CHAPTER:

Environmental Management Systems in Public Sector

Handbook of Public Administration Reform

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ABSTRACT

This chapter focuses on environmental management systems (EMS) in public sector organisations (PSOs). Our objectives are to 1) explain what is an EMS, describe the two main EMS standards (ISO 14001 and EMAS) and how to implement them in PSOs, 2) present the benefits of EMS adoption in PSOs, and 3) present the key factors of successful EMS implementation in PSOs. The major benefits of EMS implementation in PSOs are improved environmental management practices, environmental awareness and image, organizational cost-efficiency, and environmental performance. The major key success factors are management's support, employees' and managers' awareness, competence and involvement, adoption of a collaborative management approach, allocation of sufficient organizational resources, and stakeholder involvement. We conclude by identifying interesting avenues for future research. This chapter will assist EMS scholars and practitioners in better understanding the specific issues related to EMS implementation in PSOs.

Key words

Environmental management systems, outcomes, benefits, key factors of success, public sector, public administration, public service

Introduction

Environmental management is the management of the "environmental aspects" of an organization (Gilpin, 1996; Starkey et al., 1998), and would include managing the organization's impacts on local ecosystems, natural resource use, waste generation, recycling activities, pollutant output, etc. Combining environmental science knowledge with organizational management can be difficult, however, so there is a need for EMSs that provide structure to the understanding of organizations' environmental impacts.

Environmental management systems (EMS) are sets of guidelines that organizations can use to identify, manage, monitor, and mitigate their environmental and human health risks (ISO, 2015a; 2021b). They can help organizations in the successful development, implementation and continuous improvement of their Environmental Management Plan or the environmental portion of their Sustainability Management Plan (Eccleston, 2011; Theodore and Theodore, 2010). EMSs have played an important role in decreasing the negative environmental impacts of various industries and sectors (Boiral et al., 2018; Waxin et al., 2020). International institutions and governments of many countries around the world have supported or even required EMS implementation (Sammalisto, 2007; Al-Darrab et al. 2013). The implementation of an EMS can be part of public sector reforms to improve the governance and accountability of public sector organizations, particularly in areas concerning their environmental responsibilities (Madi et al., 2016).

Understanding the benefits of EMS implementation is critical for leaders and managers, so they are able to employ evidence-based practices to implement effective environmental strategies, develop useful policies and promote meaningful environmental activities. If the benefits of EMSs are not understood, an EMS might be 'successfully' implemented in terms of process, but not lead to clear environmental or organizational benefits or even cause negative outcomes. This is particularly likely to occur if implementation does not result in changes to the organization's day-to-day practices. The benefits of EMS implementation are not necessarily predictable or automatic, but depend upon contingent and contextual factors that influence the success or failure of implementation. Key factors of successful implementation are rarely examined thoroughly in the literature, however.

There is a lack of research on EMSs in public sector organizations (PSOs) (Hughes, 2012; Waxin et al., 2019, 2020), especially in developing and emerging countries (Waxin et al., 2019, 2020, 2022). There is also little published research on the benefits of EMSs and the key factors of success, and most of this research has been conducted on private sector organizations (Walker et al., 2008; Waxin et al., 2020). So, what are the benefits of EMS implementation for PSOs? What are the main key factors of successful EMS implementation in PSOs? We will answer these questions in the second and third parts of the chapter, respectively. Firstly, we will discuss the historical context for the development of EMSs, further explain what EMSs are and how to implement them. Throughout this chapter we will use research conducted in PSOs from both developed and emerging countries, so the results we obtain can be used by managers and EMS consultants in a variety of international contexts.

Environmental management systems and their implementation

Historical context

Throughout the 20th century, soil, air and water pollution has led to the degradation of ecosystems and a variety of human health problems. In London in 1952, the burning of coal and other fossil fuels, combined with unusually dense fog, led to highly acidic fog that caused respiratory diseases and death. These events led to the passage of the UK Clean Air Act in 1956, that helped to minimize sulfurous smog. Unfortunately, new sources of air pollution continue to lead to health problems and deaths in London today (Davis et al., 2002; Cook and Werner, 2017).

Environmental tragedies like this led to a better understanding of the negative environmental and economic consequences associated with industrial development and pollution. Increasing awareness led to numerous environmental movements in the second half of the 20th century, and has led to more recent sustainability initiatives. The growth of these movements has led to the development of important environmental laws, regulations and guidelines for preventing negative environmental impacts and mitigating against future risks (Eccleston, 2011; Enger and Smith, 2019). An example of an environmental management success story is how the scientific understanding of how chlorofluorocarbons (CFCs) and other chemicals destroy the ozone layer led to the Montreal Protocol that banned these chemicals (WMO, 2014). This required strong collaboration between scientists, industry and governments around the world.

Environmental problems are still among the most important global risks. According to the World Economic Forum 2021 "Global Risks Perception Survey" climate action failure, human environmental damage and biodiversity loss are among the top five risks that are "most likely to occur". The top five risks with the "Biggest Impact" include climate action failure, biodiversity loss, and natural resource crises (WEF 2021). In order to address these risks and respond to societal pressures, many private and public sector organizations have assessed their own environmental impacts through environmental management programs. EMSs can be used to develop these programs and hopefully reduce organizations' negative environmental impacts.

Environmental Management Systems

EMSs are generally based on a cyclical Plan-Do-Check-Act model. The organization develops an environmental *plan* that reviews all the activities within the organization that have an environmental impact and develops methods for mitigating, monitoring, fixing, and reassessing those impacts over time. Organizations then implement the plan (*do*), assess the effectiveness of their methods (*check*) and fix those things than did not work effectively (*act*). This cyclical model allows for "continual improvement". Audits, reporting and open communication with regulators and all stakeholders are important parts of this cyclical process (Eccleston, 2011; Theodore and Theodore, 2010). An organization's EMS can be designed and implemented in-house, informally, or certified formally and legally through external review.

The most widespread and renowned EMS certification standards are "ISO 14001:2015 Environmental Management Systems — Requirements with guidance for use" and the "Eco-Management and Audit Scheme" (EMAS). EMAS tends to be limited to the countries of the European Union (EU), whereas ISO14001 is more international. In 2021, there were 348,473 ISO 14001 certificates covering 568,798 sites in 179 countries around the world, with 974 (0.12%) of these labeled as public administration according to the annual ISO survey of certifications (ISO, 2021a). China, Japan and France had the most certified sites, with over

50% of certifications in these countries. In 2021, there were 3,851 organizations that are EMAS registered at 12,856 sites in the EU, with approximately 400 (3.1%) of those labeled as public administration according to the official statistics of the European EMAS (DG-E, 2021a). Italy, Germany, Greece, Austria, and Spain were the top countries for registration, and over 85% of all registrations were in these countries. EMAS encourages public sector organizations in the EU to become registered, to highlight its importance and effectiveness, to set a good example and act as mentors for local industries. Several EU institutions, including the EU Commission, are registered through EMAS (DG-E, 2021a). This is especially important, as EMAS registration varies greatly between EU countries, and the EU commission of each member state can mentor organizations and encourage registration within its borders.

These certification standards do not set specific environmental goals or environmental targets that must be met (e.g. reduction of greenhouse gas emissions, increased recycling or lower energy consumption). Rather, they define the procedural requirements concerning the types of policies, plans, organizational practices and control mechanisms to be adopted by organizations, so that they can better manage activities that have a significant environmental impact (Heras-Saizarbitoria et al., 2016). In the next sections, we present the two main types of EMS, ISO 140001 and EMAS in further details.

ISO 14001

The International Organization of Standardization (ISO) was formed in 1946 and is based in Geneva, Switzerland (ISO, 1997; 2021b). The ISO currently has 165 members from various countries, with one "national standards competent body" per country. Technical committees develop and reassess various types of standards for several important aspects of industry and society (ISO, 1997, 2021b), and conferences are held for the purposes of re-evaluation and dissemination. In 1971, the first technical committees were formed for the environmental issues of air and water quality, and later committees addressed issues in environmental management, soil, energy, sustainability and sustainable design. The 1987 ISO 9000 family of standards on Quality Management Systems led to the development of other management systems, such as the EMS.

The ISO 14000 family of standards was developed in 1996, based on the EMS guidelines of the British BS 7750, for the purpose of managing an organization's environmental impacts (ISO, 2015a; 2015b). The ISO 14000 family of standards was developed for any organization of any size in any country to help them develop, implement, and manage their EMS. The specific "ISO 14001 Environmental Management Systems — Requirements with Guidance for Use" standard lays out the specific criteria for successful certification of the EMS (Table 1). Final certification is granted through a third party certification process to companies that demonstrate compliance of their organization's EMS with the set of criteria listed in the ISO 14001: 2015 standard.

The ISO 14000 family of standards goes through re-evaluation on a regular bases, and has been updated approximately every 5 years (ISO, 2015a; 2015b). As the family of standards has evolved with reevaluation, the PDCA Model of EMS for the continual improvement cycle has remained at the core of the standard. The latest revision of ISO 14001 was in 2015, with a 2021 review and reacceptance.

The most prominent changes in this latest revision involve incorporating a life cycle perspective of all products produced and services used, meaning all purchases and decisions should consider environmental impacts from "cradle to grave" (ISO, 2017). A life cycle analysis considers the environmental impacts of a product or service, starting with the acquisition and processing of raw materials (cradle), production, waste generated along the

path of processing and assembly, transport packaging, transport method, sale to customers, use by customers and finishing with the eventual disposal of the packaging and product or the end of the service (grave). Using a cradle to grave approach, packaging and products can be made in a way so they are easier to recycle, which contributes to a circular economy.

Table 1. Sections of the ISO 14001 EMS Model

Context	Identify and characterize internal and external issues that may affect the EMS and your organization's environmental performance
	Understand stakeholders' needs
	Define the scope of the EMS
Leadership	Communicate responsibility and support of the EMS through the development of an Environmental Policy and Environmental Objectives, signed by higher administration
	Develop the environmental leadership through roles and responsibility of environmental officers
Planning	Develop the Environmental Plan for continual improvement of the organizational environmental performance
	Identify and prioritize the risks from environmental aspects of your organization
	Determine compliance and other stakeholder requirements or desires with regard to organizational environmental performance
	Determine how EMS outcomes will be achieved
Support	Build a network of competent individuals to support the EMS needs
	Facilitate open and objective internal and external communication platforms for dissemination of the needed competencies for a successful EMS
	Communicate the EMS Policy and management strategies throughout the organization and to all stakeholders
	Develop a Document Control System for all internal and external EMS documents and records
	Develop and maintain procedures for emergency preparedness and response
Evaluation	Evaluate the environmental performance through a monitoring system
	Evaluate compliance with all regulations and EMS objectives
	Perform internal and external audits on your EMS as required
	Continuously review EMS effectiveness throughout the process
Improvement	Develop and implement corrective actions for nonconformities as they occur
	Document all nonconformities and corrective actions
	Improve your EMS as needed to maintain continual improvement of environmental performance

Source: ISO (2015)a.

Eco-Management and Audit Schemes

Starting in 1995, EMAS regulation 1836/93 allowed industrial sector organizations in EU member states to register for EMAS on a voluntary basis (EC, 2017; DG-E 2021b; Lecerf et

al., 2017). In 2001, the policy regulation (EC) No 761/2001 ("EMAS II") was revised to integrate the ISO 14001 EMS standard, and voluntary registration was extended to organizations from any economic sector, including public sector organizations. In 2010, regulation (EC) No 1221/2009 ("EMAS III"), made it easier for small and medium sized enterprises (SMEs) to be registered, and extended registration to sites in non-EU member countries through EMAS global. Currently, EMAS registration is encouraged for any organization, regardless of size or economic sector, that wants to improve their environmental performance, empower their employees, develop a better reputation, evaluate regulatory compliance and improve relationships with regulators, to name a few key benefits (EC, 2011).

EMAS EMS registration starts by contacting the "Competent Body for EMAS" registration in the specific EU member state for advice on the process and assistance in finding available funding opportunities (EC, 2017; DG-E 2021b; Lecerf et al., 2017). Next, the EMS requires an initial environmental review, which is more rigorous than the review of the ISO 14001 standard, to find direct and indirect, internal and external environmental aspects of the organization's activities that might impact environmental performance or the EMS. A review of regulatory requirements and stakeholder needs helps to develop the environmental aspects list. All indirect and direct impacts should be reviewed in a complete "life cycle perspective." Based on this review, the environmental management team will develop the organization's environmental program, a plan of action for developing a cycle of planning, evaluation, assessment, and improvement starting with an environmental policy. Following implementation of the EMS for an annual cycle, an internal environmental audit is performed to identify and fix mistakes and non-compliance for the cycle of continual improvement. An environmental report is developed to disseminate actions, measures, and future plans for organizational environmental performance. This report is then sent to an external EMAS registered verifier for the entire EMS to be verified and thus registered by the competent body of the EU member state. After verification, the report can be used by the organization to promote their environmental efforts to stakeholders.

Since EMAS has integrated the ISO 14001 standard, an organization that is registered for EMAS is automatically ready for ISO 14001 certification, but at additional cost (EC, 2017; DG-E 2021b; Lecerf et al., 2017). Many organizations will pay for the extra certification to meet supply chain requirements or to enhance their reputation outside the EU.

ISO 14001 Certification vs. EMAS Registration

Both ISO 14001: 2015 and EMAS require audits / verification of their EMS prior to certification or registration, respectively, by local ISO / EMAS accredited third parties. With EMAS Global, organizations within the member countries of the EU or outside can voluntarily develop their EMS to different levels (below).

Organizations can develop the EMS:

1. *Using ISO 14000 series family of standards without certification*
2. *Using EMAS tools and guidelines without registration*
3. *With certification for ISO 14001*
4. *With registration for EMAS*
5. *With both certification for ISO 14001 and registration for EMAS*

Box 1. EMS implementation in the City Council of Marrakech, Morocco.

In 2001, the EMAS II regulation allowed non-industrial organizations to develop EMAS for the first time. The public administration organizations of the EU began to develop, implement and register Environmental Management Systems (EMS) in their own municipalities, not only to improve environmental performance, but also to be mentors for other organizations as EMAS registration spread throughout their countries (DG-E, 2021a). Between 2003 and 2007, the city council of Marrakech, Morocco, decided to develop and certify an ISO 14001 under the umbrella of EMAS guidelines for the municipality's administrative structure, and became the first to do this in the African and Arab region. EMAS registration was not allowed outside the EU until 2010, so the city council could only use the structure of EMAS, but not register.

Daddi et al. (2011) presents a case study on the implementation and perceptions of this certification. First, they compared the drivers and barriers associated with EMS implementation in developed countries to those of the Marrakech city council. Secondly, they explored the perceptions of the residents of the city to determine if they had enough knowledge and awareness of environmental issues to be active partners in the implementation. They conducted interviews with the municipal employees that were involved with implementation and over 1500 residents to collect data.

Implementation of the EMS started with the environmental review to determine the environmental aspects of the city municipality, leading to a report on the state of the environment for Marrakech. Key stakeholders were the city residents, municipality employees and the audit team. The main driver for implementation was to improve the city's image to their own residents and outsiders. An improved image would improve tourism, improve economic activities with international organizations and would highlight past environmental management commitments and achievements that improved the city. This focus on improved image is more typical of municipalities in emerging economies, whereas the drivers for EU municipalities are more concerned with improved environmental performance or regulatory compliance.

There were many barriers to implementation. There were cultural and language differences between the Moroccan managers and staff and their EU partners, and communication challenges slowed the progress of implementation. Local training sessions, procedures, and work instructions were required to be multi-lingual. Local expertise, knowledge, skills and competencies for environmental management, and more specifically EMS implementation and certification, was lacking in Marrakech, and this made it difficult to determine the "environmental aspects" of the municipality's activities. Historic information on these environmental aspects was lacking, therefore there were challenges associated with the collection of baseline environmental information and organizing people to set up and run monitoring programs that measure environmental performance. EU municipalities reported some similar barriers, but in Marrakech these barriers were more severe, due to an overall lack of focus on environmental issues prior to EMS implementation. The interviews with residents revealed that they support the need for using EMS and could be valuable stakeholders to develop plans to address the city's environmental issues.

Source: Daddi et al. (2011).

What are the benefits of EMS implementation in PSOs?

There are many empirical studies in the academic literature that examine the benefits of EMS adoption, but it is important to note that almost all of these studies have been conducted on private sector organizations, and most have been conducted in Western countries (Boiral et al., 2018; Waxin et al., 2019). There are numerous significant benefits of EMSs, both for the organization and for the environment, that have been identified in the literature, although there are also instances in which PSOs did not realize some of the anticipated benefits. There are four main types of benefits to EMS implementation in PSOs, and we present them below (see table 2).

Improved Environmental Management Practices

EMS implementation in PSOs can result in improved rigor and effectiveness of environmental practices, mainly by improving coordination, cooperation and communication between departments, by improving environmental activities management, and by improving regulatory compliance. Boiral et al. (2018) found that 95% of organizations improved their EM practices with ISO 14001 certification, although in some cases they achieved only limited improvement (Boiral, 2007).

One way to improve EM practices is **to improve coordination, cooperation and communication** between departments around EMS activities. These can be especially important outcomes of EMS implementation for municipalities, that have different departments in multiple locations that deliver very different services. For example, Daddi et al. (2011) reported that EMS implementation created communication between different municipality offices that were previously uncoordinated, and created close cooperation between several governmental departments in order to achieve certification.

PSOs can also benefit from EMSs with improved management of EM activities. This includes better **organizational structure and procedures for environmental work** and better planning of environmental projects (for example, Daddi et al., 2011). Municipalities changed their decision-making process following EMS implementation, because they incorporated environmental aspects into their decisions in order to achieve and maintain certification (Lozano and Valles, 2007). As a result of improved EMS implementation, municipalities can respond to environmental problems they experience more quickly (Lozano and Valles, 2007). ISO 14001 certification may also encourage municipalities to consider the environmental records of companies they award tenders to (Ridolfi et al., 2007).

PSOs improve their EM practices through **improved regulatory complianc**e. Most PSOs surveyed by Waxin et al. (2020) reported greater regulatory compliance following EMS implementation. EMS implementation requires that organizations know all of the environmental laws that are applicable to them, which allows certified organizations to better anticipate legal risks, reduce penalties and fines and reduce the time needed to become fully compliant with laws and regulations.

Improved Image and Environmental Awareness

The social benefits of EMS implementation in PSOs include four main aspects: improved image and relationships with stakeholders, improved organizational transparency and

credibility, improved employees' and managers' knowledge, awareness, motivation and participation in environmental projects, and improved community awareness of environmental issues.

EMS adoption improves the image of a PSO, which in turn, can lead to improved relations with stakeholders, including local residents, customers and government regulators (Pawar and Risetto, 2001; Hughes 2012). Waxin et al. (2020) found that improved **image and reputation** were common outcomes of EMS certification for both private and PSOs, and that improved image and reputation led to improved relations with various stakeholders. PSOs tended to mention improved relations with community and industrial partner stakeholders more frequently, whereas private organizations often mentioned improved relations with customers (Waxin et al., 2020).

EMS implementation can lead to **increased transparency and credibility** (Myszczyszyn, 2017). Stakeholders gain a better understanding of how the PSO addresses their environmental concerns and problems, which improves credibility (Daddi et al., 2011). EMS implementation requires the publication of reports, which generally improve communication with the public and key stakeholders.

EMS adoption has been found to increase the **environmental awareness, knowledge and competencies of staff and managers**, and increase their motivation and participation in environmental activities. Municipalities that become EMS certified reported improved employee environmental awareness, knowledge of environmental issues, and enthusiasm for environmental projects (Pawar and Risetto, 2001; Daddi et al., 2011). A majority of the PSOs surveyed by Myszczyszyn (2017) and a minority surveyed by Waxin et al. (2020) mentioned improved employee environmental awareness as an outcome of EMS adoption.

EMS implementation can also lead to i**mproved community awareness.** Employees' increased environmental awareness, associated with EMS, can even "spillover" into groups outside of the PSOs. Waxin et al. (2020) found that occasionally employees became more environmentally active in the larger community as well. Innovations developed by organizations participating in voluntary environmental programs are sometimes adopted by organizations that are not directly participating themselves (Hughes, 2012). Lozano and Valles (2007) found that municipal promotional campaigns about the environment and environmental policy, associated with EMS implementation, increased environmental awareness of the municipality's inhabitants.

Improved Organizational Efficiency and Performance.

EMS implementation can lead to improved organizational efficiency and performance, by reducing costs, increasing revenues, and adopting a more systematic approach to management.

The implementation of an EMSs can help PSOs **reduce costs.** This is achieved by reducing the use of energy and other resources, improving waste disposal and recycling efforts and reducing non-compliance and liability costs. Most PSOs surveyed by Waxin et al. (2020) reported better organizational efficiency and reduced costs due to more efficient energy and resource use and reduced non-compliance costs. Local US governments reported improved efficiency and reduced costs associated with ISO 14001 certification, as well as improved compliance (Pawar and Risetto, 2001). Small, simple changes of employees' individual behaviors in areas such as reducing energy use and better waste management can collectively add up to substantial cost savings for PSOs (Zutshi et al., 2008).

EMS implementation can lead to increased revenues by opening up **new business opportunities**. EMS certification of a municipality will improve its image amongst its own citizens and external stakeholders, which may lead to increased tourism, business activity and investment, and may help attract and retain municipality employees and residents (Lozano and Valles, 2007; Daddi et al., 2011). An improved municipality image can also result in more opportunities for national and international collaborations (Daddi et al., 2011). EMSs certification can make municipalities eligible for more external funding opportunities, and generate new income through the sale of recovered waste materials (Daddi et al., 2011). In some cases, EMSs may allow municipalities to discover innovative new ways to diversify their economy and increase their economic output (Lozano and Valles, 2007).

Finally, EMSs can help municipalities adopt a more systematic **approach to management**, and give them a more structured knowledge of their internal activities, both of which can improve organizational efficiency (Daddi et al., 2011).

Improved Environmental Performance

EMS adoption in PSOs relates to improvement of environmental performance, which is a reported benefit in both private and PSOs (Waxin et al., 2020; Boiral et al., 2018). Some of these reported environmental performance improvements, like better wastewater treatment and landfill improvements, may have significant public health benefits associated with them as well (Pawar and Risetto, 2001). In a review, Boiral et al. (2018) report that 71% of organizations generally improved environmental performance with ISO 14001 certification, but a minority of studies report mixed results or no significant improvement. PSOs can improve their environmental performance by reducing resource use, improving waste management, and by reducing their environmental impact.

A first way that PSOs improve their environmental performance is **by reducing the use of non-renewable resources and energy (**Waxin et al., 2020; Ridolfi et al., 2007; Lozano and Valles, 2007)**.** For example, Swedish municipalities reported lower resource **use** and fewer environmental accidents due to EMS implementation (Emilsson and Hjelm, 2007). Boiral et al. (2018) found that 92% of companies that implemented ISO 14001 decreased their energy and resource consumption.1

A second way that PSOs improve their environmental performance is through **improved waste management,** including reduced waste generation and increased recycling (Waxin et al. 2020, Zutshi, 2008; Lozano and Valles, 2007). For example, Lozano and Valles (2007) found that EMS certification of a rural Spanish town led to better wastewater treatment, modification of the local dump and new recycling initiatives.

A third way that PSOs improve their environmental performance is by **reducing their environmental impact**, including reduced air, water and land pollution, and reduced carbon footprint (Waxin et al., 2020). EMSs require organizations to identify all of their impacts on the environment. Organizations can then formulate and implement plans to reduce their negative environmental impacts and improve their environmental performance.

Table 2. Summary: Outcomes of EMS implementation in PSOs

Outcomes	Description
2. Improved environmental management practices	Improved coordination, cooperation and communication between different departments around EM
	Better management of environmental activities, incorporation of environmental issues into decision-making processes
	Greater regulatory compliance and reduced liability
2. Improved image and awareness of environmental issues	Improved image and relationships with stakeholders
	Improved organizational transparency and credibility
	Improved employees' and managers' knowledge, awareness, motivation and participation in environmental projects
	Improved community awareness
3. Improved organizational efficiency and performance	Reduced costs associated with reduced energy and resource use, better waste management and reduced non-compliance fees
	Increased revenues through economic diversification and eligibility for more external funding opportunities
	For municipalities: attracting more tourism, business activity and residents
	Adoption of a systematic approach to management
4. Improved environmental performance	Reduction of negative environmental impacts: reduced pollution and carbon footprint, fewer environmental accidents
	Improved waste management: reduced waste generation, increased recycling, improved wastewater treatment
	Reduced use of non-renewable resources and energy

EMS adoption does not always lead to measurable positive outcomes, however (Barla, 2007; Boiral, 2011). EMS implementation does not always result in improved environmental performance, there may be a lack of financial return on investment in EMS, and benefits could take a long time to be realized. There are several examples of PSOs that did not observe some of the expected benefits of EMS implementation. Emilsson and Hjelm (2007) found that around 41% of Swedish municipalities did not observe positive environmental outcomes associated with EMS implementation, although some of municipalities were only in the early stages of implementation. Hughes (2012) found that voluntary environmental programs for water conservation instituted by California local governments and public institutions did not actually reduce water use. The author concluded that in order increase the likelihood that voluntary EMSs produce positive environmental outcomes, rigorous performance standards need to be set, accompanied by monitoring of environmental variables and sanctions against non-compliance. Not all PSOs in the United Arab Emirates reported improved environmental practices as a result of EMS certification, but PSOs were more likely to do so than private

organizations (Waxin et al., 2020). Private organizations in Poland surveyed by Myszczyszyn (2017) reported financial benefits from EMS certification, whereas PSOs did not. The administrative burden associated with implementing and maintaining an EMS is significant, and the up-front costs are substantial, particularly for certified EMSs (Vernon et al., 2009; Merli and Preziosi, 2018). Some benefits of EMS certification for municipalities, like cost reductions, better environmental performance management and improved image amongst citizens may take some time to be realized (Daddi et al., 2011).

What are the key factors of successful EMS adoption in PSOs?

These are a variety of contingency factors that influence the degree to which EMS adoption succeeds or fails, both in the short term and for many years after adoption. Key factors of success (KFS) are underexplored in the general literature, and the little research that has been conducted is mostly on private sector organizations (Boiral et al., 2018; Waxin et al., 2020). We identified five key factors of successful EMS implementation, and present them below (see Table 3).

Managers' support and commitment

Management support and commitment is critical for changing organizational culture when implementing EMSs, and is identified as the most important KFS for EMS adoption in PSOs. Waxin et al. (2020) found that top management support was the most commonly reported KFS for ISO 14001 certification in both public and private organizations in the UAE. Management needs to effectively communicate the importance of EMS to all employees (Zutshi et al., 2008; Gustafsson et al., 2010) and act as role models for environmentally-friendly behavior (Waxin et al., 2020). Management commitment should also include designating full-time personnel (well-qualified EMS coordinators or "champions") early on in the implementation process, but the task of EMS implementation should not be entirely delegated, as managers need to remain involved and engaged throughout the implementation process (Lemon, 2017; Sammalisto, 2007; Zutshi et al., 2008; Gustafsson et al., 2010). Even the most passionate EMS coordinators are unlikely to be successful without adequate, continuous management support (Gustafsson et al., 2010).

Employees' and managers' awareness, competence, and involvement

Employees' awareness and involvement is the second most important KFS. Getting all employees involved, not just the managers and personnel directly involved in EMS implementation, improves the likelihood of obtaining positive outcomes and meeting management goals (Gustafsson et al. 2010; Waxin et al. 2020). Employee training that improves environmental awareness and competencies, and that emphasizes the importance of the EMS is another KFS (Sammalisto, 2007; Zutshi et al., 2008; Gustafsson et al., 2010; Daddi et al., 2011). Training all employees, not just those directly involved with the EMS, can improve environmental awareness throughout the organization, and facilitate organizational change (Waxin et al., 2020). Communication with employees, including employee training sessions, should "keep it simple" whenever possible (Gustafsson et al., 2010). In organizations where employees' environmental knowledge and competencies are low, the use of external consultants for EMS implementation can be a KFS (Waxin et al., 2020), although employees must be trained to maintain the EMS once these consultants leave (Gustafsson et al., 2010).

Finally, one possible way to encourage more employee engagement is to work on environmental projects early on in the implementation process that have low costs, high positive impacts and that are important to the organization. Early success in high impact projects creates momentum and builds up morale for more difficult environmental projects later (Lemon, 2017).

Adopting a collaborative management approach

Adopting an integrative and collaborative management approach, with effective communication between managers and employees, is another KFS. Coordination and communication between managers and employees, and between different departments in an organization, are needed to incorporate EMSs into day-to-day operations. Integrating EMS issues and activities into daily operations is critical for successful implementation, and to improve environmental performance (Sammalisto, 2007; Gustafsson et al., 2010; Waxin et al., 2020). If multiple departments are implementing EMSs within a larger municipal or state government, establishing a communication network of EMS coordinators is a KFS, in order for them to share experiences and best practices (Zutshi et al., 2008).

Allocating sufficient organizational resources

Allocation of sufficient budgetary and personnel resources specifically for EMS implementation is a commonly reported KFS. Organizational resources may be a more important KFS for private companies, which must be more self-reliant for EMS implementation, compared with PSOs which may receive significant governmental support (Waxin et al., 2020). Once an EMS has been successfully implemented, it is critical to designate personnel that are in charge of maintaining the EMS, to update goals and policies based on new problems or legislation that arises, to ensure existing goals are met and to continuously communicate the benefits of the EMS to stakeholders (Sammalisto, 2007; Gustafsson et al., 2010). If EMS implementation is only associated with particular people who subsequently leave the organization, the EMS may collapse with their departure unless personnel are designated to maintain the EMS as part of their job (Gustafsson et al., 2010). Hiring these personnel before existing EMS coordinators leave is important for continuity and sustaining the EMS (Gustafsson et al., 2010).

Stakeholders' involvement

Finally, it is critical to identify and involve all the key stakeholders early on in the EMS implementation process. Greater stakeholder involvement improves transparency and reporting of environmental impacts (Lemon, 2017), and is generally associated with greater perceived legitimacy and likelihood of success (Hughes, 2012). Key stakeholders for municipalities would include residents, businesses and government agencies. Outreach efforts to increase participations could include town halls and surveys (Lemon, 2017). Feedback from stakeholders should then be used to prioritize future environmental policies and actions, based upon the importance to the stakeholders and the anticipated positive impacts of the actions (Lemon, 2017). Governmental support and commitment may be a more important KFS for PSOs compared with private sector organizations, since PSOs are more likely to be reliant on government funding (Waxin et al., 2020).

Box 2: The benefits and key factors of success of ISO 14001 certification: a comparison between UAE private and PSOs.

Waxin et al. (2020) examined the benefits and key factors of success (KFS) related to ISO 14001 certification, and compared these in private sector organizations and PSOs, in the United Arab Emirates, an emerging Arab Gulf country. They interviewed the environmental managers of 14 UAE private and PSOs.

The five major outcomes of ISO 14001 certification in PSOs were improved 1) environmental performance (such as reduced use of energy and resources), 2) organizational reputation and relationships with stakeholders (such as improved relationships with regulators, community and industrial partners), 3) organizational efficiency (cost reduction related to better use of energy and materials, reduction of non-compliance costs), 4) environmental management practices (such as improved rigor and effectiveness of these practices, greater regulatory compliance), and 5) environmental awareness, including improved employee awareness, involvement and commitment at work and in the larger community. These outcomes were shared by private sector and PSOs, although improved resource management, improved relations with stakeholders and improved EM practices were more common in PSOs, and improved organizational efficiency was more common in private sector organizations.

The six KFS for implementation were: 1) senior management's support, 2) employees' awareness, involvement and competence, 3) government regulations, initiatives and commitment, 4) sufficient organizational resources, 5) adoption of a continuous, integrative and collaborative approach and 6) using external consultants to compensate for a lack of internal EMS knowledge and experience, particularly for smaller organizations. These KFS were shared by private and PSOs, although government initiatives and commitment was a more commonly cited KFS in PSOs, and sufficient resources was more commonly cited in private sector organizations.

Source: Waxin et al. (2020)

Table 2. Summary: Key factors of successful EMS implementation in PSOs.

Key factors of success	Description
1. Managers' support and commitment	Managers communicate the importance of EMS to all employees
	Managers act as role models and remain engaged throughout the implementation process
	Training managers about EMS early in the process
2. Employees' awareness, competence, involvement	Training all employees in order to improve their environmental knowledge, competencies and awareness. Training should "keep it simple" when possible
	Environmental projects that will have a lot of early success at low cost should be addressed early, to boost employee morale
	Use of external consultants, if needed
3. Adoption of a collaborative management approach	Effective communication and coordination between managers and employees, and between departments to integrate EMS into daily operations.
	Establishment of communication / coordination networks between the EMS coordinators of different departments
4. Allocation of sufficient organizational resources	Allocation of a specific, adequate budget to EMS
	Assignment of adequate personnel resources to EMS
	Assignment of personnel to maintain the EMS, after successful implementation
5. Stakeholders' involvement	Identification and inclusion of all the stakeholders early in the process
	Incorporation of stakeholder's feedback into environmental policies
	Importance of governmental support and commitment

Conclusion

As global awareness of environmental issues and problems has increased, there has been increasing pressure on private and public sector organizations to improve their environmental performance through various environmental management initiatives. EMSs generally improve organizations' environmental performance and also benefit the organization itself in various ways. Environmental Management Systems have been designed using a Plan-Do-Check-Act cycle of continual improvement. The most important standards for EMS certification are ISO 14001, which is more international-recognized., and EMAS, associated with EU countries. Organizations have options for specific certifications in EMS in models, such as ISO 14001. In the EU, public organizations are encouraged to implement the EMAS registration process to become mentors to private sector organizations.

The main benefits of EMS implementation in PSOs are improved environmental performance, improved environmental management practices, improved environmental awareness and

image / reputation and improved organizational cost-efficiency. These benefits of EMS implementation in PSOs are quite similar to those reported by private companies in the literature, although we did identify some differences between private and PSOs. Large municipalities may derive different positive outcomes from EMS certification compared with smaller PSOs. Municipalities have multiple departments in different locations that deliver very different services. Because of this, large municipalities may particularly benefit from the improved environmental management practices associated with EMSs, which would encourage greater coordination, cooperation and communication between these disparate departments. Improved image due to EMS certification may be particularly important for municipalities too, as it may help them attract more businesses, residents and tourists. EMSs may help municipalities diversify their economy as well, which is less likely to occur in a small PSO. There were instances in which PSOs failed to achieve some of the anticipated benefits of EMSs, but in some cases, studies were conducted soon after implementation, and the benefits may have taken longer to realize.

We identified five main key factors of successful implementation of EMS in PSOs: management's support and commitment, employees and managers' awareness, competence and involvement, allocation of sufficient organizational resources, adoption of a collaborative approach and stakeholder involvement. The first four of the five key factors of successful EMS implementation in PSOs are similar to those found in the literature on private sector organizations. Managers' support and commitment and employees' awareness, competences and involvement are frequently mentioned as the most important KFSs (Boiral et al., 2018). Management support is important to initiate employee training, designate adequate personnel and budget for EMS implementation, assign tasks to specific employees and ensure effective communication and coordination within the organization. Stakeholder involvement is a KFS that is more specific to PSOs, particularly municipalities. Early involvement of all stakeholders helps municipalities identify and prioritize the various environmental issues in their jurisdiction, improves transparency and legitimacy of the municipality, and gives citizen and business stakeholders input on environmental decisions that affect their lives and livelihoods.

We identified several research gaps that are promising areas for future research. Firstly, there is a lack of research on EMSs in PSOs (Hughes, S., 2012; Waxin et al., 2019, 2020), especially in developing and emerging non-western countries (Waxin et al., 2019, 2020). Secondly, we identified a few limitations in the research methodologies commonly employed in PSO EMS studies. EMS researchers often rely on interviews of the managers and specialists responsible for EMS implementation, who may exaggerate the positive outcomes that they achieved. Information about employees' awareness and commitment generally comes from managers' perceptions, for example, rather than interviewing the employees themselves or observing their behavior directly. To decrease this social desirability bias, future research should survey a wider spectrum of respondents, such as employees, citizens and other stakeholders, to better assess outcomes and KFS of EMS in PSOs. Future research should rely on more objective data and adopt a more longitudinal approach. Environmental and financial data collected before and after EMS implementation would help researchers objectively assess EMS outcomes related to environmental and business performance, for example. Furthermore, negative outcomes of EMS implementation, or instances when EMS implementation did not achieve anticipated positive outcomes, are usually underexplored and underreported. Finally, researchers could conduct a systematic literature review, and map the published academic literature on EMS in PSOs. Our chapter did not differentiate between EMS implementation and certification, and did not differentiate between the different kinds of certification systems, and this could be done in future research.

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