Environmental Management System Implementation in MSMEs: A Literature Review

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Abstract
The amount of MSMEs units about 99.99 percent of the overall number of business operators in Indonesia showed that MSMEs play a significant role in economic growth and development. At the same time, MSMEs cumulative contribution to environmental issues is not recorded MSMEs participation in the cleaner environment has not yet been noticed. Thus, the environmental management system for MSMEs is crucial. This study is a literature review about the implementation of the ISO 14001 environmental management system in MSMEs, challenges and its future potential. The result and discussion discussed the case study of ISO 14001 implementation in Indonesia and other countries. Case studies from Indonesia and other countries showed that implementation of ISO 14001 is possible for MSMEs. The biggest challenges of its implementation is cost, the competence of employees, and resources available for the organization. An alternative for overcoming these challenges is implementing other models of EMS that is more suitable for MSMEs. The important aspects is the environmental awareness of the stakeholders and the internal and external drivers within the organization. Further studies can be done to research specific case studies of EMS such as ISO 14001 or AMEMs implementation in MSMEs.

Keywords: MSMEs, EMS, Environmental Management System, ISO 14001.

1. Introduction

Environmental Management System is defined as “a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency” [1] EMS helps organizations to comply with environmental regulations and achieve environmental goals, such as energy conservation in an economical way. EMS is a voluntary instrument that can affect an organization’s environmental behaviour [2]. Generally, there are three environmental policy tools: “direct regulations, economic instruments, and soft or voluntary instruments” [2] With the current social trends, there is an increase of public pressure on the image of a company. Especially in the issue of environmental compliance and sustainability. Considering the cost savings and other benefits, environmental responsibility can give competitive advantage [3].
The concept of EMS is first initiated in the Earth Summit that was held in 1992 in Rio de Janeiro [4]. In recent years, there is an increased attention on environmental issues and the threat of climate change from greenhouse gas emissions. This led to the creation of policies that support business operation that are environmentally accountable [5]. EMS has the benefits of controlling waste and cost that is produced by the company, improve energy efficiency, and boost the image of the company. This tool helps organizations to identify, manage and evaluate environmental impacts within the organizations [6]. The main principles of EMS is planning, implementation, evaluation, and corrective action [7].

**ISO 14001**

ISO 14001 is an international standard that is developed by the International Organization for Standardization that focus on Environmental Management Systems (EMS). This ISO gives a guideline to help organisations improve their environmental performance [4]. A research in Korea found that compared to un-certified facilities, ones that certified with ISO 14001 emits less pollutants [8].

| Pollutant emissions of both groups | Number of Case | Mean (kg) | Standard deviation (kg) |
|----------------------------------|---------------|----------|------------------------|
| Group                            | Number of Case | (kg)     |                        |
| ISO 14001-certified facilities   | 22 (176)       | 15519.66 | 2271.34                |
| Non-certified facilities         | 52 (416)       | 18302.53 | 2396.84                |

| Production index of both groups  | Number of Case | Mean (kg) | Standard deviation (kg) |
|----------------------------------|---------------|----------|------------------------|
| Group                            | Number of Case | (kg)     |                        |
| ISO 14001-certified facilities   | 22 (176)       | 25.8     | 1.57                   |
| Non-certified facilities         | 48 (384)       | 25.13    | 1.17                   |

Source: K. Baek (2018)

At ISO 14001:2015 there are a total of 10 clauses. The first three clauses are information clauses, which are, Scope, Normative Reference, Term and definition. While the remaining clauses are indicators of the assessment, i.e. Context of organization, Leadership, Planning, Support, Operation, Performance Evaluation, and Improvement [10]. Context of organization indicator identifies the needs, scope, expectation and stakeholders that are involved in the organization. Leadership refers to the support and responsibility of the higher ups of the management in the implementation of ISO 14001. Next, in planning the environmental goals, opportunities and risks is assessed. The indicator of support refers to the competencies of the members of the organization to support the implementation of ISO 14001. The clause of operation guides organization to initiate, apply and control the processes involved so it complies with the EMS requirements.

As an effort of implementing sustainable development goals in Indonesia, it was stated in Presidential Regulation No. 59 of 2017 that one of the strategy to achieve target 12.6 is by increasing the amount of companies in Indonesia that implement ISO 14001 Environmental management system [11].

**SME definition and SME in Indonesia**

MSMEs are Micro, Small and Medium Enterprises. Micro Business is a productive business owned by individuals and individual business entities. Small Business is a productive economic business that is carried out by individuals or business entities that are not subsidiaries. Medium Business is a productive industrial business that stands alone, which is carried out by a business entity that is not a subsidiary or a branch of a company that is given, controlled, or become a part. In Indonesia, MSME stipulates in the Law of the Republic of Indonesia Number 20 of 2008 concerning Micro, Small and Medium Enterprises. In Chapter VI, Article 20, The Government and Regional Government provide business development by offering incentives for Micro, Small and Medium Enterprises to develop technology and environmental sustainability [12].

According to BPS data, the number of MSMEs continues to increase and continues to dominate the number of companies. Since the beginning of the new order era until now the Indonesian government has run many programs encourage the development of MSMEs [13]. In 2017, The Indonesian Ministry of Cooperatives and MSMEs estimated that, in terms of units, MSMEs have a share of about 99.99 percent (of the overall number of business operators in Indonesia, while large enterprises are only 0.01 percent [14].
The amount of MSMEs units shown that MSMEs play a significant role in economic growth and development, not only in developing countries, but also in developed countries. Still, then most MSMEs do not have durable managerial power in the organization of their business activities to balance economic, social and environmental aspects. SMEs' cumulative contribution to pollution and environmental issues is not recorded but is proposed by some scientists to be equal, if not higher [15]. Thus, MSMEs' potential participation in the cleaner environment is not yet noticed.
It proven by the fact, in 2019 there are 23 charcoal burning business activities, as well as 2 aluminum smelting business activities in North Jakarta, which are small-scale micro and medium-sized enterprises (MSMEs). People around constantly complained about the emissions, as the findings of the study showed that parameters NO\textsubscript{2} and H\textsubscript{2}S surpassed the quality standard [16]. Meanwhile, MSMEs in the field of textiles producing batik in Pekalongan contribute to river pollution [17]. The Environmental management system (EMS) is used to evaluate whether the industry has policies relating to the environment, including practices with clients and external organizations [18]. Thus, implementation EMS for MSMEs is deemed to be necessary.

2. Material and Methods

This study is a literature review that analyzed various sources in a systematically way to understand the implementation of ISO 14001 in MSMEs. The result and discussion discussed about the case study of ISO 14001 implementation in Indonesia and other countries. From the case studies, the challenges that exist in the implementation of ISO 14001 is explained. Then the green indicators for MSMEs is explained. Lastly, the recommendation and future potential are described.

3. Results and Discussion

EMS/ISO 14001 Implementation in Indonesia

The case study in Indonesia was taken from a laundry machine SME in Jogja. First the stakeholder was identified as the customer, supplier, employees, government and community. The organization has the expectation of providing a durable and environmentally friendly machine for the customer, having an uncomplicated and scheduled billing system, guarantee the safety of employees, comply with government regulations concerning the environment, reduce environmental pollution and properly manage waste. The scope chosen for this organization involves the whole process from raw material until marketing.

In the planning stage, the risk and opportunities of the SME were not explicitly mentioned in the article. The SME sets environmental objectives based on the risk and opportunities previously identified. The first objective is increasing 10% of paper efficiency and 3% in electricity consumption efficiency in the Marketing, Finance and HR department. Next, they aimed to manage raw material packaging in the purchasing department. Lastly, the production department has the objective of reducing waste production by 5%. An advantage in this case study is that the employee has a fairly good understanding of ISO 14001 implementation and management of waste. Although the cooperation between management and employee, the motivation of the employee and the control of information needs to be improved. In the operation of the process, the SME was able to implement following the environmental management system set.

With regards of the evaluation process, the SME has the system of monitoring the liquid waste in an environmental laboratory every three months. In addition, the internal audit and management evaluation is conducted annually. Although it is stated that the SME has implemented continuous improvement of their EMS, the specific form of this is not stated in the article [11].

EMS/ISO 14001 Implementation in other countries

A study of 220 owner-managers in the United Kingdom, 95% of which were micro and small businesses. Three-fourths of the owner-managers surveyed believed the MSMEs could have a significant cumulative environmental impact. In addition, the majority of business owners were increasingly involved in EM activities such as recycling and environmentally friendly-efficiency energy. Moreover, about 53% of those surveyed said they wanted to reduce CO\textsubscript{2} emissions from their companies [19].

Another study has been done to analyze current implementation, environmental management system for MSMEs in Pakistan. The research showed the current practices, challenges and motivations for EMS in Pakistan's food and beverage manufacturing sector both in large companies and MSMEs. The findings showed that large industries are more worried about environmental issues and environmental regulations compared to MSMEs, because they have the interest of gaining ISO-14001 certifications. The SME market, though, displays a lack of knowledge and significance. The SME owners and managers told that the key obstacles to EMS network operations were the expense of registration, obsolete facilities, no legal requirement and no customer demand. They found additional evidence that complicated reporting is also a bottleneck [19].

Challenges of Implementing EMS in MSMEs

Compared to larger companies, MSMEs face more challenges in pursuing environmentally friendly growth, despite being more versatile in adjusting to changes in the market. The difficulties faced involve:
(1) lack of common sense; (2) restricted access availability of information and technology; (3) strict requirements; (4) lack of skilled personnel; (5) limited access to financial services; and (6) market barriers [15]. This means that cooperation between government, industry and the community is needed to face challenges in the realization of environmental management system in MSMEs [15].

One of the aspect that determine the success of ISO 14001 implementation is the organizational structure, competence of employees and economic reasons [11]. In addition, the high cost of certification and challenges to adapt the company’s culture adds to the difficulty of implementing ISO 14001 in SMEs. The inadequate technology and resources also hindered the documenting process. In SMEs there is a lack of understanding of the need for efficiency in processes and awareness of environmental impacts. SME are not usually used to implement reporting activities and processes [19].

Based on research done by Ref. [20], there are several factors and relationship each factor that is influencing implementation, Environmental Management System in MSMEs is shown in Figure 2 [20].

![Fig. 2. Relationship of factors](source:\[20\])

**Recommendations/Future potential of ISO in MSMEs**

By encouraging conventional producers (MSMEs) to become environmentally friendly MSMEs, efforts to increase awareness and participation of business actors or producers of MSMEs in the preservation of micro and global environments can be pursued. It states explicitly that for MSMEs, six things need support from the business world concerning environmental issues, those are (a) the origins of the raw materials; (b) method of material production and the forms of additives; (c) processing and manipulating waste from production; (d) the use of the product (consuming energy and generating waste); (e) handling end of life of the product; (f) human resource readiness; and (g) strategy to market [21].

Each company has its ways and tactics [22]. The gap in strategy depends on the needs of each nation or company [23]. There are several ways to maintain environmental management, such as proactive action to protect the atmosphere, i.e. waste management, reduction of air pollution, and the use of environmentally friendly goods [24]. To promote and enable the spread of EMS of many MSMEs, the most possible successful practices would be: (a) technical support for small and medium-sized enterprises; (b) economic support and/or economic incentives for small and medium-sized enterprises; (c) simplification of ISO 14001 standards and/or guidance for small and medium-sized enterprises personnel; (d) preparation for internal small and medium-sized enterprises; (e) the prospect of receiving environmental approval for a whole homogeneous industrial area (e.g. an industrial district) and not just for a particular company.

The previous research discusses about a toolkit created specifically for small and medium-sized businesses. This acts as a simplified version of an EMS based on the ISO 14001 norm and is tested by target consumers and relevant officials. Some of the results are small, and medium-sized enterprises do not always feel it is their role to do so; they seemed to possess the means to implement an EMS fully. The toolkit developed is considered necessary, and recommendations are drawn for upcoming improvement [25].

Both internal and external drivers are found to be important in EMS. Based on the literature, internal drivers such as moral and personal drivers affect the performance and commitment of the SMEs.
[26]. Therefore, it is recommended for SMEs to find the internal drivers within the leadership team or the organization to improve the chances of a successful implementation of EMS. SMEs need to recognize the benefits and long-term optimizations that may result from involving workers in environmental management initiatives [26].

Implementing green practices in MSMEs do not have to be considered as a burden, simple changes such as advancing the organization leader’s awareness and knowledge about environmental issues, modifying products or increasing process efficiency. MSMEs have a strategic position in terms of lowering costs whilst reducing environmental impacts. Second, MSMEs should identify specific customers and recognize the value that they can offer on the basis of green differentiation [27].

![Image of green strategies]

**Fig. 3.** Generic green strategies  
Source: [27]

Considering the challenges of implementing ISO 14001 in SMEs, there is an alternative of implementing “alternative models of environmental management systems” (AMEMs). Compared to ISO 14001, AMEMs have some advantages such as, less effort for documentation, more adaptive, and less cost. Although the research found that the implementation of AMEMs and ISO 14001 both have similar obstacle and benefits for MSMEs. The driving factor for MSMEs to implement AMEMs are motivations to improve the environmental situation of the company as opposed to ISO 14001 where public perception and organization image are the main drivers [28]. The current available AMEMs is presented in Table 2.

| Table 2. AMEMs |
|----------------|
| **Name**          | **Organization**             | **Establishment Date** | **Country of Origin** |
| Acorn Method      | British Government           | 2003                   | UK                   |
| e + 5             | Foundation Entorno           | 1999                   | Spain                |
| Ecoaction 21      | Japanese Ministry of Environment | 1996              | Japan                |
| Eco-Lighthouse programme | Norwegian ministry of environment | 1996            | Norway               |
| Ecomapping        | Heinz-Werner Engel the Eco- Council Institute | 1997           | Belgium              |
| Ecoprofit International | University of Technology | 1991                   | Austria              |
| Ecostage          | Ecostage Instute             | 1993                   | Japan                |
| OuH (Environmental Certification for the Skilled Trades) Envi,Diploma | Chamber of Trade For Central Franconia | 1997         | Germany              |
| PIUS (Produktion integrieter Umweltschutz) | Effizienz-Agentur-Nordrhein Westfalen | 2000       | Germany              |
| PREMA (Profitable Environmental Management) | Federal Ministry of Economic Cooperation and Development | 1995       | Germany              |

Source: [28]
Green Growth Indicators Suitable for MSMEs

Green growth is increasingly becoming a popular term as communities understand that natural resources are finite and that sustainable economic development requires careful management of these resources. Environmental development metrics typically map members' success through different environmental factors. The Climate Change System of the World Bank has partnered with three local partners in South Africa to evaluate an outcome-based financial plan to boost investment in green small and developing enterprises (SGB). A series of indicators have been created to evaluate the effects of green SGBs and to cause payments as shown in the Table 3, which can also be used to calculate green growth of MSMEs [29].

Table 3. Green growth indicators suitable for MSMEs

| Indicators                           | Explanations                                                                                                                                 |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Waste Produced                       | A green MSME is one that either pursues strategies that decrease the amount of waste produced or creates a good or service that helps consumer organizations reduce the amount of waste produced. The European Commission supports waste management programs, as SMEs are often not fully aware of the environmental damage that they inflict. |
| Resource performance                 | Relative to the amount of waste produced, an MSME could either implement strategies that boost its resource efficiency or create a good or service that improves consumer companies' resource efficiency. |
| Company qualification                | International requirements such as the norm family ISO 14000, which offers specific guidance for companies and organizations trying to handle their environmental obligations, or the certification ISO 50001 (Energy Management) will enable MSMEs to become eco-friendlier. Although international qualification is desirable, the acquisition of structured certification is often complicated and expensive for an MSME. |
| Environmental revenue sharing        | Carbon taxes are levied on corporations whose actions harm the environment. It is intended to act as a source of government income and as a safeguard against actions affecting the climate. The tax deductions, therefore, encourage MSMEs to adopt green business practices that mitigate environmental harm. Not all economies can enforce environmental taxes, thereby preventing comparisons between them. |
| Improving green work or abilities    | This could be in terms of R&D education or improving specific skills that contribute to climate change mitigation or adaptation. It may also be linked to hiring workers with qualifications or prior experience in "natural" careers. |
| Participation in environmental projects and information-based institutions | It enhances MSMEs’ potential by participating in expertise clusters. Besides, more ambitious MSMEs will add to the cluster by improving network dynamism. |

Source: D. Cheok et al (2018)

4. Conclusion

In conclusion, MSMEs are an important segment of the industrial sector that have a lot of potential for implementation of environmental management systems. This is supported by the fact that MSMEs also gives negative environmental impacts of their activities. Case studies from Indonesia and other countries showed that implementation of ISO 14001 is possible for MSMEs.

The biggest challenge of implementation of ISO 14001 in MSMEs is cost. Additionally, another challenge includes the competence of employees and resources available for the organization. An alternative for overcoming these challenges is implementing other models of EMS that is more suitable for MSMEs. The important aspects that need attention in MSMEs is the environmental awareness of the stakeholders and the internal and external drivers within the organization. Further, studies can be done to research specific case studies of EMS such as ISO 14001 or AMEMs implementation in MSMEs.
5. Abbreviations

| Abbreviation | Description |
|--------------|-------------|
| AMEMs        | Alternative models of environmental management systems |
| ISO          | International Organization For Standardization |
| MSMEs        | Micro, Small, Medium Enterprises |
| EMS          | Environmental Management System |

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