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Original Research

Factors for Improving Environmental Management Systems in Polish Companies According to ISO 14001

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Abstract

Continual improvement is a key component of environmental management systems (EMS) according to ISO 14001 standard. But in contrast to most other specifications in the standard, it is difficult to assess. The following article discusses factors influencing the EMS improvement in Polish companies according to ISO 14001 standard. Research of the factors influencing the EMS improvement was conducted in Polish companies from July 2007 to April 2009 by the Department of Standardized Management Systems at the Poznań University of Economics. The research was carried out at 1,360 companies that have certified their Environmental Management System against ISO 14001 requirements. There is a significant number of factors that can influence improvement of the EMS and there are many elements that can be improved in it.

Keywords: environmental management system, improvement of EMS, ISO 14001, continual improvement

Introduction

The growing interest of organizations in implementing, certifying, and maintaining an EMS in conformance with ISO 14001 standard requirements is strictly related to their expectations as far as achieving specific environmental performance impacts is concerned. The impacts, in turn, can be realized when the organization ensures continual improvement of its EMS. Neither the improvement of EMS, nor verification of the factors influencing the improvement have been discussed in Polish or foreign literature in a more comprehensive way [1]. This article presents the main factors influencing EMS improvement, as well as the EMS elements that undergo it. Companies with their principal place of business in Poland and having a certified EMS conforming to the requirements of the ISO 14001 standard have assessed these elements.

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Continual Improvement of the Environmental Management System

Role of Continual EMS Improvement

Continual improvement is a process of enhancing EMS to achieve improvements in overall environmental performance consistent with the environmental policy of the organization [2]. An efficient EMS is characterized by continual improvement [3]. The description makes clear that improvements in environmental performance are the ultimate touchstone for continual improvement. The description suggests that such improvements are based on enhancement of the EMS itself [4]. It must be stated here, however, that it is not necessary to realize continual improvement in all areas of activity at once. Continual improvement of the EMS can be achieved by [5]:

- realizing specific environmental targets and objectives reflected by specific indicators that help to assess the impacts of environmental performance
- defining new ambitious environmental targets and objectives
- improving the function of the EMS or its elements by eliminating problems and environmental non-conformances, identifying the causes of non-conformances and taking proper corrective and preventive actions
- introducing innovation in order to improve performance aimed at attaining environmental impacts.

The areas in which improvement can be achieved should be identified in organizations that have a functioning EMS in order to realize requirements regarding continual improvement. The opportunity for continual improvement of environmental performance in a given organization should be identified as a result of [4]:

- evaluating the function of the EMS
- monitoring actions, processes, and products, and how they influence the environment
- assessing the realization of environmental targets and objectives
- monitoring conformance with legal requirements and other requirements the organization is obliged to meet
- monitoring the environmental policy realization level.

Top management commitment is necessary in order to assess realization of the actions in an effective way. First of all, the top management's commitment should be manifested by passing on the significance of environmental performance across the organization as well as by acting according to established policy. The management review, in which the top management should actively participate, is an effective tool in assessing the functioning of the EMS [4]. Issues related to assessment of the effectiveness of the EMS are discussed during the management review. For this reason, it is of great significance that the top management be engaged in all actions related to increasing the effectiveness of the EMS and improving it to the highest degree possible.

It is not easy to provide evidence for continual improvement of an EMS in an organization. This can only take place when the problem areas of the EMS in operation and the errors committed by the employees, together with the causes of such errors, are identified. Also, continual improvement can be realized when the organization identifies the risks, e.g. any possible defects or non-conformances with legal requirements. In order to ensure the realization of continual improvement, the employees should identify areas in which more effective measures could be taken, e.g. by making better use of resources such as water, energy, and materials. Moreover, opportunities for decreasing negative impacts on the environment resulting from the operation of the company and from introducing its product onto the market should be determined [6].

When the causes or irregularities of ineffectiveness of environmental performance in the organization are known, a proper solution to the problem can be suggested. This includes the scope and time limits of the necessary measurements to be implemented while taking into consideration the company's technological and financial capabilities. In order to identify the areas in which the organization can improve its EMS, different kinds of information that are the basis for potential improvement should be used. This information can be obtained from the following sources [7]:

- records of internal and external audits
- assessment of progress in the realization of environmental targets and objectives
- records of the monitoring of key process and measurement parameters
- emergency situation analysis records
- monitoring conformance with legal requirements and other requirements the organization is obliged to meet
- monitoring conducted by employees
- supplier and customer comments, customer and neighbour complaints, etc.
- data from market research, competition observation or benchmarking
- exchanging experience information with other organizations.

Example actions related to the EMS improvement, which after some time should bring about the improvement of environmental impacts related to the organization's operation include: streamlining internal and external communication or raising employee awareness by means of training (e.g. regarding the need to sort waste in order to limit the amount of waste transported to the refuse dump).

Elements of Environmental Management System Improvement

Organizations that implement, maintain, and improve their EMS according to the requirements of the ISO 14001 standard should make use of a four-stage framework initiated by Deming, i.e. the so-called Plan-Do-Check-Act (P-D-C-A).

In accordance with the requirements specified in the ISO 14001 standard, the organization should draw up an environmental policy in the planning stage. The next step is to determine the objectives and processes required to attain the expected impacts in relation to established environmental policy. At this stage of improvement the environmental aspects should also be identified. Also, the influence of significant environmental aspects on the natural environment needs to be determined. The evaluated significant environmental aspects shall be monitored in the realized processes and managed in a proper way. This stage can be called the implementation stage or performance. The "checking" phase requires monitoring and process measuring to be performed as far as realization of environmental policy, targets, objectives, legal, and other requirements, as well as reporting results, is concerned. The last stage of the operation concerns implementing actions in order to ensure continual improvement of the functioning EMS [8].

Using the four above-mentioned steps based on the PDCA approach will help the organization to continually improve its EMS and to achieve general environmental performance impacts.

Factors Influencing EMS Improvement

Factors influencing EMS improvement most often described in the literature in this field are the following:

- top management commitment and leadership
- employee involvement
- suppliers
- process realization monitoring
- evaluation of the EMS by measuring and internal audits
- requirements of clients and other interested parties.

Y.S. Wee and H. A. Quazi [7] identified seven critical factors of environmental management:

- top management commitment to environmental management – setting an environmental vision or corporate policy
- total involvement of employees – "green" teams are being set up to tackle environmental problems
- training – employees to be trained in skills that are required to fulfil their environmental responsibilities and achieve their environmental goals
- green products/process design – designing production processes and products in such a way that the design has a minimal adverse impact on the environment
- supplier management – environmental performance used as one of the criteria when choosing a supplier
- measurement – objective measurements established to gauge the level of environmental performance
- information management – environmental information must satisfy four main criteria, i.e. timelines, accessibility, accuracy, and relevance.

These factors can be used in the continual improvement of EMS.

A significant element influencing EMS improvement is the involvement of employees, without whom even the most efficient top management is not able to realize the determined targets. Also, qualified workers' ideas are not used very often in order to improve the EMS. Only stable and effectively supervised processes, as well as properly monitored significant environmental aspects, can ensure appropriate EMS improvement.

Properly developed relations with suppliers, together with proper functioning of the supply chain, can also create a competitive advantage which, in turn, influences the realization of targets determined by the organization [9], including the realization of environmental targets. The above factors influence the realization of environmental performance impacts, which are indicators of continual improvement. Monitoring shall be conducted in order to assess the impacts of environmental performance. The monitoring can be realized by way of direct or indirect measurement, but also through internal audits. The audits are an essential tool used to assess the effectiveness of the EMS and to improve it.

It has to be noted here that the improvement of the EMS may be influenced by [10]:

- middle level management, which significantly influences the decisions made in relation to the management of environmental aspects, as well as crisis management in an organization
- environmental policy that, for instance, includes the obligation to prevent pollution, to minimize negative impacts on the environment, and to conduct continual improvement
- a department for environmental management or environmental protection; the employees of this department have the highest levels of awareness as to the impacts the organization has on the natural environment as well as on measurements that can be implemented by the organization in order to improve the environmental management system
- training courses that are conducted in order to instil and raise environmental awareness in the employees, as well as to initiate measurements aimed at EMS improvement
- designing products by taking into consideration the influence of the products and their manufacturing process as well as of the service provided by them on the natural environment
- managing supplies, particularly with a view to minimizing the negative impact of the supplies and suppliers on the natural environment, which contributes to the improvement of the EMS
- operational control, which is aimed at managing significant environmental aspects and ensuring that all operations and activities that may have a negative impact on the environment are appropriately monitored
- data on the natural environment and reports containing the results of the monitoring and measuring of key parameters of operations and activities related to environmental impacts; some conclusions can be drawn based on this data, and measurements designed to improve the EMS can be proposed
- employee relations that significantly influence the effectiveness of information flow and of actions taken to prevent pollution and to ensure a minimal amount of negative impacts of performance on the natural environment.

According to Richard Welford, the fundamental factors that influence the maintenance and improvement of the EMS are the following [11, 12]:

- stating environmental policy in a clear way and directing it at environmental performance impacts
- reducing the amount of produced waste
- analyzing the life cycle of products
- carrying out efficient audits and management reviews.

Some other authors [13], on the other hand, consider the commitment and leadership of the top management as one of the most significant factors influencing the efficiency and improvement of the EMS. They also state that the top management in an organization should take advantage of the practical information of more experienced top managements of other organizations. According to the authors, the employees play a crucial role in ensuring the effective functioning and improvement of the EMS. For this reason, their opinions should be taken into consideration when decisions regarding environmental management are made. The efficiency of environmental activities can be ensured by training courses and educational programs directed at environmental performance and management of significant envi-

ronmental aspects. Also, the same authors think that including suppliers in environmental management is a significant factor that can affect EMS maintenance and improvement. This approach is aimed at ensuring that the suppliers will provide products, semi-products, materials, or services and, at the same time, will minimize the negative impacts on the natural environment. Another important factor is guaranteeing that the organization has clear and measurable environmental targets that can be realized. According to the authors, the efficiency of the environmental management system can be achieved by performing well-prepared and conducted internal audits, as well as by using the information obtained in the monitoring and measurement in a skillful way. This also means setting new and more ambitious environmental targets and objectives.

Another author [14], on the other hand, tries to demonstrate that improvement of EMS is connected with an improvement of environmental performance. The factors he presented were divided into internal and external ones. The following external factors can inhibit improvement of environmental performance to a certain extent:

- high interest rates for the financing of environmental equipment
- low demand for clean products
- price structure does not reflect environmental costs
- governmental bureaucracy
- lack of available information regarding environmental standards
- lack of available information about appropriate technologies
- lack of available information about implementation methodologies for Cleaner Production
- lack of areas to obtain environmental consultancy
- lack of governmental resources for training
- lack of an "environmental culture"
- inappropriate environmental standards
- inefficient environmental standards
- inconsistency among the different governmental agencies (central, local)

The same author defined the factors that have a positive influence on environmental improvements: standard requirements and national environmental enforcement, local neighbours and communities, national and foreign clients, industrial associations, following what the competition has done, free-trade agreements, internal company policy, internal economic issues of the company, unions, and fear of the press.

After a thorough analysis of the literature it can be concluded that most factors that influence the improvement of the EMS, to a smaller or larger extent, have been described. The factors result directly from both the internal activity of the organization and its external environment. Therefore, the factors influencing the improvement of the EMS can be divided into two main groups, i.e. external factors and internal ones. The following internal factors can be distinguished [6]:

- the organization's strategy, which takes into account environmental policy as well as its environmental mission, vision and targets
- commitment of top management in actions aimed at minimizing the negative impacts on the natural environment, preventing pollution and ensuring continual improvement
- other management systems in operation and the possibility of adapting their requirements in order to improve environmental performance
- technical and technological potential, as well as the resources that take into account a proper infrastructure and proper work environment
- the organization's financial standing
- employee awareness, competence, and motivation
- internal audit results and evaluation results of conformance with legal and other requirements that the organization has undertaken to meet and that concern the company's environmental aspects

Then again, the external factors influencing EMS improvement conforming to the requirements of ISO 14001 are the following:

- opinions and conclusions of interested parties regarding environmental performance together with complaints from the community
- pressure from the competition
- market requirements and customer complaints
- legal requirements on environmental protection
- the possibility of obtaining partial or full non-returnable financial support or subsidies for the EMS improvement
- new legal requirements that come into force
- requirements of administration units
- requirements of certifying bodies

The factors that influence the improvement of the EMS are presented in graphic form in Fig. 1.

It must also be stressed that apart from the internal and external factors mentioned above, the possible use of various environmental management tools may also contribute to the improvement of the EMS. These tools can be divided into two groups, i.e. formalized and standardized. These are presented in Fig. 2.

The tools belonging to the family of ISO 14000 standards can be rated as standardized tools influencing the improvement of the EMS conforming to ISO 14001 requirements. These are the following:

- assessment of the EMS by means of environmental audits
- evaluation of environmental performance impacts according to ISO 14031 together with examples set forth in the ISO 14032 standard
- product life-cycle assessment according to ISO 14040 standard series
- use of environmental labels and declarations according to the ISO 14020 standard series
- product design that pays special attention to the natural environment

Moreover, other formalized tools can be used in order to improve the environmental management system, namely: eco-management and audit scheme (EMAS), cleaner production program (CP), responsible and care program (R&C) or corporate social responsibility (CSR). It should

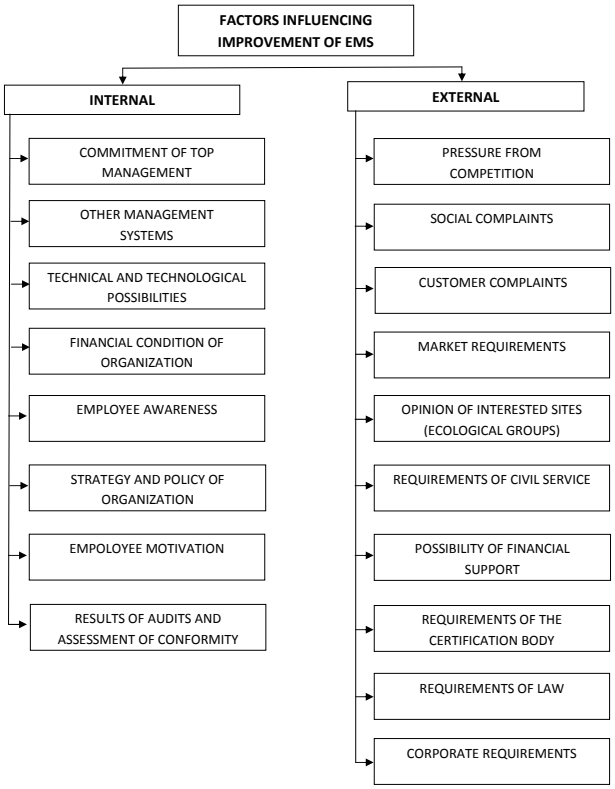

Fig. 1. Factors influencing improvement of the environmental management systems according to ISO 14001.

be emphasized that only selected methods and techniques for solving problems regarding environmental management may be used for EMS improvement.

Empirical Research

Empirical research has been conducted by the author of the article at the Department of Standardized Management Systems of Poznań University of Economics in 2007-09. The main aim of the research was to identify and assess the factors influencing the improvement of EMS in Polish companies. The statistical population comprized 1,360 (as of 31 July 2007) Polish companies conducting their business activity in Poland, that had obtained the ISO 14001 certificate confirming that their environmental management system met the requirements of the ISO 14001 standard until the end of June 2007.

The first certificate was awarded in 1997, the last one in June 2007. The biggest proportion of the analyzed organizations (19.3%) are companies which were awarded the ISO 14001 standard conformance certificate in 2004. Organizations that obtained the certificate in 2003 came in second place (16.0%). Next, 14.5% of organizations underwent the certification audit against ISO 14001 standard requirements and were awarded the certificate in 2005.

When we analyze the employment structure of the organizations in the second stage of the research proper, it can be clearly noted that they represent all groups of enterprises, starting with the large ones, which constitute the largest proportion of the analyzed organizations, and finishing with the small enterprises. The largest proportion, i.e. 55%, corresponds to organizations that belong to the group of large companies employing more than 250 people. The respondents were asked to indicate which of the organizations had between 250 and 1,000 employees and which of them had more than 1,000 employees. Companies that employed more than 1,000 people constituted 21% of this group. Medium-sized enterprises were the second largest group (33%). And finally, the smallest group consisted of organizations representing small enterprises (11%) and micro-enterprises (1%).

Above all, production companies (54.0%) implemented and certified their EMS against ISO 14001 requirements. This was also reflected in the fact that mainly this group of companies showed interest in a management system of this type. This, in turn, was influenced by the negative impact the organizations' business activity had on the environment. However, it should also be noted that 31.0% of the organizations were service enterprises and that 13.0% were organizations dealing in trade. A small proportion, namely 2.0%, was represented by organizations classified as "other." The universal character of ISO 14001 was also reflected in the structure of the analyzed statistical population. Enterprises representing various fields of business activity formed the population. The biggest number of organizations (59.5%) were industrial processing companies. The second biggest group of organizations (10.0%) were companies producing and supplying electrical power, gas, and water. A considerably smaller group were public utility companies (8.2%) or companies representing the building and construction sector.

Improvement Determinants of EMS in Polish Companies

According to the analyzed organizations, internal audits are a key element influencing improvement of EMS (64.8% of respondents). The main objective of the audit is to assess whether the EMS meets all of the requirements. However,

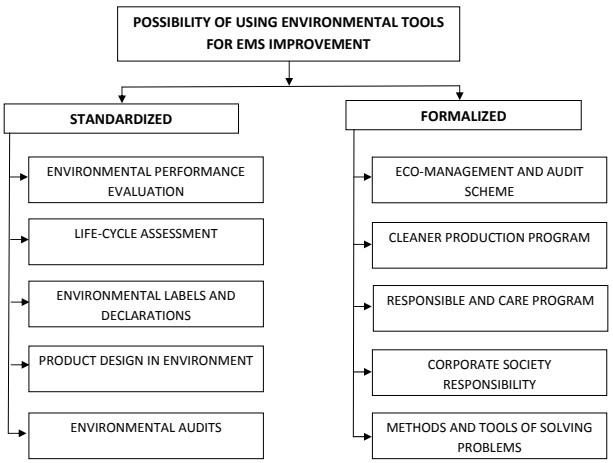

Fig. 2. Possibilities of using environmental tools in improving the environmental management systems according to ISO 14001.

these are not only requirements specified in the ISO 14001 standard, but also any other requirements that the organization decides to realize in order to improve EMS [15]. The audit results should be taken into consideration by each organization in order for it to improve its EMS. Any nonconformity or observation should be a basis for the improvement of environmental performance of a given organization and the achievement of environmental impacts in specific areas. Thus, internal audits are the most significant determining factor in the improvement of EMS according to ISO 14001 standard requirements [16].

Management reviews conducted by members of the top management (62.1%) are another element that has a significant influence on the improvement of EMS in the analyzed companies. A management review is a process in which the EMS is assessed not only in terms of conformance, but also, above all, in terms of its effectiveness. A management review is also the perfect opportunity for a more comprehensive discussion of various activity areas and impacts related to the company's environmental performance. Management members of different levels should participate in management reviews, which include: managers of organizational units that are responsible for environmental issues; managers of key units whose operational activities encompass significant environmental aspects or who are responsible for elements of the EMS; and members of top management who are responsible for assessing the EMS in operation, identifying the priorities for improvement, securing the resources, and ensuring the efficiency of the undertaken actions. The commitment of all groups of employees mentioned above can guarantee a professional approach to the assessment of key elements of the EMS that not only influence its maintenance but, above all, its improvement. As a result of a properly conducted management review, which takes into consideration all of the input elements required by the ISO 14001 standard, the top management can reach proper conclusions and define accurate guidelines regarding the realization of activities connected to EMS improvement. A properly conducted management review that takes into consideration all of the input elements that are discussed by members of the top management in great detail also ensures that the EMS is thoroughly assessed. Also, as a result of such thorough assessment, the top management can discuss a number of different factors and issues related to the improvement of the EMS and to draw appropriate conclusions.

The requirements of the certifying body (57.4%) are the third most significant factor influencing EMS improvement. The auditors of the certifying bodies determine the framework for EMS improvement in a given organization. Very often auditors pay attention to issues during certification, control and re-certification audits that have not been noticed earlier in the organization. A great number of certification bodies introduce an additional criterion called the "potential for improvement" besides the traditional classification of non-conformance (critical, major, and minor). The auditors of the certification body bear this criterion in mind when discussing a great number of issues and areas to be improved during the audit. In some certification bodies (e.g. Loyd's Register) it is the representative of the organization who specifies areas for improvement at the final stage of the audit. Subsequently, during the next audit the improvement level of the previous audit is assessed. Thus, the certification body motivates the organization to improve its own EMS.

Commitment and the leading role of top management (45.6%) is the next significant factor influencing improvement of the EMS in the analyzed organizations. Top management plays a crucial role in EMS improvement. It is the top management's responsibility to ensure access to the resources needed to improve EMS and to determine their amount. The top management's approach and policy, which are aimed at minimizing the negative environmental performance impacts of the organization, are a good starting point in the improvement of EMS. The top management's commitment can be manifested in the organization's environmental policy. The policy obligates the organization not only to meet legal and other requirements on environmental protection, to prevent pollution or minimize negative impacts, but also to continually improve the EMS, take part in environmental activities, and achieve ambitious targets that have a bearing on the impacts of environmental performance. This commitment is also manifested by the top management through active participation in management reviews, during which the effects of environmental performance and improved areas are discussed. Another important component through which the top management can manifest its commitment and, at the same time, create a role model for employees, is by making them aware of the influence of their work on the natural environment. It is of paramount importance that the organization instruct employees on what actions should be taken by them to minimize the negative impacts of their work. These actions are connected with the following factors that strongly influence the improvement of EMS in the analyzed companies, namely motivation, commitment, and awareness of the employees (45.5%). Commitment of the top management, as well as motivation, commitment, and awareness of the employees, were given similar significance in the analyzed companies. These were considered to be factors strongly influencing EMS improvement. However, when the mean of answers for the companies is analyzed it turns out that motivation, involvement, and awareness influence improvement of the EMS to a slightly smaller degree in the organization (mean equal to 4.26) than commitment and the leading role of the top management (mean equal to 4.29). Not infrequently do the employees of an organization look to the top management as an example to follow. Thus, in organizations where the top management is committed to environmental activities, the involvement of other employees can also be observed. It should be stressed that the employees play one of the most significant roles in EMS improvement. It is the employees who are responsible for managing significant environmental aspects as well as for taking efficient actions as far as operational control is concerned. It is the employees, and nobody else, who constitute the main and most significant element of any management system, not only the environmental one. Therefore, it is of great importance that

proper and effective motivation methods, which encourage the employees to improve any activities related to environmental management, are implemented in a company. It is also crucial that the employees be aware of the influence of their activities on the environment, as well as of the possible environmental impacts should they not be involved in environmental management activities. By raising employee awareness, the organization achieves more significant and positive environmental performance impacts. The influence of employee awareness on EMS improvement is discussed further in this paper.

Factors influencing improvement in the analyzed companies are presented in graphic form in Fig. 3.

When the graph is analyzed it can be seen that there are a number of other elements that play a significant role and strongly influence improvement of the environmental management system. The mean of answers provided also confirms this fact. The elements are the following:

- the financial condition of the organization – 41.8% of analyzed companies, mean of answers 4.16
- the function and/or implementation of other management systems (quality, OHS) – 40.9% of analyzed companies, mean of answers 4.20
- operational strategy of the organization – 40.2% of analyzed companies, mean of answers 4.20
- technical and/or technological potential of the organization – 32.2% of analyzed companies consider this factor as strongly influencing the improvement of the EMS, mean of answers 4.19.

The factors that definitely do not influence the improvement of the environmental management system are the following:

- using labels and environmental declarations according to ISO series 14020 standards – 27% of analyzed companies
- introducing a product life-cycle analysis according to ISO series 14040 standards – 25.7% of analyzed companies
- using the evaluation of environmental performance impacts according to the ISO 14031 standard – 18.3% of analyzed companies
- participating in systems/programs, e.g. EMAS, Cleaner Production, Responsible Care – 16.4% of analyzed companies.

Once the factors are analyzed, it should be pointed out that improvement is significantly influenced by the use of environmental management tools.

According to the top management representatives in the analyzed organizations, using the evaluation results of the environmental impacts in conforming to the ISO 14031 standard requirements definitely influences improve only in the case of 5% of the organizations in total. A slightly higher number of respondents, i.e. 31.3%, indicated that using the evaluation results of environmental performance rather

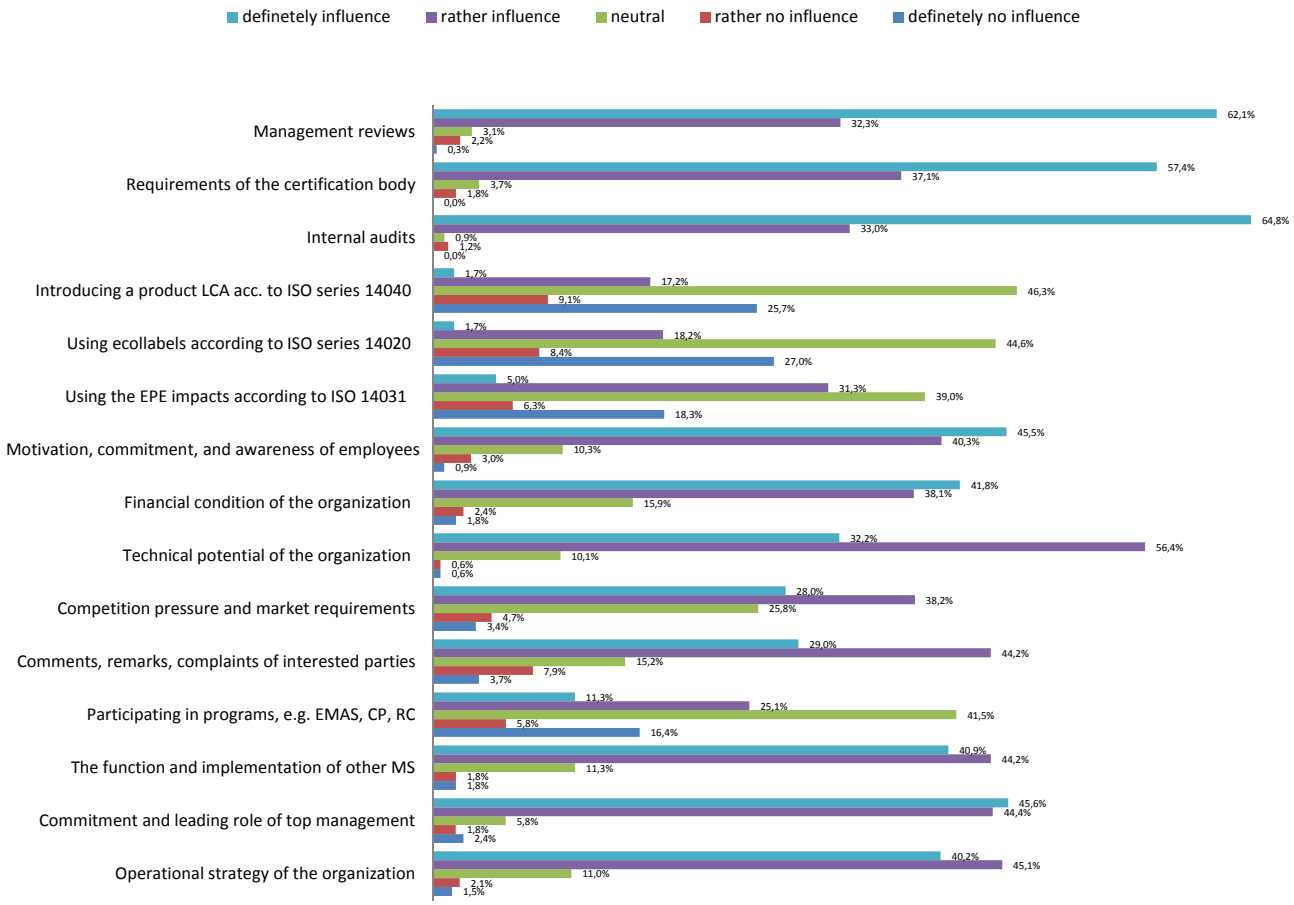

Fig. 3. Factors influencing the improvement of the environmental management system in the analyzed companies.

influences EMS improvement. Unfortunately, as said by 18.3% of the top management representatives, this factor definitely does not influence improvement, and 39% of respondents considered this very factor as neutral. However, using indicators by means of which the impacts of environmental performance are evaluated undoubtedly helps the organization identify the areas that should be assessed and, consequently, monitored and measured. Therefore, despite the fact that the top management in an organization does not use the tools that are the requirements specified in the ISO 14031 standard in order to improve its EMS, the top management should gradually implement the requirements of the ISO 14001 standard into the day-to-day activity of the organization. This should be achieved by using the practical guidelines contained in the ISO/TR 14032 standard. Then the representatives of the organization will be able to prove that their EMS is improved by means of indicators that confirm the achievement of specific environmental performance impacts which, in turn, should definitely influence EMS effectiveness. One has to remember that this is both an internal process and a management tool designed to provide the top management with up-to-date reliable and verifiable information that can be used to determine whether the impacts of environmental performance meet the criteria specified by the management of a given organization. This tool can be used to evaluate the environmental performance of an organization in relation to its policy, environmental targets and objectives, as well as other criteria regarding the impacts of environmental performance. In addition, it can be used to identify and evaluate environmental aspects, to determine the criteria concerning the impacts of environmental performance, and to assess the impacts in relation to the specified criteria. By using the guidelines set forth in the ISO 14031 standard, the top management of a given organization can evaluate the state or status of environmental impacts and identify areas for improvement.

The use of environmental labels and declarations was generally not regarded as significant by the representatives of the top management in the analyzed companies. Only 1.7% of respondents believed that using environmental labels and declarations in their organization contributed to EMS improvement. A total of 18.2% of respondents thought that using environmental labels and declarations rather did not influence improvement conforming to ISO 14001 standard requirements. This results from the fact that the standards that set forth the requirements and guidelines as far as using environmental labels and declarations (type I, II and III) are still not very common.

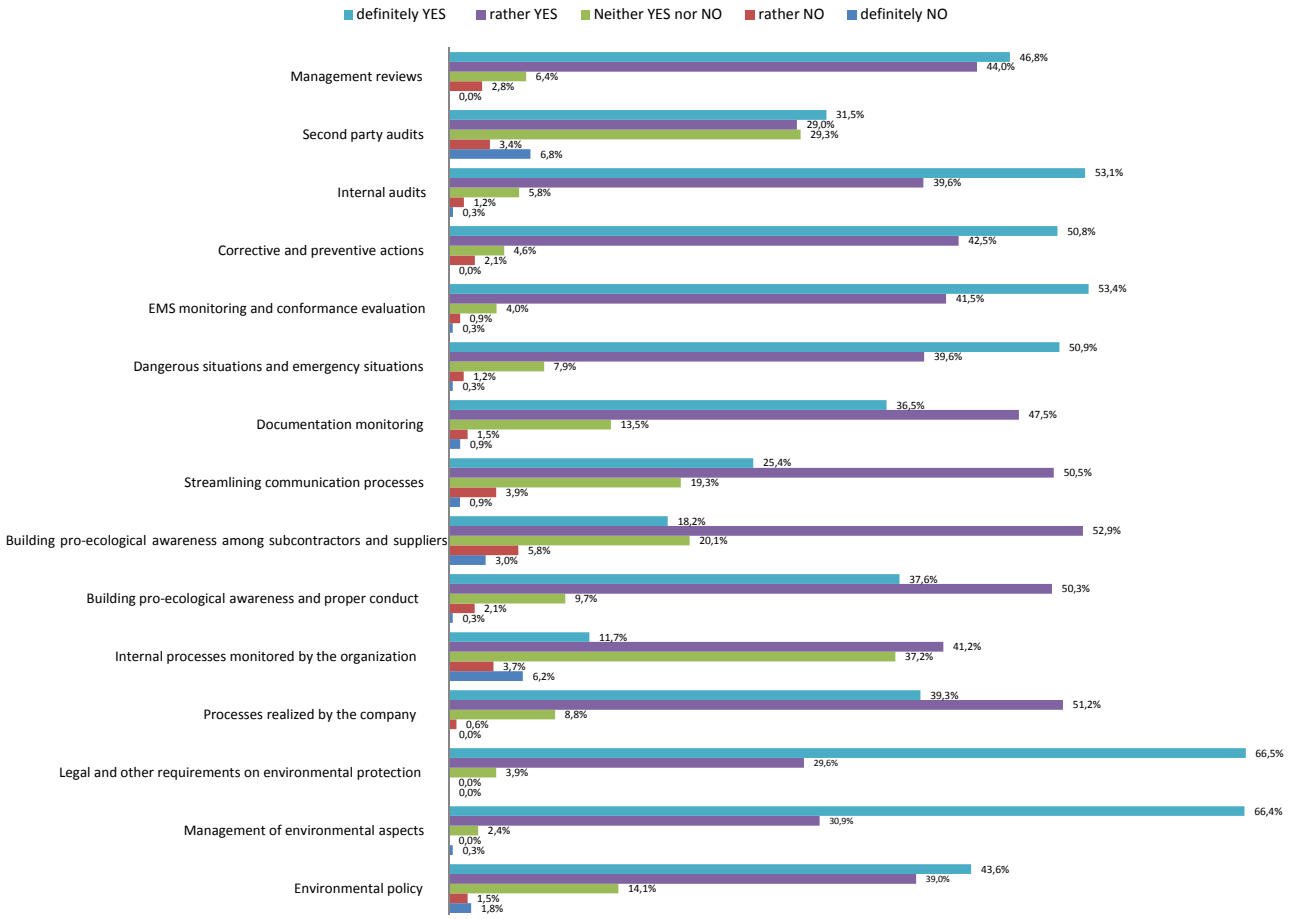

Fig. 4. Elements that have undergone improvement in the environmental management systems of the analyzed companies (results of the second stage of the research proper).

Similarly, in the case of another tool that can be implemented, i.e. product life cycle assessment, which in branch literature is regarded as influencing the improvement of EMS in conformance with ISO 14001 requirements, the results of the research did not confirm that the tool was frequently used by the top management in the analyzed companies. A total of 46.3% of respondents stated that implementing the assessment of the product life cycle according to the ISO 14040 standard series influenced EMS improvement in a neutral way. A relatively high number of representatives of the top management in the analyzed companies, i.e. 34.8%, believed that using product life cycle assessment in an organization definitely did not influence or rather did not contribute to the improvement of EMS. By analyzing the life cycle of a product, one can accurately assess its impact on the environment at each stage of the life cycle. As a result of the assessment, some solutions aimed at improving EMS can be suggested. What is more, life cycle assessment can also be employed when the organization utilizes environmental labels and declarations. Conversely, the internal activity of the enterprises falls within the scope of the EMS in the analyzed companies. It also means that the organizations very seldom attach as much significance as necessary to the environmental impacts of their products when improving their EMS. It needs to be pointed out, though, that it is the use of environmental management tools, and tools for the assessment of the life cycle in particular, that constitute a step in the improvement of the EMS according to ISO 14001 standard requirements and whose significance should not be disregarded.

Elements of EMS Undergoing Improvement in Polish Companies

An analysis of the research results shows that the most important element that is definitely being improved in the analyzed companies are applicable legal and other requirements on environmental protection (66.5%). All issues related to the management of environmental aspects are the second element, which has most frequently undergone improvement (66.4%). It has to be pointed out here that the mean of answers for both elements is the same and amounts to 4.63. Moreover, the legal and other requirements element had the smallest number of "Neither YES nor NO" answers when compared to others. The next element that is enhanced in the improvement of the EMS is the monitoring of EMS and the evaluation of conformance with legal and other requirements on environmental protection (53.4%). Other elements of the EMS that have definitely been improved in the analyzed companies are internal audits (53.1%), dangerous situations and emergency situations (50.9%), and corrective and preventive actions (50.8%). The "definitely yes" answer is dominant for all of the above elements. Moreover, the prevailing number of answers for these elements are the "definitely yes" and "rather yes" answers. To sum up, all of the above elements are undergoing improvement in the EMS to a significant and even very significant degree.

Elements that have been improved in the EMS of the analyzed companies are presented in Fig. 4.

When the results are analyzed it can be noted that elements that are undergoing improvement in the EMS to the smallest degree are the following:

- internal processes monitored by the organization (mean of answers 3.49)
- second party audits (mean of answers 3.75)
- building pro-ecological awareness in subcontractors and suppliers (mean of answers 3.78)
- streamlining communication processes (mean of answers 3.95).

Conclusions

Internal audits and management reviews are factors that most significantly influence the improvement of EMS. The second determinant of EMS improvement is the management review. This element undergoes most comprehensive improvement, compared to the other elements, when the whole EMS is improved. The requirements of the certification body are another factor influencing EMS improvement. The financial condition of the company and its resources influence the improvement process rather significantly. Commitment and the leading role of top management, as well as motivation, commitment, awareness, and competence of the employees, are also quite significant. It is important to note here that although internal audits and management reviews are the most significant elements influencing EMS improvement, the same elements are not equally significant when it comes to improvement of the system.

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