District to implement this system and the benefits perceived by managers. Thus, contributing to the proposition of solutions to facilitate the implementation and continuity of EMS in MSEs.

The organization of the paper is as follows: in the next section, the literature on the topic is reviewed, based on the characteristics of MSEs and the factors that affect these companies to implement the EMS; this is followed by a presentation of the research method; the empirical results are then presented and discussed, after which their academic and practical implications are presented in detail.

Environmental Management Systems and Micro and Small Enterprises

MSEs have peculiar characteristics that directly interfere in their relationship with the environment. By understanding their reality, it is possible to adopt efficient strategies and solutions that will lead MSEs towards sustainable development, through the implementation and continuity of an EMS. With regard to the characteristics of MSEs, the figure of the owner or "owner" stands out, whose command, in general, is centralized. Thus, in general, MSEs have an informal management, scarce of organizational resources and low managerial quality, which directly affects their growth and their impacts on the environment (Leone 1999).

According to Brazilian Institute of Geography and Statistics (IBGE 2003, p. 20), the main characteristics of MSEs are:

1) Low capital intensity; 2) high birth and death rates; 3) high demographics; 4) strong presence of owners, partners and family members as a labor force engaged in the business; 5) centralized decision-making power; 6) close ties between the owners and the companies, with no distinction, especially in accounting and financial terms, between individuals and legal entities; 7) inadequate accounting records; 8) direct hiring of labor; (9) the use of unskilled or semi-skilled labour; 10) low investment in technological innovation; 11) greater difficulty in accessing working capital financing; and 12) a relationship of complementarity and subordination with large companies.

The General Law of MSEs (Complementary Law N° 123/2006) provides for and defines this segment according to revenue and number of employees (Chart 1) (Brasil 2006). The objective of this law is to foster the development and competitiveness of MSEs as a strategy for job creation, income distribution, social inclusion, reduction of informality and strengthening of the economy (Brazilian Micro and Small Business Support Service – SEBRAE 2014).

MSEs account for 30% of the Gross Domestic Product (GDP) and represent about 90% of Brazilian businesses (Leão, 2022). MSEs make exceptional contributions in that they "provide new jobs, introduce innovations, stimulate competition, assist large firms, and produce goods and services efficiently" (Longenecker et al. 1997, p. 34).

The EMS is rarely seen in MSEs, even though it is applicable to companies of all sizes and sectors. According to Brito et al. (2008), companies even understand the benefits of environmental management, however, in general, they have a reactive posture, with the exceptions being proactive innovation actions to



minimize impacts on the environment and differentiation with the environmental focus. For Mello et al. (2016, p. 69), there is a need for greater and better clarification on the importance of environmental management for MSEs, "since this public is unaware of the advantages of implementing actions related to environmental preservation or the minimization of environmental impacts".

Chart 1. Classification of MSEs

POSTAGE	SECTOR			
	Commerce and Service		Industry	
	Billing	Employees	Billing	Employees
Microenterprise	Up to 360 thousand /year	Up to 9 employees	Up to 360 thousand /year	Up to 19 employees
Small Business	From 360 thousand to 4.8 million /year	From 10 to 49 employees	From 360 thousand to 4.8 million /year	From 20 to 99 employees

Source: SEBRAE (2014)

The investigation of the reasons that lead a company or a person to adopt a new technology is well developed in the literature. Several studies have adopted the theoretical frameworks proposed by Tornatzky and Fleischer (1990) and Venkatesh et al. (2003), testing the Unified Theory of Acceptance and Use of Technology (UTAUT) (Franco & Almeida 2022; Recskó & Aranyossy 2024) and the Technology-Organization-Environment framework (TOE framework) (Lutfi et al. 2017; Chittipaka et al. 2023). A construct present in the theoretical frameworks mentioned is the benefit perceived by users in adopting a new technology.

Empirical findings indicate that perceived benefits significantly affect EMS adoption (Phan et al. 2018; Wang et al. 2019; Lutfi et al. 2023b). Phan et al. (2018, p. 667) recommends that "training should be provided to increase the understanding of EMS practices and their benefits". According to Lutfi et al. (2023b, p. 6) "if a firm is convinced that its adopted EMS practices will benefit its enhancement of economic and environmental performance, managers will focus more on EMS adoption".

As it has a centralized management, dealing with environmental issues in MSEs depends on the conception that their owners have in relation to the environment. Understanding the EMS as a tool that, in addition to helping the company comply with its obligations under the law, can increase productivity and enhance the organizational image of MSEs, is not yet the rule in the market. Based on a literature review, Peixe (2014) related the difficulties of implementing the EMS to: 1) Documentation, identification of environmental aspects, and team training; 2) Environmental information of suppliers; 3) Lack of trained human and technical resources; 4) Time and financial resources; 5) Lack of structure of companies and environmental agencies.

Materials and Methods

Area of Study

The neighborhood markets in Federal District, in general, are MSEs and are found in a high number in the satellite cities of the Brazil capital. These are companies that have a daily interaction with the population and the environment. Its activities are concentrated in the commercialization of various types of food, household utensils, cleaning and hygiene products, among others (Figure 1). Despite being a small business,



the operation of a grocery store can generate numerous environmental impacts, such as: generation of solid waste without proper treatment, liquid effluents, food waste, excessive use of water and electricity, handling and storage of chemical substances, among others.



Figure 1. Example of sampled companies. Source: Authors (2023)

The neighborhood minimarkets of Federal District fall under the District Law N° 5610/2016, on the responsibility of large solid waste generators in the Brazil capital (Distrito Federal 2016). The content of this law is in line with the observations of Andreoli (2002). The author emphasizes that reducing costs with waste mitigation, promoting the development of clean and cheap technologies, and recycling inputs are not only principles of environmental management, but also a condition for business existence in the market.

Survey data

The data were obtained by applying a semi-structured questionnaire to owners of the grocery stores. The questionnaire was applied in person. The sample reached was 19 grocery stores, all characterized as MSEs, distributed throughout Federal District. The sample is characterized as convenience. Figure 2 shows the profile of the sample according to annual revenue and number of employees. Around 60% of the sampled establishments were characterized as micro enterprises and 40% as small enterprises.

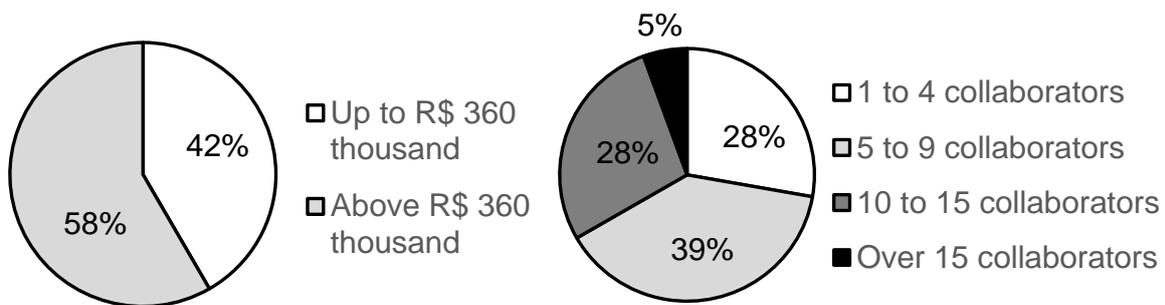


Figure 2. Sample Profile. Source: Authors (2023)



The questionnaire was designed with the objective of transforming desired information into questions, motivating and encouraging the interviewee, and minimizing response errors. Initially, segmentation questions were asked, as shown in Chart 2, allowing the research to focus only on companies characterized as MSEs.

Chart 2. Segmentation questions

- 1) Does your company have an Environmental Management System (EMS):
yes () no ()
- 2) If not, have you heard about EMS: yes () no ()
- 3) How many employees does your company have: _____
- 4) Revenues up to 360 thousand/year () Revenues from 360 to 4.8 million/year ()

Source: Authors

Then, only for the establishments characterized as MSEs, the entrepreneurs pointed out the difficulties in implementing an EMS, considering 10 aspects pointed out in the literature (Campos 2012; Peixe 2014; Tavares & Guedes 2023). The owners of the MSEs indicated the degree of relevance for each difficulty within a scale with 5 (five) attributes: 1) Not Relevant (NR), 2) Not Slightly Relevant (PR), 3) Relevant (R), 4) Very Relevant (MR) and 5) Extremely Relevant (ER) (Chart 3).

Chart 3. Difficulties in implementing EMS and measurement scale

5) Difficulties	Degree of Relevance
Financial Difficulties – Dfin	(1) NR (2) PR (3) R (4) MR (5) ER
Management disinterest – DeGes	(1) NR (2) PR (3) R (4) MR (5) ER
Lack of environmental awareness – FCamb	(1) NR (2) PR (3) R (4) MR (5) ER
Lack of information – Finf	(1) NR (2) PR (3) R (4) MR (5) ER
Lack of infrastructure – Finfra	(1) NR (2) PR (3) R (4) MR (5) ER
Lack of qualified human resources – FRHum	(1) NR (2) PR (3) R (4) MR (5) ER
Bureaucratic difficulties – Dbur	(1) NR (2) PR (3) R (4) MR (5) ER
Improper and obscure legislation – LIObs	(1) NR (2) PR (3) R (4) MR (5) ER
Difficulty in measuring results – DMRes	(1) NR (2) PR (3) R (4) MR (5) ER
Difficulty in Continuity – Dcont	(1) NR (2) PR (3) R (4) MR (5) ER

Source: Authors

At the end of the questionnaire, in an open question, the main benefits, in the owners' view, of implementing an EMS were asked (Chart 4).

Chart 4. Insight into the main benefits of an EMS

- 6) In your opinion, the implementation of an EMS can bring what benefits to your company:

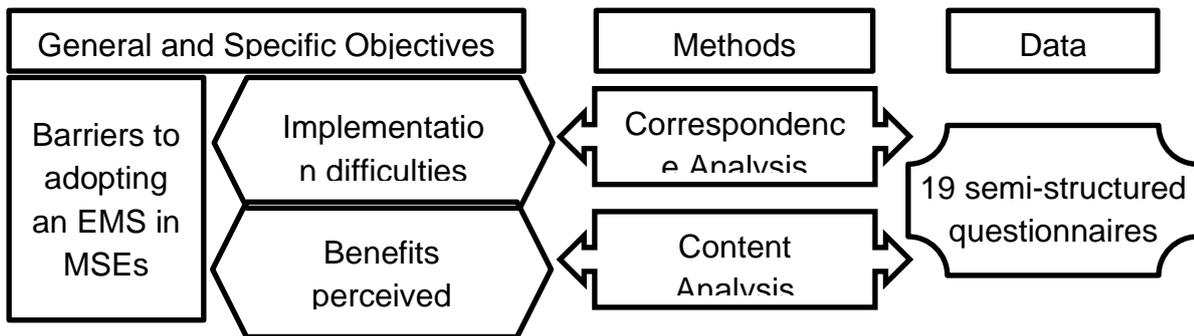
Source: Authors

Analytical Instruments

To interpret, analyze and discuss the information obtained by the questionnaires, the following methods were used: 1) correspondence analysis, to identify the main difficulties in implementing the EMS in MSEs and 2) content analysis by Bardin (2011), to analyze the benefits of the EMS in MSEs (Chart 5).



Chart 5. Research Summary



Source: Authors

Correspondence analysis examines the relationship between variables and attributes, approximating them according to a measure of distance, thus simplifying the data by creating homogeneous groups necessary to describe them in a perceptual map (Pestana & Gageiro 2014; Hair et al. 2009). The calculations used in the correspondence analysis can be followed in Valentin (2012), the *software* used was SPSS version 20.

Content analysis is considered one of the techniques for data analysis in research with a qualitative approach, Bardin (2011, p. 47) defines it as:

A set of techniques for the analysis of communications in order to obtain, through systematic and objective procedures for describing the content of messages, indicators (quantitative or not) that allow the inference of knowledge related to the conditions of production/reception (inferred variables) of these messages.

Bardin (2011) summarizes the process of content analysis in three phases: 1) pre-analysis, 2) exploration of the material, and 3) treatment of the results: inference and interpretation. The pre-analysis consisted of reading all the content of the messages, just to get to know the material. In the exploration of the material, the messages are interpreted and classified into common units of record (codes), reducing and simplifying the data. In Statistical analysis of the frequencies was performed according to the composition of the recording units.

Results and Discussions

Difficulties in implementing an EMS

Figure 3 shows the degree of relevance of the difficulties that affect the implementation of an EMS in the minimarkets of Federal District, as perceived by their owners. Within the circle are the extremely relevant difficulties (financial difficulties and lack of qualified human resources) and the very relevant ones (lack of information on EMS). Clustered in the square are the difficulties considered as relevant, they are: lack of interest from senior management, lack of adequate infrastructure and bureaucratic difficulties. Figure 3 characterizes the legal barriers to implementing the EMS as not very relevant and operational difficulties and lack of environmental awareness as not relevant, although dispersed around the PR and NR attributes. Chart 6 summarizes the results of Figure 3, facilitating understanding of the results.

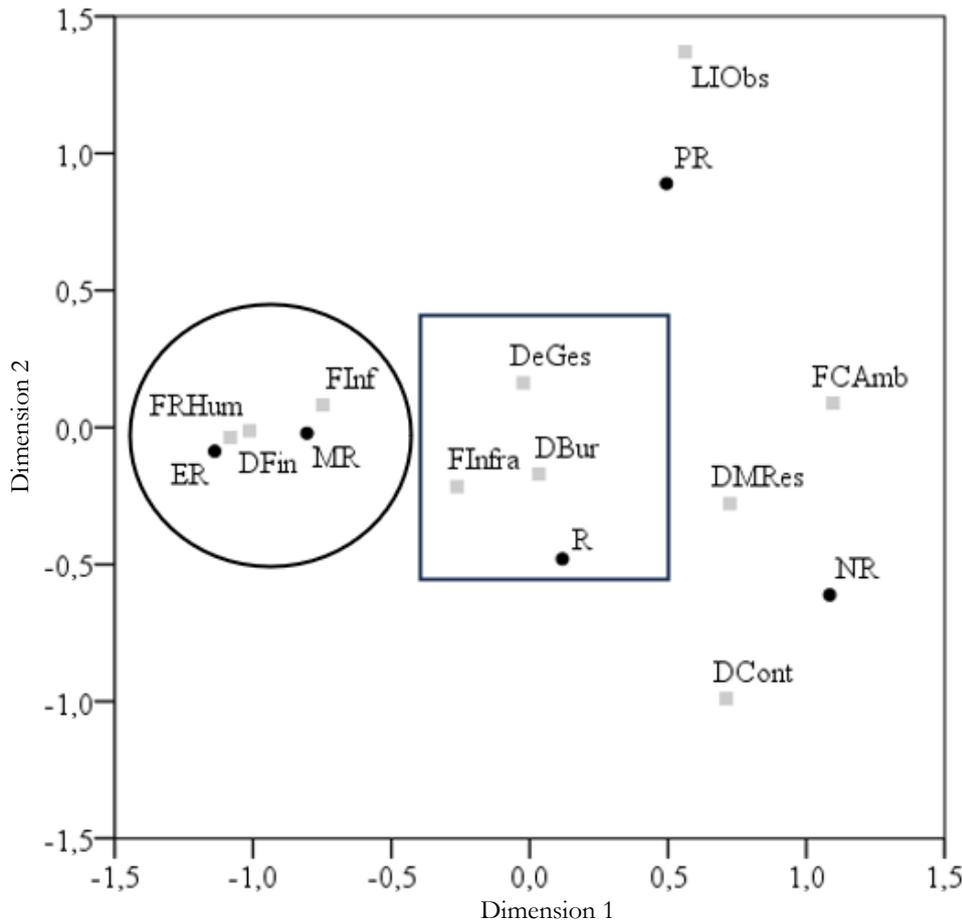


Figure 3. Perceptual map - degree of relevance of the difficulties affecting the implementation of the EMS. Source: Authors (2023)

Note: Attributes: Extremely Relevant (ER); Very Relevant (MR); Relevant (R); Not Very Relevant (PR); Not Relevant (NR). Variables: Financial Difficulties (DFin); Lack of Information (FInf); Management Disinterest (DeGes); Lack of Environmental Awareness (FCAmb); Lack of Infrastructure (FInfra); Lack of Qualified Human Resources (FRHum); Bureaucratic Difficulties (DBur); Improper and Obscure Legislation (LIObs); Difficulty in Measuring Results (DMRes); Continuity Difficulty (DCont).

Chart 6. Degree of relevance of the difficulties affecting the implementation of the EMS

Extremely or Very Relevant	Relevant	Little or Not Relevant
Financial Difficulties	Lack of Infrastructure	Improper and Obscure Legislation
Lack of Qualified Human Resources	Bureaucratic Difficulties	Lack of Environmental Awareness
	Management Disinterest	Difficulty in Measuring Results
Lack of Information		

Source: Authors

The results reflect the reality of many MSEs, indicating financial difficulties, lack of qualified human resources and lack of information about EMS as the main difficulties encountered by mini-markets in Federal District to implement an EMS. The results reflect the great difficulty of MSEs in dealing with environmental issues and implementing an EMS, and the presence of this tool in these organizations is very rare. Especially in micro and small companies, the difficulties in implementing an EMS are maximized due to the lack of knowledge of environmental management practices on the part of entrepreneurs, the absence of planning



practices, the reduced financial power in which they work, and the lack of incentives from the government and support institutions (Paz et al. 2009).

De Paula et al. (2022) and Dasanayaka et al. (2022) corroborated the results, highlighting the following factors as limiting for sustainable practices in MSEs: shortage of financial resources; absence of support for the implementation and difficulties in persuading everyone to participate. The authors identified that the main sustainable practices adopted by MSEs were related to saving water and energy, reducing and treating waste and better use of materials. Yusoh and Mat (2020, p. 31) shows that "financial barrier, informational barrier and institutional barrier significantly influence EMS adoption among the hotel companies in Malaysia". Voukkali et al. (2017) identified that employees' awareness and skills were decisive to Implementation of an EMS in a Bakery-Confectionary Industry in Cyprus.

According to Campos (2012), environmental management models and systems present complex steps with high costs for small companies or, when simpler and more applicable, present restrictions regarding extension and competition. The author reflect that although traditional EMS models are designed for large companies, there is room for the construction of models suitable for the reality of small companies. Pereira et al. (2021) concluded that the environmental practices with the highest incidence in MSEs correspond, on a decreasing scale, to saving electricity, providing/encouraging the use of mugs to drink water/coffee, selective waste collection and saving water of rain for cleaning.

The lack of interest of the management (owner) was also evident in the results. With little knowledge about EMS and several financial and structural difficulties, it is expected that most owners of MSEs will not have environmental care as a priority and/or differential. According to Barbieri (2015), Singh and Sarkar (2019), a paradigm shift is needed in MSEs. The solution of environmental problems, or their minimization, requires a new attitude from entrepreneurs and administrators, who must include and take into account the environment in their decisions and adopt administrative and technological concepts that contribute to expanding the planet's carrying capacity. In other words, companies are expected to stop being problems and be part of the solutions, and experience shows that this attitude hardly arises spontaneously. Knowing the characteristics, their context and the difficulties of MSEs, Barbieri (2015) states that it is possible to design more efficient strategies to solve and minimize environmental impacts, through an EMS aligned with the size of the company.

On the other hand, the operational difficulties in continuing and measuring the results of the EMS, according to the results, are perceived as a not very relevant difficulty. Possibly, this perception is related to the simplicity of management of MSEs and also to their less complex relationship with the environment and easier to understand and control, being mainly related to aspects inherent to water and energy consumption and garbage disposal.

The barriers most frequently mentioned in the literature faced by SMEs while adopting EMS belong to the "organizational, managerial and attitudinal aspects, training and skills development, informational and financial categories" (Alayón et al. 2022, p. 21). Alayón et al. (2022, p. 22) warn of barriers that are difficult to mitigate: "difficulty quantifying the financial performance of environmental investments, traditional financial accounting systems excluding environmental costs; frequent changes in environmental regulations; absence of single authoritative body interpreting EMSs and corruption".

Contrary to the conclusions of Mello et al. (2016), the results suggested that the lack of environmental awareness of minimarket owners was not among the most relevant difficulties for the implementation of the EMS. The entrepreneurs consulted perceive the benefits of the EMS and showed concern for the environment, but do not present a really proactive stance with environmental issues, either due to financial or human resources constraints and/or lack of information.



Benefits of implementing an EMS

Figure 4 shows the main benefits that an EMS can bring to mini-markets from the point of view of their owners. Of the 19 responses (100%), only 3 (three) entrepreneurs answered that they do not see any benefit from the implementation of an EMS (Figure 4).

The vast majority of entrepreneurs (84% of respondents) recognized the benefits of implementing an EMS in their companies, all of them pointing out the possibility of cost reduction in their answers. These results are in line with Tavares and Guedes (2023), Wong et al. (2020), Zimon et al. (2022) and Bresciani et al. (2023), concluding that the EMS allows small companies to achieve environmental excellence, process optimization, reduction of waste costs, distribution, energy and material consumption, thus improving their image with customers, investors, suppliers, and regulatory entities. Even so, within the sample studied, as much as they recognize some benefits, the entrepreneurs of the minimarkets understand little about how the EMS can contribute to their business and also realized that this contribution may not compensate for the costs of implementation.

According to Lutfi et al. (2023b, p. 14), EMS assists MSEs “in obtaining competitive advantage, cost savings, cost wastage reduction, operational efficiency, saving costs, increasing revenues, and enhancing the overall corporate environmental performance”. From an empirical study with 4.292 companies, Ronalter et al. (2023) concluded that firms with EMSs accomplish statistically significant higher ESG scores than companies without such management system. ESG scores are provided by specialized rating agencies and measure benefits in environmental, social and governance terms.

The lack of information about EMS, pointed out as very relevant in Figure 3, contributes to the lack of knowledge of the tool, reflecting the lack of environmental education in various areas of society, including those involving MSEs. One way to mitigate this problem is to promote training, demonstrating the benefits of the EMS, by development and training agencies such as the SEBRAE.

Contrary to Bravi et al. (2020) and Pesce et al. (2018), another relevant result was the fact that none of the interviewed landowners mentioned the contribution of the EMS in complying with environmental legal requirements, even though they are increasingly intense and restrictive, which demonstrates the voluntary nature of the tool. The divergence among the results can be explained by analyses in different contexts, Brazil compared to Italy and China. A concern expressed by society stems from the fact that an increase in environmental restrictions may benefit large companies and bring problems arising from market concentration, given the greater financial and technological capacity of large companies to meet these restrictions.

Inoue et al. (2013) identified that the increase in environmental technologies investments is correlated with concentrated markets, occurring mainly in oligopolistic structures. The authors concluded that companies with few competitors can direct resources to research in environmental development in a long-term perspective, given that these companies do not need to compete within aggressive competition in the short term. Paiva et al. (2019) found no statistically significant difference in the economic results between MSEs with more and less socio-environmental responsibility practices, suggesting a difficulty in obtaining financial returns from green actions in MSEs.

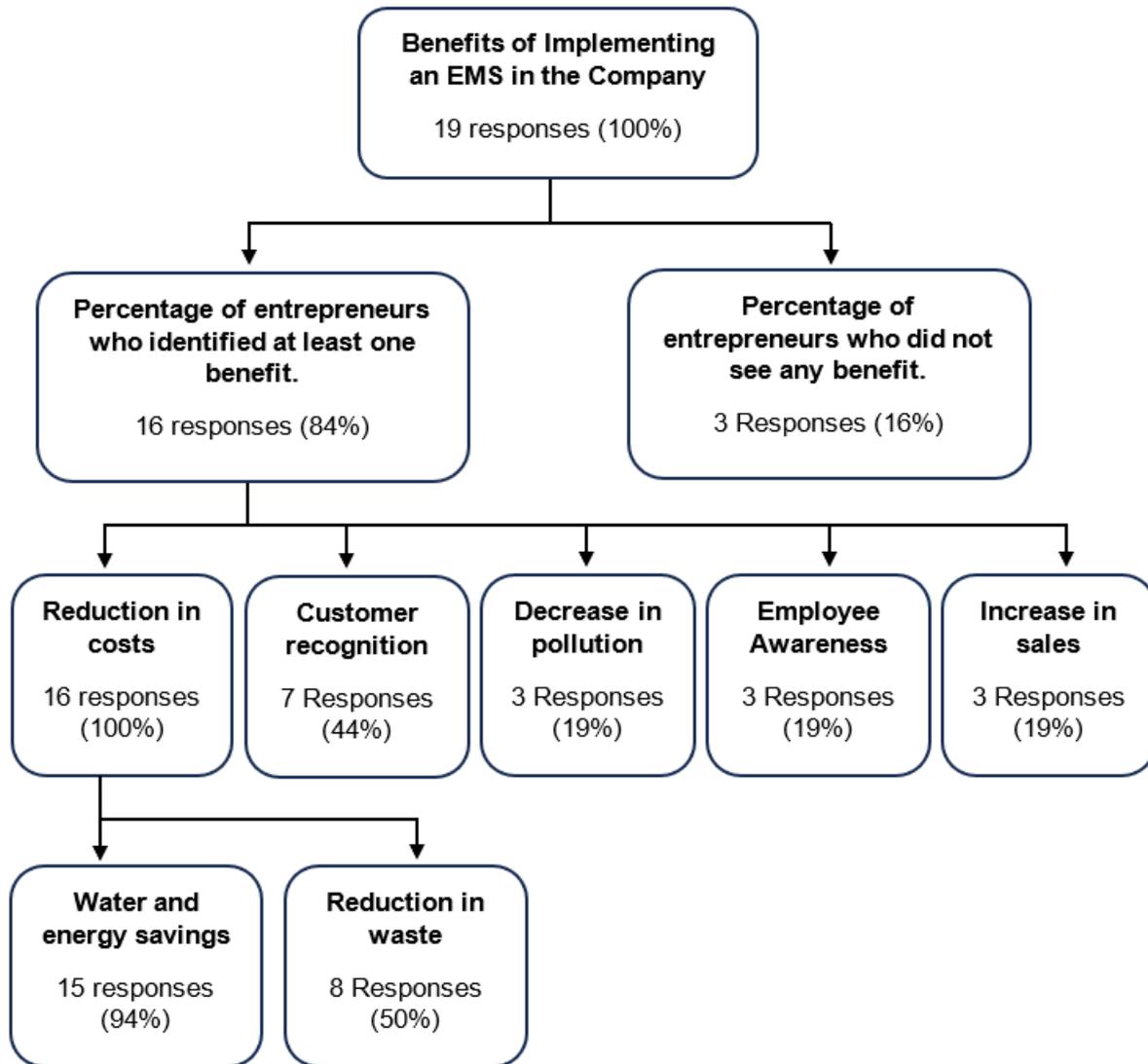


Figure 4. Key Benefits of Implementing an EMS. Source: Authors (2023)

The environmental awareness of the interviewees and the recognition of the benefits of the EMS indicated an opportunity that can be exploited in the implementation of the EMS. The absence of resistance and/or prejudice facilitates the dissemination of the tool, which can help MSEs to remain in the market, improving their environmental performance, their organizational image and, therefore, increasing their competitiveness. Environmental pressure is growing and the adjustment of MSEs in the adoption of sustainable practices can be a matter of survival.

Conclusions

The EMS promotes environmental management within companies, aggregating isolated environmental actions in order to provide synergies in order to achieve broad and effective environmental results. Despite its potential, there are criticisms regarding its viability for micro and small businesses. In this context, the objective of this work is to identify the main difficulties of mini-markets (micro and small) in the implementation of the EMS, as well as to analyze the benefits of this system in the perception of entrepreneurs of MSEs.

The main difficulties to implement the EMS in MSEs were related to the lack of knowledge of the tool, financial constraints and human resources for its implementation. The solution to the financial difficulties and



lack of qualified human resources requires the creation of public incentive programs for MSEs to adopt sustainable practices, granting subsidies, differentiation and/or tax exemption.

It can be seen that the main difficulties in implementing the EMS are consistent with the reality of MSEs. Based on the knowledge of these difficulties, it is possible to propose appropriate solutions and strategies to facilitate the implementation of the EMS in these organizations.

The adoption of low-cost, sustainable practices, which do not necessarily require skilled labor and high investment, can make a difference in MSEs. Developing a more efficient work method, making the most of resources and avoiding waste, can reduce the consumption of water, energy and raw materials, resulting in gains in productivity, competitiveness and profit. The recurrent adoption of these practices becomes a habit, internalizing within the company and modifying its organizational culture.

Although the number of companies that participated in the research is small when compared to the universe of MSEs in Federal District, it is considered that this research can contribute to explore a theme that is little addressed, since the EMS mainly permeates the environment of large organizations. It should also be noted that this investigation in no way exhausts the subject, it only aims to bring elements that can contribute to the advancement of micro and small companies in the search for a more balanced relationship with the environment.

It is also possible to conclude that it is necessary to bring to the attention of entrepreneurs of MSEs the existence of the EMS, showing its applications and its benefits. Although the benefits are perceived by entrepreneurs, there are still doubts about the cost/benefit ratio in the implementation of the EMS. One way to introduce the EMS in MSEs stems from the clarification that the tool acts in an integrated manner with other management actions employed by the company. In addition to presenting environmental solutions and opportunities, the tool helps the management of the business as a whole, as it adopts instruments and strategies within the PDCA cycle. Therefore, one of the advantages that an EMS can provide is the possibility of integrating environmental management into the overall management of the company, making actions in all areas and levels of decision more effective, as duplicate or conflicting efforts are avoided.

The limitations of the research are related to the sample size and the use of exclusively qualitative data. Further research is suggested to assess the difficulties and benefits of EMS in MSEs through quantitative techniques with metric data.

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