

## **Initial ISO 14001 Gap Analysis Tool and Environmental Management Guide for SMEs**

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<p>Via participating in ECO-Sup-PORT Project and based on the data gathered for it, it was concluded that nowadays many SMEs operating in Europe do not bother themselves with taking any voluntary actions related to environmental management. The main reason for this phenomenon is poor SMEs' awareness of the benefits that EMS' implementation and environmental certification may bring in addition to the apparent complexity of the existing tools for environmental management.</p> <p>In order to reduce environmental impacts from business activities of SMEs, to motivate those companies to enhance their sustainability and to guide them on the path towards EMS' development and implementation, as well as environmental certification, the product titled "Initial ISO 14001 Gap Analysis Tool and Environmental Management Guide for SMEs" was created and developed during ECO-Sup-PORT project and afterwards, during the process of thesis writing.</p> <p>The product itself is a model of reliable and highly efficient tool, which is user-friendly, practically applicable and designed as for the SMEs which already have EMS, and for those ones which have not considered environmental issues before, regardless of their business sector. The tool had been developed taking into consideration the features of SMEs and based on theoretical concepts, relevant information resources, workshops under the supervision of professionals and analysis of the already existing EMS tools such as ISO 14001 and EMAS.</p>	
<p><b>Keywords</b> Environmental Management System, Sustainability, SMEs, ISO 14001, Gap Analysis</p>	

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# 1 Introduction

Earth's resources are limited and being depleted every day; ecological situation in many places is deteriorating; and environmental impacts from lots of business operations are unrecoverable or, at least, influence negatively on the ecology.

All the influential global companies try to struggle with those problems in more or less extent, because they have sufficient resources and clear understanding of the benefits which can be brought to the company with the attempts to develop sustainably.

Nevertheless, it is important to remember that, according to the statistics, 99% of all companies in the developed countries are SMEs (Planet S.A. & Danish Technological Institute 2010, 7). Whereas not many of them do something that exceeds compulsory measures dictated by the government and common sense aimed at the sustainable development. This may be due to the fact that the most of SMEs have very limited resources and do not want to waste their time and funds on the activities which, as it may mistakenly seem, do not bring any benefits. Moreover, some SMEs may even be unaware of the existing tools for the environmental management development and implementation.

Small and medium-sized companies which do not consider environmental issues could typically be wrong in judgments about some issues. They may believe that attempts to develop sustainably require huge investments, a lot of time and employees with relevant education. Also they may think that the process of environmental certification is an extremely difficult practice and do not bring any value. Even the fact that adherence to the environmental management system may significantly reduce costs, can be neglected. In addition, SMEs often forget that it is essential to be proactive in order to attract new clients and partners, to stay competitive and to save on the taxes which can grow rapidly under the state programs of the environmental protection.

This product based thesis helps to dispel over mentioned misconceptions. While the created tool's model is a logical continue of the theory and a good example of the tool that helps SMEs to start or continue their path towards sustainable development from any point; helps to develop EMS from the very beginning with the intention to get ISO 14001 certificate in the future; or allows to check the environmental management system on the compliance with ISO 14001 requirements.

To sum up, the target market for the product are SMEs operating in the different business sectors, both those that have never considered environmental issues before, and those that implement EMS and want to check the level of its compliance with ISO 14001 requirements. The tool can be useful even for the companies that are already ISO 14001 and want to check their progress and compliance with the current requirements of the standard.

## **1.1 Commissioning party**

Commissioning party of the thesis is ECO-Sup-PORT project created with the support and under the initiative of the European Commission and in cooperation with such universities as Rotterdam University of Applied Sciences (Netherlands), Haaga-Helia University of Applied Sciences (Finland), RISEBA University (Latvia), Bahçeşehir University (Turkey), Artesis Plantijn Hogeschool Antwerpen (Belgium).

The aim of the project is to attract students to help small and medium-sized companies operating in ports to find the solution to the problem how to become more sustainable. Another idea at the same time is to contribute to the students educational level via lectures, workshops, company visits and exchange of international practices and experiences on the topics related to sustainability, ports and SMEs.

ECO-Sup-PORT project was lasting for 3 years during which multinational teams consisting of students from the over mentioned partner universities in Finland, Netherlands, Belgium, Turkey and Latvia were working on the determination of the focus-area and were making an in-depth problem analysis in accordance with the 1<sup>st</sup> year objective; were identifying the drivers and barriers for sustainable development of SME's in the strongest sector related to port operations due to 2<sup>nd</sup> year objective; as well as were working on the development, testing and improvement of the tools and finding sustainable and beneficial solutions for SMEs operating in the ports of Finland, Netherlands, Belgium, Turkey and Latvia following the 3<sup>rd</sup> year project objective. (Chen, A., et al. 2013, 5.)

I took part in the 3<sup>rd</sup> and the final year of ECO-Sup-PORT project which was held in Istanbul, Turkey and hosted by Bahçeşehir University. Our team got an opportunity to apply in practice all the theoretical findings collected during the previous years of the project, to develop and to test the tool for SMEs operating in Finnish ports and, of course, to improve it with the help of the collected data and feedback on the testing

stage, workshops where multinational members of the teams shared experiences and practices in their countries, relevant lectures and activities, lectures by the guest speakers who were representing the ports in Istanbul or SMEs.

## **1.2 Objectives**

The foremost objective of the thesis is to create and describe the product that helps SMEs to make initial environmental review on the EMS' compliance with ISO 14001 requirements; provides efficient user friendly Environmental Management System framework which fits the features of the particular company; and increases SMEs' awareness of the benefits from EMS implementation, environmental certification and sustainable development.

The product is supposed to be an online-based tool, although it is presented as an Excel file in this thesis. By those SMEs that already have elements of EMS in more or less extent, the product can be used as a momentary gap analysis to identify company's EMS compliance with the requirements of ISO 14001 standard.

For those SMEs that have not considered environmental issues before, the designed tool helps to give a start for the effective and efficient EMS, offers a framework and provides valuable tips and hints taking into consideration ISO 14001 requirements and organisation's features.

The product is easy to use and relatively not too time consuming, since it assists the respondent with lots of helpful and valuable information reflected in the pop-up windows.

The content of the tool is considered to cover all the elements included in ISO 14001 standard, but the scope of the product's content was limited to two issues which are environmental policy and environmental aspects, that still fully demonstrates the idea and key features of the holistic product for SMEs.

## **1.3 Thesis structure**

This product-oriented thesis report is designed in accordance with the traditional report structure, and its content adheres to the traditional thesis model where theoretical part is followed by empirical one.

The thesis starts from the introduction part where the reader may find general information about the product, objectives of the thesis, further described concepts.

Next, there is a theoretical part of the thesis where such concepts as sustainability and environmental management systems are described in details and followed by the relevant sub-chapters. Some of the ideas are illustrated with the figures or tables for better understanding. At the end of the theoretical part, there is theory summary where the connection between concepts and created product is explained and demonstrated in the figure.

An empirical part follows the theoretical one where all needed information related to the product and the process of its creation can be found. For example, this part includes product plan and time schedule, data and collection methods, usability of the designed product and product process.

After the conclusion, where the developmental proposals are given and the thesis process, own learning and professional development are evaluated, references used to create a product and thesis report are located.

Besides the report part of this product-oriented thesis, it includes Product Thesis Timeline as Attachment 1 in addition to the product itself.

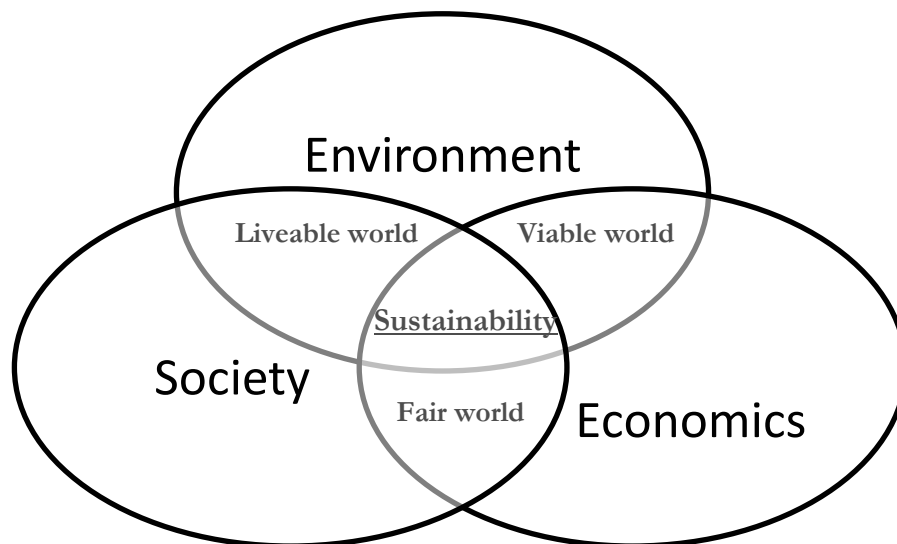
## 2 Sustainability

To understand what sustainability really means it is beneficial to give a famous inspirational quote taken from the Brundtland Report (1987) that explains the main idea behind the sustainable development: "Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs."

So in other words, sustainability itself means the ability to continue defined behaviour indefinitely without compromising environment or future generations.

From the practical point of view, the concept 'sustainability' consists of three aspects: environmental, social and economic, which are so-called The Three Pillars of Sustainability (The World Conservation Union 2006, 2).

The concept is graphically shown in the Figure 1 and explained in the details in the further chapters.



**Figure 1.** Three Pillars of Sustainability (Thwink 2012).

All the developed and most of the developing countries understand the importance of sustainable development and take appropriate measures. For example, it can be done via investing as much resources as possible to economic, social, and environmental pillars of sustainability, via establishment of organisations that take care of those issues. It is clear that usually sustainable development is the key to successful economic growth and the welfare.



## 2.1 Environmental Factors

The main objective of sustainability in terms of the environment is to contribute to the quality of the environment in the long run or, at least, do not compromise it.

When environmental sustainability is discussed, usually, four topics are considered: energy consumption, water consumption, greenhouse gas emission and waste generation, that also demonstrate the scale of the over mentioned issues. (Planet S.A. & Danish Technological Institute 2010, 35).

Overall idea is to decrease human impact on the environment as much as possible via:

- reducing energy and resources consumption;
- reducing pollution and waste generation;
- finding eco-friendly solutions;
- the use of new technologies and alternative energy sources;
- increasing ecological awareness among population and businesses.

If to give detailed examples, it could be adherence to “cradle-to-cradle” thinking and practices; reduction of CO<sub>2</sub> emissions; usage of alternative fuel for cars as biodiesel. (Hunter Lovins, L. 2008, 33.)

Disregard of the environmental sustainability issues may entail irreversible changes that will make our planet uninhabitable, because of the lack of vitally important resources, unpredictable and extensive natural disasters. That is why it is so important for the government, companies and people to pay great attention to the environmental issues. Moreover, environmental indexes (for example, the index of energy consumption) are easily measurable and could become reasonable objectives for governmental and companies' development strategies and policies.

## 2.2 Social Factors

In terms of society, the key idea behind sustainability is to optimize quality of life for the current population of the planet as well as for the future generations.

Social sustainability pillar is the most unstable one, the most difficult to be measured and to set general objectives. The problem is that countries cannot agree on any practical goals which are similar to each other, because the difference between cultures, people expectations, current level of development, priorities is huge. (Thwink 2012.)

Despite on the difficulties to define what social sustainability is, it is crucial not to ignore this pillar because it is the key to a democratic society.

One of the potential solutions to set more or less tangible goals that are applicable for all countries could be attempts to increase the level of gross national happiness (Sharrock, G., 116). The advantage of this index is its measurability and reflection of people's satisfaction or dissatisfaction towards the present conditions.

### **2.3 Economic Factor**

According to the general definition given in the Business Dictionary, the main idea of economic sustainability is implementation of different strategies for using existing resources optimally to keep responsible and beneficial balance in the long run. It could be explained more precisely: economic sustainability is the ability to support a defined level of economic production indefinitely.

Many people believe that economic sustainability is all about the Gross Domestic Product growth within a nation by the defined percent annually. However, this idea can be easily refuted, because, GDP does not show the real situation, the quality of life (for example, level of poverty, GDP growth per each citizen, average income).

The real idea behind economic sustainability is stable improvement and support of quality of each person' life. To illustrate it, one of the indexes, which shows that the defined country is close to economic sustainability, could be keeping on the very low level the percent of population who are below the defined preferred minimum standard of living (about 3-5% of population). In such case, the quality of life of 95-97% of the population will be high, and it means that economic resources are allocated appropriately and optimally. (Thwink 2012.)

To achieve this goal it is necessary not to forget about two other pillars, because in many cases the root causes are hidden there. Only finding a solution for those root causes will bring positive long term effects and will give a chance to make economic sustainability real in more or less extent.

### **2.4 European Union and Sustainability**

The example of European Union sustainable development strategy demonstrates the main challenges on the path towards sustainable development on top of some key

objectives and policies which are aimed at the solution or mitigation of the existing problems.

According to the Current Sustainable Development Strategy (European Council, 2006), there are seven key challenges that must be overcome in the future, but the main efforts and resources should be aimed at their solution already now.

Three of them are environmental pillar related: climate change and clean energy; sustainable transport; conservation and management of natural resources.

Two of the challenges are social pillar related: public health; social inclusion, demography and migration.

Last but not least, two challenges are economic pillar related: sustainable consumption and production; global poverty and sustainable development challenges.

To summarise those challenges, it is reasonable to mention that there are 4 main objectives, which are environmental protection, social equity and coherence (as a result social welfare), economic prosperity, meeting international responsibilities.

To meet all those objectives and to overcome challenges EU made a policy with such core principles as open and democratic society; cooperation and involvement of people, businesses and non-governmental organizations; cohesion between generations; policy coherence, governance and integration; development and execution of the best practices; being proactive and making source of problems (polluters) pay. (European Council, 2006.)

## **2.5 SMEs and Sustainability**

There is a misconception that small and medium-sized businesses cannot significantly contribute to the sustainable development of the planet, nor can benefit a lot from being sustainable because of their size, scope of operations, number of employees and turnover.

On the contrary, small and medium enterprises play an extremely important role in the world economy and this role is difficult to overestimate.

According to EU industrial structure report 2013: Competing in Global Value Chains (European Commission 2013a), currently there are about 20,8 million SMEs registered

in European Union, and those companies represent 99% of all businesses providing 90 million jobs in EU what is 80% of all workplaces.

The same situation takes place in many other countries besides European ones. For example, in New Zealand and Australia more than 99% of all companies are SMEs (Ministry of Business, Innovation and Employment 2011 & Australian Government Department of Innovation Industry, Science and Research 2011).

Moreover, small and medium-sized enterprises grow much faster than large companies. It means that they significantly influence on the growth of the country's economy that allows calling SMEs «an economy's backbone» in most developed countries all over the world.

Over mentioned figures should be one of the good proofs why SMEs should enhance their level of sustainability. The share of small and medium-sized businesses to all businesses in the developed countries is crucial, so it is extremely important to make as much SMEs as possible develop sustainably. In this case, it will bring the significant value to people, planet and profit.

There are some other drivers which are more obvious and direct than the previously mentioned one. They push SMEs to be more sustainable via, for instance, use of eco-innovative solutions or any other actions aimed at the development of sustainability. First of all, SMEs are highly motivated to act sustainably with the high energy prices and desire to cut expenses. But also they can be driven with expected increases in energy prices or potential regulations imposing new requirements and standards according to the state policies and strategies concerning sustainable development. Consequently, SMEs should be proactive and to start acting accordingly as soon as possible to be able to make amendments and improvements gradually and without harm to the business and its turnover.

Next driver is high material prices, so SMEs try to decrease usage of raw and packaging materials in order to cut expenses or to be ready to the material scarcity in the future. Third point which drives SMEs to develop their sustainability could be desire to have good business partners, because many of reliable companies consider environmental issues, for instance, availability of environmental certificate or at least environmental policy when choosing long the term partners.

Fourth, an increase or security of the taken market share along with an increase of competitiveness can be identified as another driver for SMEs which try to develop sus-

tainably. It is well known fact that to attract new customers, to take bigger market share, to stay competitive, it is necessary to improve continually, to follow the trends, to be proactive and innovative what will allow being ahead of the competitors. Environmental friendly solutions, innovative technologies, certificates, long-term goals can be a good option for reaching over mentioned goals.

In addition, activities of SMEs related to the sustainable development can lead to an access to subsidies and fiscal incentives by the government in some cases. For instance, low environmental impacts from business activities of the company, can cause lower tax rates.

All the drivers stated in previous paragraphs are the most frequently given responses according to different conducted researches among SMEs representatives. Good example of the comprehensive research results used for this chapter, could be found in The Big Green Opportunity for Small Business in U.S. report (Green America 2013).

It is not a secret that there are some challenges besides benefits for SMEs that try to be sustainable.

The most common and serious obstacle that SMEs can meet is the limited resources. Usually those resources are time, money and information. It is especially obvious, when comparing the opportunities of SMEs with the opportunities of the large companies, where it is not extraordinary case to have the whole department which takes care of environmental and sustainability issues, has professionals in this area and stable budgeting.

Another challenge is non-awareness of all the benefits that sustainable development can bring to SME.

In addition, many SMEs overestimate the complexity and the resources required to start acting more sustainably. Nevertheless, if to use systematic approach and to act step by step, it will not be a problem anymore.

The next problem is the complexity of some tools aimed at green behavior and improvement of sustainability level in the company. The reason is that many of the tools were created mainly for the large companies assuming the resources they may have and without consideration of SME's peculiarities and limitations. It means that lots of the tools are not effective and practical for small and medium-sized companies. (Iraldo, F., Testa, F.& Frey, M. 2010.)

However, there are some ways to overcome the those challenges.

One of the best options is to develop and adhere to the environmental management system. It will allow SME to cut cost and save time via more efficient and effective use of materials, company resources, energy, setting effective strategic goals; and with the help of clear framework.

To illustrate potential cost reduction and efficiency, it is worth to provide results of calculations taken from An Overview of Energy Use and Energy Efficiency Opportunities report (U.S. Environmental Protection Agency 2010). It is stated there that SMEs in USA spend more than \$60 billion a year on energy, whereas if to invest strategically, SMEs can cut utility costs by 10-30% without sacrificing quality of production/services, uniqueness, comfort and service level.

If an SME has lack of information about sustainability, environmental issues and does not have budget to hire a specialist or to outsource, it is sensible to attend relevant exhibitions. Many important things could be found out by asking professionals and attending seminars at such events. Furthermore, it is possible to cooperate with universities where students and professors can offer their help and solutions for free and to use SME's case as a basis for the project. In addition, in many countries there are non-profit organizations and centers for small and medium-sized businesses which are sponsored by the government, where it is possible to get all necessary assistance and information for free or for very low fee.

Another option is to focus on the improvements that have fast return on investment index and not too costly. For example, it is reasonable to invest into installation of efficient lighting instead of buying solar panels for the whole roof of the small company's office which is located in Finland, where sun appears not every day.

Also, it is necessary not to forget about the actions aimed at sustainable development which are free of charge but help to go forward and to cut some expenses. The easiest example can be reduction of paper use via double-sided printing.

Last but not least, it is important to try to use those tools that had been developed especially for small and medium-sized enterprises when it is possible. It will help to take most of the advantages from the tool; to make gradual steps which do not make harm to business processes and turnover; to get better results and to have the definite plan of action.

### 3 Management Systems

When management systems are discussed, usually means the framework of processes and activities which had been created in order to achieve the certain goals (Anderson, C. 2005). This definition is rather broad, so this term along with the phenomenon defined with it, could be met in many cases regardless of the business sector or company's size.

Why is it so important to have this framework to achieve the certain goals? This question could be answered through listing of the common benefits from the implementation of different management systems in the companies.

The following benefits for the companies are the most significant ones:

- the existence of clear elaborate framework which allows to set priorities and to act in the most effective and efficient way in case of adhering to the management system;
- as a result of the previous point, implementation of the management system leads to cost reduction, in addition to reduction of resources consumption;
- another benefit is new opportunities for the development, for instance, extension of the market share;
- reduction or/and mitigation of the risks;
- in some cases adherence to the management system leads to the better reputation and attraction of new customers/ suppliers;
- management system can demonstrate the compliance with requirements (for example, with legal requirements or company's policy);
- if the company follows the trustworthy and elaborated management system it help to establish the best practices.

The next logical question which may arise is what kinds of management systems do exist?

Most of the companies have a systematic approach towards managing human resources, finances, health and safety of employees besides customers' ones. Also, the typical representative of management systems is Environmental Management System (EMS) which helps to meet environmental objectives and enhance environmental performance (Weiß, P. & Bentlage, J. 2007, 19). Another one is Quality Management

System that focuses on the achievement of quality objectives and assists in intersection of stakeholder's expectations and need with company's products, services and abilities (Weiß, P. & Bentlage, J. 2007, 87). All over mentioned systems including many others, have different tools that help to meet company's goals.

In the next chapters, there will be a focus on the Environmental Management Systems, their core principles and benefits, in addition to the information about some of the environmental standards.

### **3.1 Environmental Management Systems**

In greater or less extent, majority of business activities have an impact on the environment. To manage those activities and as a result to remove or mitigate their impacts, environmental management systems exist and are implemented in many companies in the structured way.

There is a comprehensive explanation for the term Environmental Management System (EMS) in the document AS/NZS ISO 14001:2004 (2004, cl. 3.8): "Part of an organization's management system used to develop and implement its environmental policy and manage its environmental aspects". In other words, the general task of any EMS is to improve company's environmental performance and consequently to effect positively on the sustainable development of the planet and society.

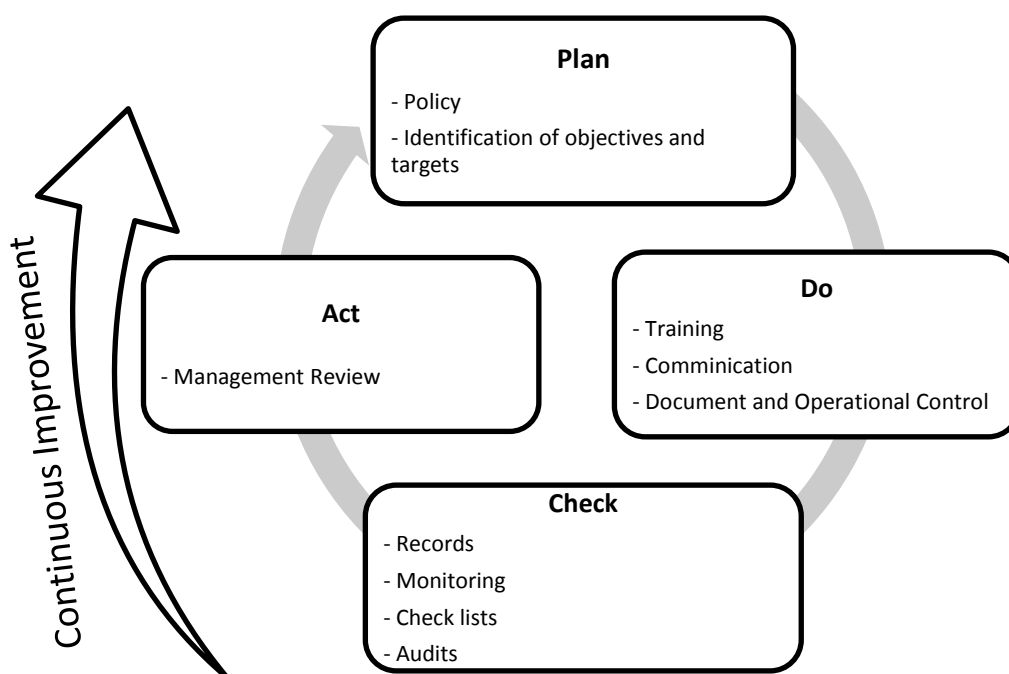
To understand better what EMS is, it can be helpful to give an explanation for the term environmental aspects and environmental policy.

All business activities, services, products that have or potentially might have a positive or negative impact on the environment are called environmental aspects (European Environment Agency 1998, 45). There is a variety of potentially harmful for the environment business activities which hinder the sustainable development of the organisation and the society generally. Unfortunately, usually there are much fewer activities which are aimed at the sustainable development.

Environmental policy is a statement by top management of the company, where organization's intentions and practices, objectives and targets in terms of environmental performance could be found (European Environment Agency 1998, 34).



Different tools exist in order to help companies in EMS's implementation. For instance, there are various environmental certificates which will be described in the further chapters in details. All these tools have some common features and serve to plan, implement, check, act and develop all company's business activities and impacts related to the environmental issues. In other words, the PDCA (plan-do-check-act) method should be applied when adhering to any management system (Weiß, P. & Bentlage, J. 2007, 24). This idea is shown graphically in the Figure 2. Also it is important to mention, that all those procedures should be done permanently and with attention to the details to guarantee the compliance with such key principle of any EMS as continuous improvement.



**Figure 2.** PDCA Cycle (Weiß, P. & Bentlage, J. 2007, 24).

As far as process of planning any EMS is concerned, it includes three main points to be considered:

- significant environmental aspects;
- legal and other environmental requirements;
- objectives and targets of EMS.

So what are the reasons to have EMS in the company?

First of all, it is the best way to improve environmental performance systematically and to be able to measure it against the key performance indicators.

Secondly, EMS implementation allows to reduce energy, water, material consumption and waste generation, and, as a result, it leads to cost savings and legal/other environmental requirements compliance.

Thirdly, EMS helps to set clear environmental objectives and targets and allows to assess the progress towards their achievement.

Last but not least, EMS implementation, usually, gives a competitive advantage and demonstrates goodwill of the company.

If a company wants to facilitate EMS's implementation, to make it work in the most efficient and effective way and to increase employees' involvement, it is important to design an Environmental Management System in accordance with the core principles of the other management systems implemented in the company. For example, the planning cycle, the approach towards corrective and preventive actions should be the same. (Weiß, P. & Bentlage, J. 2007, 21.)

In addition, it is important to anticipate and try to avoid the potential barriers which can occur on the path of EMS implementation and significantly decrease its efficiency and effectiveness. Those barriers are:

1. lack of management support and/ or employees involvement;
2. inadequate resources required to implement EMS;
3. lack of awareness of management and employees about EMS's benefits and Environmental Management Systems generally;
4. not clear and reasonable division of responsibilities in terms of EMS implementation;
5. complexity of EMS. (Hillary, R., 1999.)

### **3.2 Environmental Standards**

To maximize the benefits from EMS implementation it is necessary to execute it in a structured way and to set measurable objectives.

For this purpose, as well as for the long term purpose of environmental protection via cooperation and contribution to sustainable development of the planet by the businesses from all over the world, various environmental standards have been established.

They differ from each other by the extent of coverage, by the issuing body, by the requirements and the efforts which should be made to be certified, the extent of recognition, by the procedure of certification and many other aspects.

Despite on the variety of existing certificates, some of them are more recognizable than others and deserve special attention. For example, EMAS and ISO14000 Series of standards related to EMS could be highlighted and in the following two chapters there will be specified information about those tools for EMS's implementation. (Weiß, P. & Bentlage, J. 2007, 27.)

So what are the main factors that motivate companies to get an environmental certificate? There are some general benefits which environmental certification brings to the majority of companies regardless of the type of this certificate.

Firstly, all those certificates are the tools for EMS implementation. Consequently, they provide a framework which helps to improve, manage and follow up environmental performance effectively and efficiently, and, as a result, to save energy, to decrease resource consumption, to reduce environmental impacts and to cut costs.

Secondly, availability of the environmental certificate in the company is an effective marketing tool, because it is considered as an expression of corporate social responsibility. Moreover, in some cases the certified company will have the opportunity to put eco label on their products. Therefore, the fact that the company is certified improves organisation's image and generates competitive advantage. It helps to satisfy stakeholders and local communities, to attract new customers, to be able to work with reliable suppliers and could give an opportunity to enter new market.

Next, obtaining an environmental certificate usually means company's compliance with existing environmental regulations and laws, what leads to fewer problems with authorities and, often, even tax relief.

Last but not least, environmental certification helps to enhance risk management. (Constructing Excellence 2013.)

As far as environmental standards issue and SMEs are concerned, there are some points that should be mentioned. SMEs might have much tighter budgets and fewer resources than large companies, for example, time or employees who are aware of environmental issues. In addition, often SMEs are not fully aware of environmental certification, underestimate potential benefits and do not know the procedure. In many

cases, SMEs have to decide where to allocate their resources, so they choose another objectives to invest in than environmental certificates, because, for instance, some requirements could be ruled by the law, thus they are in priority.

Over mentioned reasons trigger the situation that many SMEs give priority to other standards over environmental ones or even do not consider environmental certification at all.

### **3.2.1 ISO 14001**

As it was already mentioned, EMS should be implemented in a structured manner. ISO 14001 that firstly was realised at 1996 and then updated in 2004, is a well-known voluntary global environmental management standard which fully meets this goal of giving the structure for EMS.

The main ideas behind ISO 14000 family of standards are to improve efficiency of resource consumption and to motivate companies to control their environmental impacts.

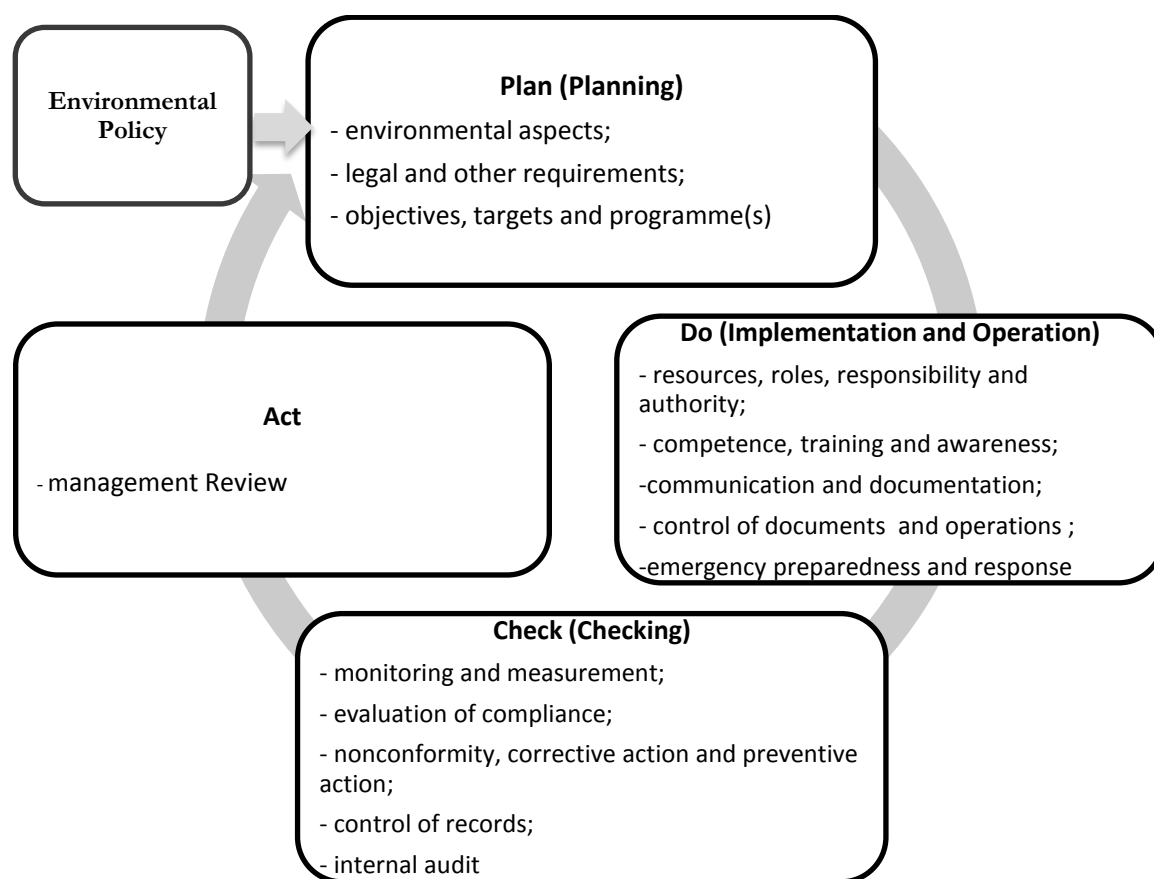
ISO 14001 belongs to ISO 14000 family of environmental standards and focuses on environmental management system, its shape, content and execution (Weiß, P. & Bentlage, J. 2007, 28).

If to quote ISO 14001 developers, there are some expected outcomes from the ISO 14001 certified companies: ” ... an organization with a certified environmental management system is managing its interactions with the environment and is demonstrating its commitment to:

- A. Preventing pollution.
  - B. Meeting applicable legal and other requirements.
  - C. Continually enhancing its environmental management system in order to achieve improvements in its overall environmental performance.” (ISO & IAF 2004).
- Additionally, it is very important to clarify that ISO 14001 sets the framework for the development and implementation of effective EMS, but does not list any concrete environmental requirements or objectives. This fact in turn makes ISO 14001 very flexible and suitable for any company regardless of its size, sector, activities.

ISO 14001 standard consists of 17 elements which are covered by five key principle categories: environmental policy; planning (environmental aspects; legal and other requirements; objectives, targets and programme(s)) ; implementation and operations (resources, roles, responsibility and authority; competence, training and awareness; communication; documentation; control of documents; operational control; emergency preparedness and response) ; checking (monitoring and measurement; evaluation of compliance; nonconformity, corrective action and preventive action; control of records; internal audit); and the management review. (Environmental Protection Department 2005, 7.)

The content of ISO 14001 standard is shown graphically in the Figure 3, where PDCA cycle is used as a basis.



**Figure 3.** The content of ISO 14001 standard (Environmental Protection Department 2005, 7).

Summing up, the content of the standard demonstrates tool's integrity and comprehensiveness, as well as shows its flexibility and suitability for the diversity of organisations.

As far as benefits of ISO14001 for organisations are concerned, according to the certificate developers, there are four key benefits which are:

1. reduced consumption of energy and materials;
2. improved company's image among stakeholders;
3. lower cost of waste management ;
4. potentially lower distribution costs. (International Organization for Standardization 2014.)

According to The Big Green Opportunity for Small Business in U.S. report (Green America 2013), most of the interviewed SMEs which are ISO14001 certified emphasized such benefits of this certificate as:

- increased demand for products and services;
- convenience and effectiveness as of management tool;
- higher exporter's goodwill and willingness to cooperate because of company's credibility enhancement.

Also, such significant benefits as a reduction of the environmental risks and, obviously, sustainability enhancement and achievement of environmental compliance could be added.

Some companies are aware of the over mentioned benefits, but still do not have this certificate. As things stand because of the existing challenges on the path towards ISO 14001 certification which are especially relevant in the case of SMEs.

One of the biggest challenges is company's resources limits. It applies to human resources limits (in most of the cases there are no employees who have experience and knowledge of environmental management systems); financial restrictions (development, implementation and running cost of EMS could be high) and time restrictions (the whole process is very time consuming, especially in some cases). The second challenge could be lack or no demand from the authorities, customers, suppliers and other stakeholders.

The third challenge is lack of information. Many companies are not fully aware of the potential benefits from EMS implementation and obtaining ISO14001 certificate; do not know how to start; do not know what resources will be needed.

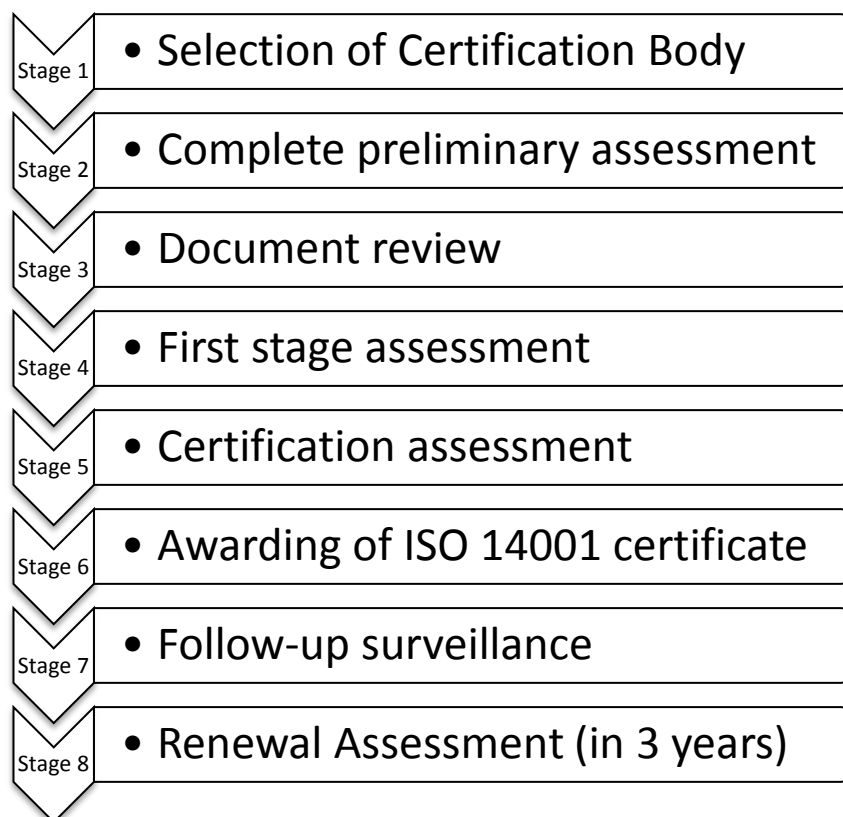
Last but not least, companies, especially small and medium-sized ones, often have to focus on other standards that are more important for the sector of business which they

belong to or required by the law. Subsequently, there are no any resources and motivation left to develop and implement EMS and to apply for ISO 14001 certificate.

But there is also an advantage for an SME that intends to get ISO 14001 certificate . In most of the SMEs operations and processes are much simpler than in the big companies. Additionally, the organisational system in small and medium-sized enterprises is usually plain that, for example, allows to get management commitment easier and faster with much less bureaucracy. Hence from this side, SMEs usually need to put fewer efforts to get certified.

To understand some of the challenges and advantages for SMEs trying to get certified, it is reasonable to describe the process of obtaining ISO14001 certificate. Besides, the steps which are listed below illustrate why the whole process can be time and resources consuming.

The path towards ISO 14001 certification consists of eight general stages which should be completed. For the illustrative example, it can be referred to the Figure 4.



**Figure 4.** Roadmap towards ISO 14001 certification (Environmental Protection Department 2005, 51).

First of all, an organisation should choose the Certification Body based on company's resources, needs and expectation, and the reputation of the Certification Body.

The second step is to make a preliminary assessment, in other words, gap analysis of company's environmental management system on the compliance with ISO 14001 requirements.

Thirdly, the company needs to prepare all EMS related documents and to provide them for auditor review.

Fourth, during the first stage assessment, it is identified whether your environmental aspects complies with the EMS of your company or not. All nonconformities identified at the second stage and during fourth stage (First Stage Assessment) require a corrective action plan.

The fifth stage is the certification assessment where Certification Body reviews the executed EMS against ISO 14001 Standard, its effectiveness and organisation's requirements regarding environmental issues. To sum up this audit, the Certification Body prepares a full report based on the assessment. In some cases, the company will be asked to provide a corrective action and preventive action plan regarding some of the company's practices. Then the follow-up visit will be made.

The sixth stage is the stage when the audited company (in case of company's EMS compliance with ISO 14001 framework) is awarded with ISO 14001 Certificate which is valid for three years.

The next stage is follow-up routine surveillance which is conducted once or twice per a year where EMS implementation and its effectiveness is reviewed.

The eighth stage is the repeated assessment after three years of the certificate issue in order to renew it. (Environmental Protection Department 2005, 51; ISO& IAF 2004.)

### **3.2.2 EMAS**

EMAS (Eco-Management and Audit Scheme) is a voluntary tool aimed at the environmental protection and sustainable development. Also, this tool is a public European wide quality label.

EMAS is not emphasised in this thesis, but there are some elements which were considered when Initial ISO 14001 Gap Analysis Tool and Environmental Management Guide for SMEs had been developing. Therefore, only EMAS' distinguishing characteristics in comparison with ISO 14001 are listed in this chapter.



According to developers of EMAS, it goes further than ISO 14001 via adding some requirements and elements on the top of ISO 14001 ones (European Commission, 2011).

First of all, EMAS has a legal status of European Regulation (EC) No 1221/2009, whereas ISO 14001 is a commercial standard regulated by private law.

Secondly, EMAS provides a detailed set of requirements which covers many environmental indicators, such as energy efficiency, material consumption efficiency, wastes, emission and biodiversity, while ISO 14001 does not go into the specific details and indicators, but evaluate performance and existing practices more generally.

Thirdly, EMAS requires to conduct initial environmental review, but ISO 14001 only suggests to do that. In addition, internal audit means much more intensive review than in the case of ISO 14001.

Next, according to the requirements of EMAS, company's contractors and suppliers must comply with the policy of the company, whilst according to ISO 14001, the company only needs to communicate their policy to the contractors and suppliers.

Last but not least, there is a difference from the marketing point of view. To communicate about the assignment of the certificate externally, in case with EMAS the company makes the public statement and gets the right to use EMAS logo, whereas in ISO 14001 case, the company has only the certificate. (European Commission, 2011.)

It might seem that ISO 14001 and EMAS are competing, but that is not true, they are compatible with each other. ISO 14001 requirements are an integral part of EMAS, moreover, there are some agreements between these organisations which allow a smooth transition for the companies trying to go further and to progress from ISO 14001 to EMAS. (European Commission, 2011; Engel, H.W.)

## 4 Theory summary

The theoretical concepts, which are described in the upper paragraphs, are the basis for Initial ISO 14001 Gap Analysis Tool and Environmental Management Guide for SMEs. Additionally, they explain the purpose of tool's creation and prove its relevance. There are two general concepts that are the focus of special attention in this thesis: Sustainability and Management Systems, which are followed by their sub-concepts. It is worth of mentioning that the concepts covered in the theory part were carefully analyzed, that gives a result when the reader can learn not only about the positive sides of some issues but become acquainted with disadvantages and challenges of the described subjects, subsequently get the holistic overview.

The concept Sustainability is revealed through The Three Pillars of Sustainability that are environmental, social and economic factors (The World Conservation Union 2006, 2). Moreover, to demonstrate the relevance of the concept nowadays, the attitude and the policy of European Union towards sustainability was shown on top of the description of relationship between SMEs and sustainability.

The second theoretical concept in the thesis is Management Systems where the emphasis is made on Environmental Management Systems. To guarantee structured and logical frame for efficient implementation and environmental management environmental standards were created. In order to illustrate existing environmental standards and to show their objectives, advantages and disadvantages, ISO 14001 and EMAS examples were used.

Establishing a logical link between two concepts, it can be concluded that, generally speaking, the necessity for companies to develop sustainably without compromising environment or future generations is a global problem that needs to be solved.

Environmental management system and the tools for its implementation is one of the effective and efficient instrument for the solution of this problem. .

Since small and medium enterprises represent 99% of all businesses in European Union providing 80% of all workplaces (Planet S.A. & Danish Technological Institute 2010, 7), they play an extremely important role in the world economy and have a significant impact on the nature and society. It means that to ensure the sustainable development for the country and the planet, SMEs should develop sustainably as well.

Nowadays many SMEs still do not take any actions to become more sustainable, because most of the environmental management tools are created for the big companies which can invest lots of resources in the sustainable development and clearly understand the benefits from doing that. Whereas the most of SMEs ignore, underestimate or are not aware of the potential benefits from the increase of sustainability level, execution of EMS and environmental certification and have no idea how to start the process of EMS development or significantly overestimate its complexity.

Figure 5, which can be found in the Attachment 2 to the thesis, shows the linkage between the theory concepts covered in this thesis and demonstrates the relevance of the designed product and the stages where it is in special need. Generally, as it can be noted from the figure, there is a global issue for consideration- sustainability which consists of three pillars: environmental, social and economic.

People, government, large businesses and SMEs are those parties which influence on the sustainability. To create a positive input to the sustainable development of 3 pillars, people need to behave and consume sustainably. As for the government, they need to invest into the development of green technologies, create proper policies and strategies related to environmental issues, influence on the businesses via incentives and regulations. Large companies may invest and execute green solutions in their business activities, make donations, enhance the overall state of the economics, state short and long term goals aimed at the sustainable development of the company.

As far as SMEs are concerned, in order to contribute into sustainable development they need to implement some steps as:

- setting of the environmental objectives and targets (which are dictated by such factors as: legal/other requirements; environmental aspects in the company; stakeholders; features of SME. ) and to create the environmental policy;
- creation of the EMS that complies with the requirements and environmental certification.

It guarantees the continuous improvement and leads to the contribution to the sustainable development.

The challenge of the thesis was to create an effective tool that can help SMEs to become more sustainable and to assist on the stages marked with in the Figure 5. Created Initial ISO 14001 Gap Analysis Tool and Environmental Management Guide for

SMEs is a reliable and highly effective product, which is user-friendly and practically applicable. It had been developed taking into consideration the features of small and medium- sized companies, theoretical concepts, advantages and disadvantages of the already existing EMS tools as ISO 14001, EMAS and some others including their requirements.

Summing up, all the activities under ECO-Sup-PORT project and product thesis development led to the product that helps SMEs from different business sectors to step on or continue the path towards sustainable development and ISO 14001 certification.

## **5 Product**

The product Initial ISO 14001 Gap Analysis Tool and Environmental Management Guide for SMEs is a model of the tool (hereinafter will be referred as the tool) created to help SMEs to develop EMS and to guide them on the path towards environmental management certification.

Designed tool covers two elements of ISO 14001 standard which are environmental policy and environmental aspects, that vividly demonstrates the whole idea behind the tool and its concept and provides all opportunities for further development of the product.

### **5.1 Product plan and time schedule**

Thesis writing and especially product development processes were consisted of many stages. Each of them significantly contributed to the final result and assures the quality and value of the created tool. Product plan that covers all the stages was designed for six months ahead.

Four main stages based on the timeline, activities and involved people can be distinguished: pre-workshop stage, workshop stage, tool content stage, and thesis writing stage. All of the stages could be united by a common goal which was the creation of affordable, comprehensive and valuable tool for SMEs trying to become more sustainable. Each of the mentioned stages is explained in the details below.

First of all, pre-workshop stage started from formation of the team from interested in Eco-sup-Port project Haaga-Helia's students and their familiarization with all findings and materials collected during the previous 2 years of the project what was taking place during December of 2013 and January of 2014.

Next, during February and the first half of March we found and contacted SMEs in Helsinki which met project requirements and created the first version of the tool (paper-based questionnaire translated in Finnish and English languages) based on the project objectives, brainstorming sessions, recommendations of project coaches and the concept of the tool for service companies from the team of 2<sup>nd</sup> year of Eco-sup-Port project.

During the second part of March and the beginning of April our team tested the tool via interviewing interested in the project companies in Helsinki Metropolitan Area.

Collected results and the tool' usability were analysed in April of 2014, and all key findings, analyses, significant information were placed in the report.

As far as Workshop Stage is concerned, it was held in Istanbul, Turkey and was lasting for two weeks from 4<sup>th</sup> till 17<sup>th</sup> of May. During this stage students representing 5 universities in 5 countries (Finland, Latvia, Netherlands, Belgium and Turkey) met in Istanbul in order to share their findings from Pre-workshop Stage and to improve the designed tools via getting inspired by the ideas of students and coaches and relevant activities.

Generally the project program was very intensive and each day agenda was divided into two parts: during the first part we had lectures on port related activities, environmental and sustainability issues, European affairs, logistics activities, SMEs, along with study trips to some of the ports in Istanbul including guest lectures by managers of those ports. The second part of the project days was dedicated to working sessions on the improvements of the designed tools and evaluation by coaches. Those working sessions were hold in newly formed teams of 5 students with a representative of each country; 5 of the teams were working on the improvement of the general concept and content of the tool for each country separately, while other 3 teams were working on social media or website, or communication solutions for all 5 tools for SMEs of different countries.

To sum up, each of 5 previously created tools for SMEs operating in the ports were significantly improved with the help of team discussions and workshops, feedback from other coaches and project members, advantages of other tools and different educational backgrounds of all members of the formed teams; and they were presented on the final day of the project where valuable comments and recommendations were given by coaches and other students what helped a lot to go further with development of the tool on the post-workshop stage.

Tool content stage could be combined with thesis writing stage, because they were carried out simultaneously and could be so called post-workshop stage which started in late May of 2014 and was supposed to end in the end of September.

Both stages will be described in more details in the Product Process chapter, because they are directly related to the creation of the thesis and were conducted based on the Product Thesis Timeline, whereas pre-workshop and workshop stages originally were

not supposed to lead to the thesis and anything besides very general concept of the tool.

To illustrate all the steps which needed to be taken to create the product and to complete the thesis on it, as well as to organize the whole process in the most effective and efficient way using project management approach and tools, detailed thesis timeline for post-workshop stage was created and could be found as Attachment 1 to the thesis.

## **5.2 Data and collection methods**

Since this thesis is based on the product and the basic idea was to create the reliable, useful and relevant tool for SMEs, it was decided to use mixed-methods for data collection. The data of various types was collected at the different stages of product development and thesis writing process. Such approach helped to create the comprehensive product, as well as to cover all theoretical concepts in the thesis report from various perspectives that gives a holistic picture of sustainability and EMS concepts.

As it was already stated, mixed-methods of data collection were used. Brainstorming sessions, workshops, study of the secondary and primary sources, analysis of the content (e.g. the content of ISO 14001 standard), study visits were among those data collection methods.

For the process of thesis report writing and creation of the tool's content, secondary data was used in most cases. For example, the data was gathered from such sources as the reports by governmental organisations, textbooks, vocabularies, articles on the Internet, brochures.

The format of Eco-Sup-PORT project, not too tight deadlines and available opportunities, let to use primary sources of information in addition to the secondary ones. In other words, some information was gathered from the first hands and is a pure and original data, as guest lectures, companies' reports, users' manuals for EMS tools, government websites. This data was especially important on the stage of tool's concept development.

To illustrate the paragraph above, there are some examples in more details.

One of the main sources of data and ideas for product development process and thesis content were workshops and brainstorming sessions at Pre-workshop Stage and par-

ticularly at Workshop Stage which was held in Istanbul, Turkey in cooperation with other students and under the supervision of Eco-Sup-Port project coordinators. Thus the most relevant and bright ideas were collected, then discussed among team members and then, based on the teachers' comments and recommendations, the best ideas were used to develop the tool, plus later were described in the thesis.

The next important data sources were multiple manuals to the existing elaborate environmental tools (for instance, some information was taken from the official ISO 14001 manual). What is important, those manuals helped to create a user-friendly tool and to make right emphasizes in the content of the tool.

Moreover, studying of the existing environmental tools as certificates, requirements to them, various brochures and guides created especially for SMEs of different countries like Generic ISO 14001 EMS Templates published by Environmental Protection Department of the Government of Hong Kong in 2005 and others helped to get needed data and to develop the tool, because of the opportunity to consider advantages and disadvantages of those tools, its value and efficiency, or to benefit from the conducted researches by professionals.

Another valuable source for reliable and comprehensive data was governmental websites or websites of non-governmental organizations where sections related to the environmental issues or SMEs could be found including the reports on the relevant topics. Also, it was the best source to get the official figures and to consider governmental point of view, some plans concerning the issues covered in the thesis. So I studied those resources, used massive amount of data from them and was able to make some predictions and conclusions for the theoretical part of my thesis and to create useful and up-to-date tool.

Last but not least, some data was taken through examination of the relevant textbooks, publications, lectures from relevant courses in Haaga-Helia University of Applied Sciences.

### **5.3 Usability**

The final product, which is supposed to be the extended online version of the tool created for this thesis, is going to be easy and logical for its users and designed to comply with the definition of "usability" given by ISO which is "The extent to which a product can be used by specific users to achieve specified goals with effectiveness, efficien-



cy, and satisfaction in a specified context of use” (ISO 1998). The ways how product’s usability is achieved are described in the next paragraphs.

First of all, the product Initial ISO 14001 Gap Analysis Tool and Environmental Management Guide for SMEs is featured with sufficient tutorial and helpful in-line tips and hints, as well as with some other interactive details, what make sometimes difficult for understanding tasks much easier.

Secondly, the heart of the tool- its content is well optimized, easy readable and understandable, all sentences are concise, what lead to its efficiency and reduces the time of completing the gap analysis without any loss in reliability and value of the results and given recommendations. It is also important to mention that the tool is easily modifiable to be able to keep it up to date based on the changes in ISO 14001 standard and its regulations.

Thirdly, when the tool is put on the website, it will have user friendly design, clear and easy navigation which will allow acting intuitively; no having any troubles to find all necessary information as contact details, feedback form, tips and hints. In addition, the fonts are of the appropriate size and adjustable, the colors used in the design are elaborate.

Next, the tool allows to get instant result which is easy to analyze and to start acting immediately based on the clear recommendations and tips during the tool’ accomplishment. So users’ expectations before starting the gap analysis will be entirely fulfilled and relevant results with some potential solutions will be offered in the end.

Last but not least, originally the product is supposed to be free of charge, because it would help to attract first users of the tool. If needed, some funding can be gained from the commissioning party, European Union or other interested in the product parties to cover the production cost of the tool. Moreover, if the product is going to be finished as the part of another project organized in educational purposes, production cost can be very low and include purchase of domain name and some marketing campaigns. As far as monetization of the tool is concerned, it could be done via advertisement on the website and offering of some extra services as personal consultation of professional with SME or creation of the upgraded customized and more detailed version of the guidelines based on the features and unique requirements of SME.

All mentioned issues are extremely important, because only if the product (including the content, website, design, potential application) is user-friendly and affordable it will attract SMEs to use it. Representatives of organizations will get and feel the real value

of using the tool; their expectations will be met or even exceeded what will help to build product loyalty and to meet the objectives of the thesis and its product Initial ISO 14001 Gap Analysis Tool and Environmental Management Guide for SMEs.

#### **5.4 Product process**

The process of product development and writing of the thesis generally took about half of the year. As it was already mentioned in Product plan and time schedule chapter, the whole process included many steps and activities, and that is the reason the process was so time consuming.

Activities, objectives and time frames during pre-workshop and workshop stages were well described at Product plan and time schedule chapter.

To give more details about the implementation of pre-workshop stage it is important to mention challenges that the team of Finnish students met. First of all, it was not easy to understand the tools made by the previous participants of the project and that fact has led to the need to make a new tool. Secondly, it was very challenging to find suitable companies which met the requirements (for example, it had to be SMEs operating in the Finnish port Vuosaari and not ISO 14001 certified) to try the created tool on. Thirdly, team member came up with the problem of extremely low response rate and unwillingness to participate in the project. Last but not least, our team had some organisational problems what was caused by a mismatch between study schedules of the participants and lack of clear deadlines and objectives. Nevertheless, we managed to create and to test the first draft version of the tool for usage during the workshop stage.

As for the workshop stage, it went smoothly and we met all the deadlines, the workload was distributed effectively and the objectives of the project were achieved. We got such a result through effective planning, clear objectives, limited time, concentration on the project and involvement of team members. However, limited resources, especially it relates to time, did not allow to create more than a general idea. This fact led to the necessity to improve the created concept and to develop the model of practically applicable tool including its content and all the details, without the participation of the team at the next stage within the process of thesis writing.

Post workshop stage includes tool development and thesis writing and consists of many steps.

Firstly, I successfully got the written permission to use the concept of the tool as basis for my thesis from all students who were working on the elaboration of the tool for Finnish SMEs at any of the stages of Eco-sup-Port project. Secondly, main objectives and milestones of the thesis process were estimated; then thesis plan and timeline were created.

During June of 2014, I was focusing on the theoretical part of the thesis to be able to develop tool in the most effective and efficient way.

Next step, which took part in July and partly August, was to finalize the development of the concept of the tool based on the feedback given by Eco-sup-Port coaches and students at the final presentation in Istanbul, Turkey combining with the relevant theory from bibliography to the thesis and analysis of advantages and disadvantages of some other environmental management tools. Also at this stage the content for the product Initial ISO 14001 Gap Analysis Tool and Environmental Management Guide for SMEs and all the details were developed.

The conclusion part of the thesis was written at the end of August-September after product's content and details development stage. The tool, its advantages, disadvantages, usability were analysed in the conclusion part. Next, developing proposals for the commissioning party and for those, who may continue work on the product, were given.

Last but not least, at the end of September and in October of 2014 the draft version of thesis was checked and proof read; all necessary additions, for instance, product plan, abstract and thesis structure chapters were created. Thesis was submitted at the end of October.

To sum up, post-workshop stage went smoothly in spite of some minor interruptions in the process of thesis writing and slight shifts of the deadlines comparing with the original thesis timeline what was caused by such circumstances as overload at work and exchange semester, but did not effect negatively on the final result.

In addition, it is important to mention my role in all over mentioned stages. I was directly involved in all of them, being the member of Finnish team during pre-workshop stage, taking the role of project leader of the team at project stage, and individually developing the tool and its content at post- workshop stage.

## 5.5 Product

The product Initial ISO 14001 Gap Analysis Tool and Environmental Management Guide for SMEs which is aimed to help SMEs to become more sustainable and to guide them on the path to ISO 14001 certification, is presented as a Microsoft Excel file and is an integral part of the thesis.

The file consists of nine pages (Product and Recommendations, Table 1. Business Activities, Steps to Environmental Policy, Gaining Management Commitment, Table 2.Environmental Aspects, Business Sector-Aspects, Environmental Policy Content, Enhance Sustainability of SME, Sources to check), which include instructions both for users and web developers/ further developers of the tool, gap analysis, the guidelines, tables and lists with valuable information for SMEs planning to develop and implement EMS. If the user wants to delve into the details and to know more about the interested issues mentioned in the product, s/he can refer to the page with the list of sources used during product creation.

Product and Recommendations page in the excel file is the core of the tool. It includes the questionnaire with “yes” and “no” questions, over and above more complex questions and some tasks. From the very first answer by the respondent, it becomes clear if SME benefits in the greatest extent when using the tool as Initial ISO 14001 Gap Analysis Tool and Environmental Management Guide for SMEs, or the company is in the very beginning of their way towards sustainable development and needs to get guidelines how to start and develop EMS based on ISO 14001 requirements. In order to exemplify this idea, there is a Table 1 below, which is the starting fragment of the created product.

**Table 1.** Starting fragment of Initial ISO 14001 Gap Analysis Tool and Environmental Management Guide for SMEs product (Shupik, E. 2014).

	Page 1	Does your organisation have an <b>Environmental Policy</b> or at least its draft?		Page 1	
		Yes	No		
		↓	↓		
Purpose	Notes (not visible for users)	<p><i>(To check the compliance of the existed Environmental Policy and defined Environmental Aspects with ISO 14001 requirements where Environmental Policy is one of the elements of EMS (ISO 14001:2004, Paragraph 4.2) and Environmental Aspects are identified as another element (ISO 14001:2004, Paragraph 4.3.1).</i></p>	<p><i>(To guide from the very basics all those SMEs which have not considered environmental issues and implementation of environmental management systems before. To determine significant environmental aspects/impacts; as a result, to identify environmental commitments that need to be maintained and will serve as a basis for the Environmental Policy of the company, consequently for EMS.)</i></p>	Notes (not visible for users)	Purpose

In the first case, the respondent will have to answer the questions divided into the sections in accordance with the elements which are covered in ISO 14001 standard. Mainly there are “yes” and “no” questions, but some of them are multiple choice ones. After answering all the questions which cover a defined section, there will be the page with mid result of the analysis displaying the percentage gap between requirements of ISO towards the defined section and current performance of the company as a diagram. The issues which do not comply with requirements will be marked with red and shown in pop-up window. If the results to some sections have the low level of compliance with certificate, special recommendations will be given including the offer to pass the deeper analysis that will help to improve company’s performance and to increase the level of compliance. In addition, there are some valuable instructions which will help SME to become ISO 14001 certified, to decrease company’s impact on the environment and to enhance EMS and its elements. If some questions are tricky for the respondent, there are tips and hints throughout the whole gap analysis test.

In the case, if the respondent answers that there is neither environmental policy nor its draft version in the company, the following pages of the tool substantially include the guidelines aiming to help to develop and implement environmental management

system in the company which complies with ISO 14001 requirements. The user mainly will get the instructions, supporting tips and hints, informative tables, useful links that allow to meet the over mentioned goal and to be ISO 14001 certified in the future. For example, the tool includes such information as: the key steps how to develop an Environmental Policy for SME, advice how to gain management commitment, recommendations for the proper content and shape of Environmental Policy, ideas about the ways how to become more sustainable without high investments. Also the respondent will be offered to fill some tables to identify key business activities in the company (an illustrative fragment of the table is presented as Table 2 below), environmental aspects and environmental impacts. To simplify the task, there are relevant tips and hints, some of the table rows will be already filled to show the example and to save time for the user, moreover, the tables are adjustable to bring the greatest value for the company and make the results more accurate. In addition, when the respondent gets the results, like in case of significant environmental aspects' identification where the results are reflected as a list sorted by the importance of the factors or as a diagram, it is possible to print/ export/ save/ save online the results for the future use.

**Table 2.** Fragment of Business Activities table from Gap Analysis Tool and Environmental Management Guide for SMEs product (Shupik, E. 2014).

Functional Area	Business Activity/ Environmental Aspect	Evaluation of environmental impact (positive+/negative -)	Environmental Impact
<b>Production</b>			
	Use of manufacturing equipment	-	Noise, odour, vibration, air pollution
	Greenhouse gas emissions	-	Ozone depletion
	SO2 emissions	-	Deterioration of air quality
	NOx emissions	-	Deterioration of air quality
	VOC emissions	-	Deterioration of air quality, pollution, smog, employees health, exposure to volatile organic compounds (VOCs)
	Energy use (electricity consumption)	-	Air pollution, global warming
	Energy use (natural gas consumption)	-	Depletion of natural resources
	Energy use (water consumption, lighting use, heating, cooling)	-	Depletion of natural resources
	Raw materials usage	-	Depletion of natural resources
	Solid waste generation	-	Habitat destruction, drinking water contamination, wasted land resources, decrease landfill space
	Hazardous waste generation	-	Release of pesticides and fertilizers into the soil, water=> deterioration of soil, air, water quality; danger to the public health
	Waste water generation	-	Deterioration of water quality

## **6 Conclusions**

There is an obvious benefit and use from the created tool and thesis report for the commissioning party.

The tool including the thesis report is a great conclusion to the third and final year of Eco-Sup-PORT project. They both reflect the ideas and objectives behind the project in the highest extent, moreover demonstrate the tangible result of the combination of project participants' efforts with the individual efforts of the final developer of the tool's content and the thesis report.

Moreover, the model of the tool could become a good basis for another educational project, because it requires further development to be launched and be able to serve the needs of SMEs.

As for the benefits of the product for SMEs, the tool can be used by a company multiple times with a great value. It can be explained because the tool can perform such functions as: making of a gap analysis, guiding the companies on their path towards certification, to analyze significant environmental aspects, to be a check list on the compliance with current requirements of ISO 14001. So the product can assist SME from the very starting point when the company does not have any not compulsory environmental issues considered before and the tool guide them on the path towards sustainable development, till the point when the organization becomes ISO 14001 certified and can use the tool as the check list.

Think globally, act locally- via following this simple rule and trying to develop business sustainably, SMEs are able to bring incredible value not only to itself, but also to the society, planet and economy.

### **6.1 Development proposals**

As far as development proposals are concerned, first of all there is plenty of work for the website and, probably, in the future for app developers. It is needed to put all the tool content onto the website taking into consideration the notes written in the attachment with the tool and the way how the content is presented (for example, some pages should be featured with the adjustable tables, some with the links and diagrams,

some with the text). Also, it is important to provide the ability to use the tool in coherent and fluent way avoiding any bugs what can spoil the general impression from the tool and to decrease its credibility.

Next, I suggest that web designers cooperate with website developers to get the best result which will have high usability, user-friendly design, high rating in the searching engines and will attract and keep the users to use the service.

Last but not least, as it was already mentioned, the created tool for this thesis demonstrates the concept well enough, but its scope is limited and one main category out of five of ISO 14001 standard is covered (environmental policy, also environmental aspects element is partly covered as well). It means that other four key categories as planning (excluding Environmental Aspects); implementation and operations; checking; evaluation of compliance and the management review should be considered and added based on the concept of the tool and already existing example of Environmental Policy part by the future developers of thesis content.

In addition, it is extremely important to follow up new regulations, trends, requirements and any changes which will be made in the next edition of ISO14001 standard and update the tool content immediately.

Concerning the practical applicability of the designed tool, the existing content is ready to be put into the website by website developers. So as far as this part is done the tool is ready to be tested and to demonstrate company's compliance with one of the sections of ISO 14001 standard or/and to show how to start the creation of the appropriate Environmental Policy and to make basis for the EMS.

If the tool is tested successfully and attract some attention, it is necessary to continue with considering and optimising all the categories of ISO 14001 standard for the website. After finishing with all the parts and another testing stage, the product is ready to assist all SMEs on their path towards ISO 14001 certification in full extent. Only relevant and timely made updates will be needed.

## **6.2 Evaluation of the thesis process and own learning**

In my opinion, the whole thesis process went smoothly with high efficiency, in spite of some forced interruptions and slight deviations from the product thesis timeline, and finally led to the pleased result as for the thesis report and for the product itself. I had



a great command over the whole process and did not lose the goal of the thesis and product at any stages. Moreover, to get trustworthy result of the great value, a wide variety of data collection methods starting from lectures and ending with workshops were used at the different stages of the thesis process.

In addition, all the concepts and examples covered in the theory part were carefully and critically analyzed considering advantages and disadvantages what provides the holistic idea excluding preconceptions.

To conclude, to evaluate the effectiveness of the thesis process, it is enough to take a look at the created tool and to ensure in its value, user-friendliness and current relevance.

As far as learning outcomes are concerned, I was directly involved in all stages of the product development and thesis writing, what gave a chance to benefit in the highest degree from all the activities aimed on tool creation and writing of the thesis report. First of all, I got deeper knowledge of many international business and supply chain management related topics. Some of them can be highlighted as environmental management issues, trends in logistics, details of environmental certification, drivers and barriers of SMEs which try to become more sustainable, different environmental aspects and impacts depending on the business sector.

Secondly, thesis writing and product development processes helped me to put theory base, which I got via studying in Haaga-Helia and Eco-Sup-Port project participation, the knowledge and skills base which I have on the practice and to create a useful tool for SMEs.

Thirdly, via completing the thesis I was able to enhance my professional skills and to build the network that is extremely useful for my future carrier.

In addition, the work on thesis gave such learning outcome as an ability to find relevant, up to date, quality international sources of information.

Last but not least, thesis writing and tool creation processes was an excellent opportunity to check, improve and demonstrate such competencies as critical and analytical thinking, problem solving, ability to set clear and relevant objectives and to find solutions to them, as well as, the ability to write consistent, coherent, grammatically correct and comprehensive academic texts.

To sum up, this thesis report and the designed product reflect my skills and knowledge and show me as a worthy student of International Business programme in Haaga-Helia University of Applied Sciences specializing in Supply Chain Management.

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# Attachments

## Attachment 1. Product Thesis Timeline

ACTIVITY	START	END	NOTES
Pre-workshop stage	15/12/2014	04/05/2014	Formation of the team; familiarization with the results of previous years of the project; contacting SNIIE; creation of the first tool's draft; testing the tool; analysis of the results and writing of the report on key findings and tool's usability.
Workshop stage	04/05/2014	17/05/2014	Students representing 5 universities of 5 countries met in Istanbul, Turkey and shared their findings from Pre-workshop Stage. Workshops to improve the existing tools; lectures on port related activities, environmental and sustainability issues, European affairs, logistics activities, SNIIEs; study trips to the ports; presentation of the developed tools; feedback from other participants of the project and the coaches.
Work on the thesis starts (Tool content stage+ thesis writing stage)	20/05/2014		Key milestones of the thesis process are estimated; thesis plan& timeline is created.
Permission from other members of the team	22/05/2014	01/06/2014	The process of obtaining the permission to use the product as basis for the thesis from all the students who were working on the elaboration of the tool for Finnish SNIIEs at any of the stages of Eco-sup-Port project.
First draft version of the thesis	01/06/2014	16/06/2014	Objectives and key theoretical concepts and sub-concepts are defined; the approximate content, bullet points, description of the project and goals are written. Some ideas about the shape of the potential product and the scope of ISO it will cover. Based on the academic advisor's feedback, some amendments are made.
Focus on theoretical part	16/06/2014	16/07/2014	Finding of the relevant useful sources and references; description of the concepts and sub-concepts.
Product part	16/07/2014	20/08/2014	Development of the concept and the content of the product; writing Product part of the thesis report. As a result, creation of the Excel file which consists of eight pages (Product and Recommendations, Table 1. Business Activities, Steps to Environmental Policy; Gaining Management Commitment, Table 2.Environmental Aspects, Business Sector-Aspects, Environmental Policy Content, Enhance Sustainability of SNIIE).
Conclusions	20/08/2014	14/09/2014	Benefits of the tool for SNIIEs and the commissioning party; evaluation of the tool, its usability; developing proposals for the commissioning party and future tool's developers; general conclusion.
Writing the missed parts	14/09/2014	04/10/2014	Product plan, abstract, thesis structure and other missed chapters and sub-chapters were created.
Proofreading of the report	04/10/2014	17/10/2014	Proofreading of the thesis report, creation of the final draft version, checking the created product, sending the draft version and the product to the thesis supervisor.
Amendments to the final draft version	17/10/2014	25/10/2014	Amendments to the final draft version of the thesis report base on the feedback and recommendations by the thesis supervisor.
Sending the final version of the thesis report to the thesis advisor	25/10/2014	28/10/2014	
Submission of the thesis report and the product	28/10/2014	31/10/2014	
Work on thesis ends		31/10/2014	



Attachment 2. **Figure 5.** The connection between theory concepts.

