

## **Implementation of an environmental management system in a company for computers and electronic devices repairing**

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**Abstract.** The paper presents the conditions, objectives and stages necessary to implement an ISO 14001 Environmental Management System in a company for computers and electronic devices repairing. Implementing ISO 14001 standard establishes a set of rules for a high performance Environmental Management System. The company works in computers and electronic devices repairing and its purpose is to improve the organization environmental performance by using efficiently the resources. The applied system concern environmental activities and aspects that the organization can control and influence, including the requirements imposed to be fulfilled. The company environment policy had to formulate environmental objectives, according to the legislation. The environmental results are obtained in accordance with the quality, health and occupational safety policy and with the strategic direction of the organization.

**Keyword:** *management, computers, performance*

### **1. Introduction**

The work includes the stages of Environmental Management System ISO 14001 implementation described for a company for computers and electronic devices repairing. It has experience in the field, being established in 2010, by transforming a service department affiliated to a household appliance supplying company into a separate company. Its mission was to work for mother – company and for others, the main activity being to repair computers and electronic devices and the strategy was to become the number one player in the market for electronic, household appliance and IT services and repairs in south-eastern Europe.

Now, the company has almost 300 employees, of which 100 are service technicians at the headquarters, 50 are field technicians, spread in the country and around 50 people provide the call center and customer relations. They have good experience in service and professional training to repair most used long use products: mobile phones, tablets, IT, electronics, small and large appliances.

The company offers services of consultancy, diagnosis and quick repair of the breakdown, both for warranty products and for post-guarantee products, offering also a repair assurance to the last ones. The firm's portfolio covers 62 brands and it provides consulting and repair services for almost 30,000 customers per month.

The ISO 14001 standard is an international standard that establishes a set of rules for a high performance Environmental Management System. It helps to improve the environmental performance

of organizations by the efficient use of resources and it helps to win the stakeholders trust. This system can be applied to those environmental activities and aspects that the organization can control and influence, the requirements imposed to be fulfilled must allow to formulate the policy and the environmental objectives, according to the legislation [1].

*The process-based approach* of the company involves the definition and the systematic management of processes and their interaction, in order to achieve the results in accordance with the quality, health and occupational safety policy and with the strategic direction of the organization.

The PDCA cycle (Plan - Do - Check - Act) represents a method of organizing and carrying out management activities, for continuous improvement of the quality management system. Its application allows to ensure that:

- the processes are properly managed and have adequate resources;
- opportunities for improvement are determined.

The procedure for applying the PDCA (Plan - Do - Check - Act) cycle at company level covers:

– *the planning phase:*

- it establishes the system objectives and its processes and the resources to obtain the results, in accordance with the client's requirements and the organization's policies;
- it identifies and treats risks and opportunities.

– *the performing phase:*

- it implements what it has been planned;

– *the verification phase:*

- it monitors and it measures the processes, the resulting services, in relation to policies, objectives and requirements and planned activities.

– *the action phase:*

- it acts to improve the performance, by doing the changes to be adopted or abandoned, depending on the previous phase results. If the verification phase results don't show significant improvements in clients' requirements, corrective action measures are established and another PDCA cycle must be started.

*"Risk-based thinking"* is one of the key changes contained in 2015 ISO 9001 revision, taking into account the qualitative risk (and quantitative, function the organization context), by defining the formalism degree necessary to plan and to control the quality management system, also its component processes and activities. Risk-based thinking allows the company:

- to determine the factors that could cause its processes and its integrated management system deviations from the planned results;
- to implement preventive controls to minimize the negative effects;
- to maximize the improvement opportunities.

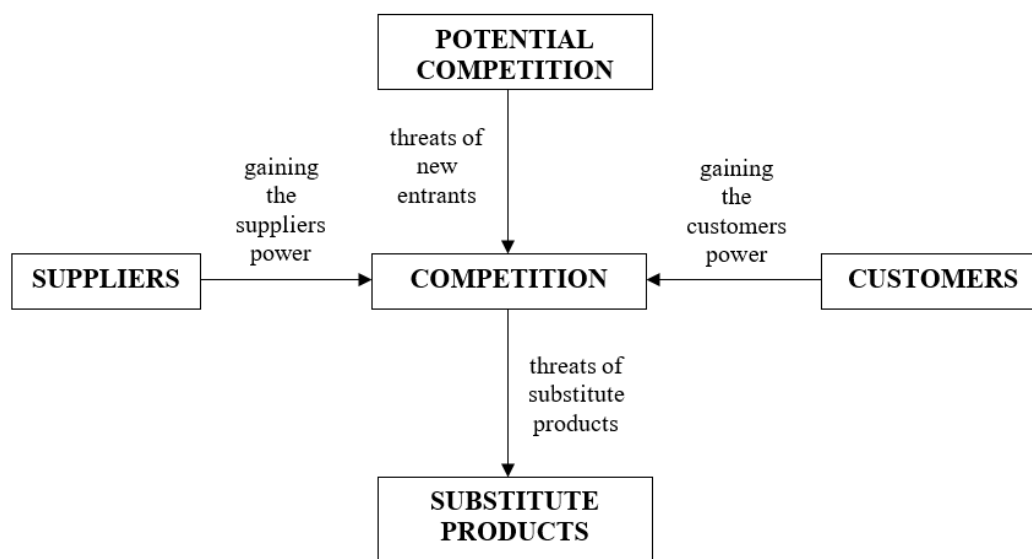
The main purpose of the implementation of an Integrated Management System is to act as a prevention tool, by planning actions for dealing with risks and opportunities. Thus it will determine a basis for increasing the system efficiency, achieving improved results and preventing negative effects.

The results that will be obtained allow the organization to attract customers, to develop new services, to reduce losses and improve productivity, to increase the quality of services for customer satisfaction.

## **2. Influence factors and analyses of company's activities**

### *2.1 Porter model*

For a good development and efficiency of the company's activities it is necessary to follow and to analyze all the factors in order to capitalize the favorable ones action and to prevent the negative impact of the unfavorable factors action - over the company's activity. That is why it was adopted the *Porter model*, which proposes an approach based on the company's perspective within its industry area. This approach is called *"The model of the five competing forces"*: current competition, potential competition, customers, suppliers and substitution products [2] (Fig. 1).



**Figure 1.** Porter model [2]

These five competitive forces determine the competition intensity and the firm profitability within the industry area [3]. Michael Porter's strategic approach concludes that the power of each factor from the 5 analyzed, as well as their combination, characterizes the company field of activity, according to the competition intensity and it determines the sector profitability, measured by the long-term return of the invested capital.

Because the analyzed company is specialized in the repair of home appliances, electronic and IT equipment, the strategic approach is according to the competition nature and intensity, in this field of activity. In this case, the Porter model is based on the analysis of the 5 factors influence:

1. The analysis of the customers negotiation capacity;
2. The analysis of the suppliers negotiation capacity;
3. The analysis of the degree of threat of some substitute products / services;
4. The analysis the entries of new competitors in the field of activity;
5. The analysis of competition between companies in the field of activity.

It is appreciated that the company performance in this field of activity is due to the competitive advantage over the competitors, with a moderate degree of risk and profitability, and the diversification may be necessary to strengthen the image with global aspirations, by acquiring new organizational knowledge. So, the analyzed company focuses on obtaining superior performance, becoming industry sector leader, in terms of: the services quality to be offered, the post-guarantee services and the facilities offered to customers, the technology used, the delivery time, the ability to adapt to environment changes and to the customers demands. The risk is low from the point of view of competition and from the point of view of substitution activities; considering these conditions, the market's absorption capacity is low in relation to the service offer.

Technological developments have a strong impact on this industry sector and the company has to adapt and specialize continuously. The area of strategic interest is represented by the Romanian and European market, the significant clients being Emag, Flanco and Altex [4], [5].

Considering Michael Porter strategies, the most suitable for the analyzed company is the differentiation strategy, the target established is to obtain a superior performance toward a leading position in the market. The company advantage is the ability to adapt to the environment and field changes.

*2.2 PEST analysis*

In order to adopt and implement marketing strategies that will work for the business profitability, the responsible managers must know the firm environment. For this they use *PEST analysis*, a very powerful tool for analyzing strategic situations in a successful business. When they do environment scanning, managers' decisions are influenced by PEST factors: Political, Economic, Social, Technological, Ecological and Legislative.

The environmental factors analysis is performed on a single level, respectively the national / international level. The differentiation between the national level and the international level is insignificant in globalization conditions, both the demand and the offers. Considering the company's field of activity, Table 1 presents the four possible subsystems of influencing factors: politico-legal, economic, socio-cultural (including demographic) and technological. The key factors selected are marked with (\*).

**Table 1.** PEST analysis of the company.

<b>Political and legal</b>	
<i>Selected Key factors</i>	<i>Comments</i>
legal regulations of Labour legislation (Labour Code) *	- Political-legal factors determine a not attractive investment climate for the analyzed company. - Possible changes in labor law and very slow legal procedures block projects development and the direct access to utilities, generating uncertainty for the growth strategies development. - The products repairs field is regulated at a set period of time, which can not exceed 15 calendar days from the customer notification date related to the product lack of conformity. - The taxes and fees system can be considered uncertain and turbulent, due to the appearance of new taxes and the frequent modification of the existing ones.
investment policy (Fiscal Code) *	
governmental stability *	
the taxes and fees system *	
legal requirements for health and occupational safety *	
waste management	
European legislation	
consumer protection	
<b>Economic</b>	
<i>Selected Key factors</i>	<i>Comments</i>
economic growth *	- Consumer confidence is an important economic factor; a positive image can have long-term economic effects - a satisfied customer will bring other customers and thus it will increase customers number, also the company reputation. - The increase of the economy minimum wage has a direct impact on the human factor expenses, especially when the company needs qualified personnel. - Improving the infrastructure by investments creates the premises for better consumption management, but it could create cash flow problems. - It is possible the European funds accessing is
relatively low possibilities to access the European funds	
labour cost *	
utility prices *	
taxes	

"leu-euro" constant exchange rate consumer confidence *	much too complicated when the company does not have specialized personnel. - The gross domestic product has a relatively high impact because if the GDP is high, consumers are tempted to replace the products and not repair them.
gross domestic product (GDP)	
<b>Socio-cultural</b>	
<i>Selected Key factors</i>	<i>Comments</i>
attitude for health and occupational safety *	- The health and safety of human resource is an absolute priority for the company, the employees work in a safe environment.
young staff *	- Communication deficiencies exist in the company due to the large number of employees, but it is a factor that is worked daily and has experienced an improvement.
employees have communication deficiencies *	- The low mobility of the workforce is an asset for the company, the employees being stable at the workplace, they do not migrate, only changing the positions, from a hierarchically lower level to a higher one.
company image at local and national level *	- Population education is one of the socio-cultural factors with influence on the company; the population with a higher level of education and a growing economy chooses to repair products, places greater emphasis on reducing waste and conserving the environment.
labour mobility *	
population education	
<b>Technological</b>	
<i>Selected Key factors</i>	<i>Comments</i>
technological equipment	- The company's technological equipments are high performance and they facilitate the technicians work in products repair, but their change influences the company's expenses.
technological evolution and technological wear *	- The technological evolution is the company's greatest impact factor, because it indirectly forces to a continuous improvement.
product life cycle *	- The products life cycle increases with the products repair, because only the defective parts are recycled, which cannot be reused for other products.
information and communication technology *	

### 2.3 SWOT analysis

Concerning the main elements of a SWOT analysis related to the company for computers and electronic devices repairing the strengths, weaknesses, opportunities and threats are:

- Strengths:
  - o well known company at national level;
  - o awarness on the national market;
  - o good visual and commercial appearance (website, layouts, posters, flyers);
  - o well-defined and efficient operational standards and procedures;
  - o good management team experience in management;
  - o team experience and stability in the process;

- good experience of the creative and product management team that develops the services;
- strategic location;
- wide category of repairable products.
- Weaknesses:
  - adequate Human Resources in the company
  - company site is played only in Romanian and it must be improved.
- Opportunities:
  - potential of the international market;
  - increasing the international market;
  - increasing the education level of the population;
  - adoption of more drastic environmental regulations;
  - national and international territories not covered by technicians.
- Threats:
  - competition;
  - technological evolution;
  - raising the minimum wage at economy level;
  - increasing taxes and fees can affect the company financial situation.

### **3. Environmental policy and implementation of an Environmental Management System for the analyzed company**

The company has implemented a quality, health and occupational safety, environment and information security management system, in accordance with ISO 9001: 20015, OHSAS 18001: 2008, ISO 14001: 2015 and ISO 27001: 2013 standards.

The company top management is committed to allocate the necessary resources for the continuous implementation and improvement of the environmental management system, in order to prevent pollution.

The company employees and the company comply with the legislation in the field of environment, health and occupational safety, for pollution reduction [6].

In order to achieve these commitments, the following objectives are considered:

- Permanent application and improvement of the environment management system;
- Staff awareness by training in environmental area;
- Insurance of the sustainable development regarding the environment, within the organization, by reducing the resources consumption and a suitable organization waste management;
- Pollution prevention

Starting from Environmental Policy, the specific objectives were elaborated and being permanently monitored. The Environmental Policy is applicable organization all levels, being known and respected by all personnel working for the company and on its behalf - according to ISO 14001 standard. For a suitable implementation of an Environmental Management System, there are some reference documents related to the Environmental Policy:

- SR EN ISO 9000: 2015 - Quality management systems. Fundamental principles and vocabulary.
- SR EN ISO 9001: 2015 - Quality management systems. Requirements.
- SR EN ISO 9004: 2010 - Quality management systems. Guidelines for performance improvement.
- SR EN ISO 14001: 2015 - Environmental management systems. Requirements
- SR OHSAS 18001: 2008 – Health and occupational safety management systems. Requirements;
- OUG 195/2005, Environmental protection.

For the implementation of an Environmental Management System at the analyzed company level, there are some distinct steps presented in a procedure:

*a. Planning to identify environmental issues*

The identification and evaluation of the environmental aspects of the activities, products and services performed within the organization is carried out in order to establish the general objectives and the environmental targets, also the elaboration of the environmental management program, in order to minimize the environment impact and prevent pollution. These points are accomplished in the implementation phase of the environmental management system and whenever significant changes occur in the organization's activity (new processes, technology changes, raw materials, equipment, legal requirements and other environmental requirements).

*b. Identification of environmental aspects*

The general manager, taking into account the technological options, the financial, operational, logistics requirements and stakeholder views, allocates the necessary resources and designates the team to be responsible for identifying and evaluating the organization environmental aspects, the team coordinator being Risk and Safety Manager, respectively Technical Director. The team also includes the personnel that carry out activities that can generate an impact on the environment.

An evaluation questionnaire is established and completed, specifying:

1. basic areas to be investigated: environmental policy, management, legislation, circumstances, current activities;
2. information to be asked as questions.

The environmental aspects are identified and recorded by direct observations, interviews with people within the organization, consulting the relevant documents, identification of activities and for each activity: inputs / outputs, quantity / control and their importance, using flow diagrams.

The environmental aspects to be categorize are: air emissions, evacuation of waste water, waste management, soil contamination, dangerous substances, use of raw materials, utilities and natural resources, other problems (noise, vibration, radiation, improper visual impact, health and labor protection).

*c. Evaluation of environmental aspects*

It is done by entering in a database the records made at stage I, in order to process this information and to obtain the List of environmental issues. The relevant criteria for the environmental aspects analysis and information processing (environmental aspects) are defined. The criteria are associated with a scoring system that allows the "quantitative" evaluation of environmental aspects. Table 2 and Table 3 present the criteria and scores used to analyze environmental issues.

**Table 2.** Criteria used to analyze environmental issues.

No.	Criterion	Notes			
		1	2	5	10
1	Impact size	Little	Medium	Big	Extreme
2	Duration of impact	Hours	Days	Weeks	Months
3	Production frequency	Occasional	Periodical	Permanent	-
4	Resource consumption	Little	Medium	Big	Very big
5	Ecological risk	Little	Medium	Big	Very big
6	Impact on employee health and safety	Little	Medium	Big	Very big
7	Compliance with legal requirements and other applicable requirements	Compliance	-	Noncompliance	-
8	Complaints	It does not exist	-	-	It exists

**Table 3.** Scores used to analyze environmental issues.

Criterion 1	Criterion 2	Criterion 3	Criterion 4
<10% of the organization surface	1-24 hours	< 3 years	< 1000 lei
10-25% of the organization surface	1-6 days	monthly, weekly	1001-5000 lei
25-50% of the organization surface	1-4 weeks	daily	5001-10000 lei
>50% of the organization surface	1-12 months	-	> 10000 lei
Criterion 5	Criterion 6	Criterion 7	Criterion 8
<10% affected environment	≤ 1% employees	100% applicability laws	0% claims for environment
10-25% affected environment	10% employees	-	-
25-50% affected environment	50% employees	serious violations of the law	-
≥ 75 affected environment	100 % employees	-	≥ 1 claims for environment

Each environmental aspect will obtain a note by summing the partial notes, corresponding to each criterion of the analysis, function the aspect definition interval. The score maximum value associated to the environmental aspects is 47 points, and the minimum value is 11 points. The threshold value accepted for environmental issues analysis was set at 25 points. The environmental aspects are ranked according the obtained score - by decreasing the environmental aspects list order. The list of significant environmental aspects is obtained by retaining the environmental aspects with scores equal to or higher that the 25 points threshold value. The list of significant environmental issues contains information on the associated flow chart number, the location / activity corresponding to the environmental aspect, the description of the environmental aspect, the associated environment impact, the obtained score.

The significant environmental aspects are grouped into four main environmental impact categories: Atmospheric emissions (EA), Waste management (GD), Management of dangerous chemical substances and preparations (GSP), Resource consumption (CR).

All the significant and insignificant organization environmental aspects will be permanently evaluated and it will be added new ones according the situation, in order to adapt the established objectives and programs to the organization realities and to improve the implemented system [7], [8].

In order to identify the organization environmental objectives and targets the following aspects are considered:

- the directions of action established by the quality, environment and safety policy;
- legal provisions and other environmental requirements related to the organization;
- the environmental analysis results, considering the significant environmental aspects;
- technological, financial, operational, commercial aspects of the organization;
- the stakeholders point of views.

The environmental objectives and targets are identified and proposed by the Quality and Environment Management Responsibilities and by the heads of departments, also the achievement indicators and the corresponding fields from the "Environmental Management Program" are completed.

The list of significant environmental issues is used in analyzing, establishing and defining the appropriate environmental goals and targets that will lead to the elimination or control of the associated environmental impacts.



### *3.1 Evaluation of the Environmental Management Program*

The Environmental Management Program is elaborated, in each year, by establishing the actions, deadlines and responsibilities necessary to fulfill the environmental objectives and targets. The Environmental Management Program is elaborated by the Quality and Environment Management Responsibles and it is approved by the General Manager. Also, there are estimated the required program implementation costs. The program is disseminated to all departments involved in its implementation and it is included in the Environmental Planning File.

### *3.2 Monitoring the achievement of objectives, targets and Environmental Management Program*

Carrying out the actions of the Environmental Management Programs is controlled by the Quality and Environment Management Responsibles, by consulting the heads of departments and internal audits, regarding the terms and responsibilities given by the Environmental Management Program.

Quality and Environment Management Responsibles report the results to General Manager. In actions non-fulfillment case, the situation is analyzed by the General Manager, who reshapes the terms and takes the decision regarding the program revision.

Yearly, the management analyzes carried out reports with all indicators associated to the environmental objectives and targets. The information regarding the accomplishment of the Environmental Management Program actions are included in the input data for the management analysis sessions.

### *3.3 Updating the environmental objectives, targets and Environmental Management Program*

The Environmental Management Program is updated whenever major changes occur in the organization (development of new processes, activities, products, changes of processes and technology, significant capacity expansion or reduction, activities expansion or relocation, changes of laws and rules), but at least annually, within the management analyzes, aided by the internal or external audits. Their review is based on:

- an analysis regarding the stage of achievement of the foreseen objectives and targets;
- significant environmental issues arising from the new investments or from a new environmental analysis;
- change of products or technologies, with implications on the environmental impact.

The review responsibilities and activities are identical to those provided for the document's elaboration. After update, the new Environmental Management Program is disseminated to the departments with responsibilities in its implementation; they will file it in the Environmental Planning File.

## **4. Conclusions**

Implementing ISO 14001 standard establishes a set of rules for a high performance Environmental Management System. The company works in computers and electronic devices repairing and its purpose is to improve the organization environmental performance by using efficiently the resources.

The applied system concern environmental activities and aspects that the organization can control and influence, including the requirements imposed to be fulfilled. The company environment policy had to formulate environmental objectives, according to the legislation. The environmental results are obtained in accordance with the quality, health and occupational safety policy and with the strategic direction of the organization.

Each year, the Environmental Management Program is elaborated, by establishing the actions, deadlines and responsibilities needed to be fulfilled. It is mandatory to monitor the achievement of

objectives, targets and Environmental Management Program. Yearly, the management analyzes carried out reports with all indicators associated to the environmental objectives and targets.

The company for computers and electronic devices repairing has implemented an Environmental Management System, after that the financial results and the relationships with the partners have been improved. It is obvious that any company that implements such a system and obtains the certification has a win –win situation, related to customers and suppliers, who gain confidence in the company.

The entire process within the company lasted two months, being followed by the audit; as an audit result, the company obtained ISO 14001: 2015 certification, also the suggestion to pay particular attention to the employees training. Critical points to monitor and to improve are mentioned: decreasing the number of wastes, all employees training, monitoring the changes regarding the environment and documented them, promoting the implementation of the Environmental Management System.

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