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Financial benefit of implementing Environmental Management System ISO 14001 in Icelandic companies

by

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Fjárhagslegur ávinningur við innleiðingu umhverfisstjórnunarkerfisins ISO 14001 hjá íslenskum fyrirtækjum

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ABSTRACT

General public, companies and public organizations in Iceland, as elsewhere in the world, meet increased demand for more emphasis on environmental issues and protection of nature. The requirements for minimizing the impact on the environment (by reducing energy usage, increasing environmental awareness, and reducing general waste, for example) have become a serious issue worldwide.

The environmental management system ISO 14001 is a procedure that some companies have adopted in order to reduce their environmental impact. The purpose of this research is to estimate the potential financial benefit of adopting ISO14001, specifically for companies in Iceland.

The research is conducted in three parts, using both quantitative and qualitative methods. The first part compares the annual reports from all the companies and public organizations certified with ISO 14001 before and after certification. The second part consists of interviews and questionnaire with some of the companies/public organizations that have adopted ISO 14001. The third part consists of an internet survey that was sent to all of the certified companies in Iceland.

The results of the study showed there is no statistically significant financial benefit for the Icelandic companies after implementing ISO 14001.

Keywords: Environmental Management System ISO 14001, Financial benefit, Implementation, Financial performance, Icelandic companies

ÚTDRÁTTUR

Almenningur, fyrirtæki og opinberar stofnanir á Íslandi eins og annars staðar í heiminum mæta auknum kröfum er varða umhverfismál og verndun nátturunnar. Kröfur um að lágmarka áhrif á umhverfið (t.d með því að minnka orkunotkun, minnka úrgang, ásamt því að auka umhverfisvitund almennt) hefur leitt til þess að umhverfismálum er nú sinnt að meiri alvöru.

Umhverfisstjórnunarkerfið ISO 14001 er ein af þeim leiðum sem eru færar til að mæta þeim kröfum. Tilgangur rannsóknarinnar er að meta hvort að það sé fjárhagslegur ávinningur fyrir fyrirtæki á Íslandi að innleiða umhverfisstjórnunarkerfið ISO 14001 í íslensk fyrirtæki.

Rannsóknin fór fram í þremur hlutum, með því að nota bæði megindlegar og eigindlegar aðferðir. Í fyrsta hluta eru ársskýrslur frá öllum fyrirtækjum og opinberum stofnunum vottuðum með ISO 14001 staðli bornar saman fyrir og eftir vottun. Í öðrum hluta voru tekin viðtöl og notaðir spurningalistar við nokkur fyrirtæki.Í þriðja hluta var gerð netkönnunin á meðal allra vottaðra fyrirtækja á Íslandi.

Niðurstöður sýndu að ekki var tölfræðilegur marktækur munur á fjárhagslegum ávinningi eftir innleiðingu á umhverfisstjórnunarkerfinu ISO 14001 hjá íslenskum fyrirtækjum.

Lykilorð: Umhverfisstjórnunarkerfi, ISO 14001, fjárhagslegur ávinningur, innleiðing, fjárhagsleg afkoma, íslensk fyrirtæki.

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Abbreviations and definitions

Btu	British Thermal Units
EIA	Energy Information Agency
COGS	Cost of goods sold
PDCA Cycle	Plan, Do Check, Act
GDP	Gross Domestic Production-
IEA	The International Energy Agency
EU ETS	European Union Emission Trading System

Environmental impact: any change to the environment, whether beneficial or adverse, wholly or partially resulting from an organization´s environmental aspect. (ISO14001:2004)

Environmental performance: measurable results of an organization´s management of its environmental aspects. (ISO14001:2004)

Environmental Management System: part of an organization´s management system used to develop, manage its environmental aspects and implement its environmental policy. (ISO14001:2004)

1 Introduction

1.1. Historical overview

The first international conference regarding environmental issues was held in Stockholm in 1972, called the 'United Nations Conference on the Human Environment'. The conference marked the beginning of international environmental policy development to protect the environment from human development. Although the conference did not result in any binding laws, it resulted in the establishment of The United Nations Environment Program (UNEP). The UNEP became a platform for shaping environmental policy through conferences, meetings and participation in international forums on environmental issues[1].

1.2. Environmental issues and public awareness

Many nations around the world are enacting policies to protect nature and to minimize the environmental impact of human activities. For example, the European Union has established the European Union Emission Trading System (EU ETS). The aim of implementing the EU ETS was to reduce greenhouse gas emissions in line with the Kyoto Protocol targets, [2] and to increase the share of energy generated from renewable sources as required by EU directive 28/2009/EC. Every member state in the EU has legal obligations to these directives [3]. .

1.3. Global energy consumption

The demand for energy from renewable sources has been increasing every year. This is related to an increase in global energy consumption in general, the sharp rise in the price of the fossil fuel, increased demand for general consumption and for energy security [3]. Global energy use is expected to increase about 56% from the year 2010 to 2040 due to population growth in non-OECD countries, as shown in figure 1.

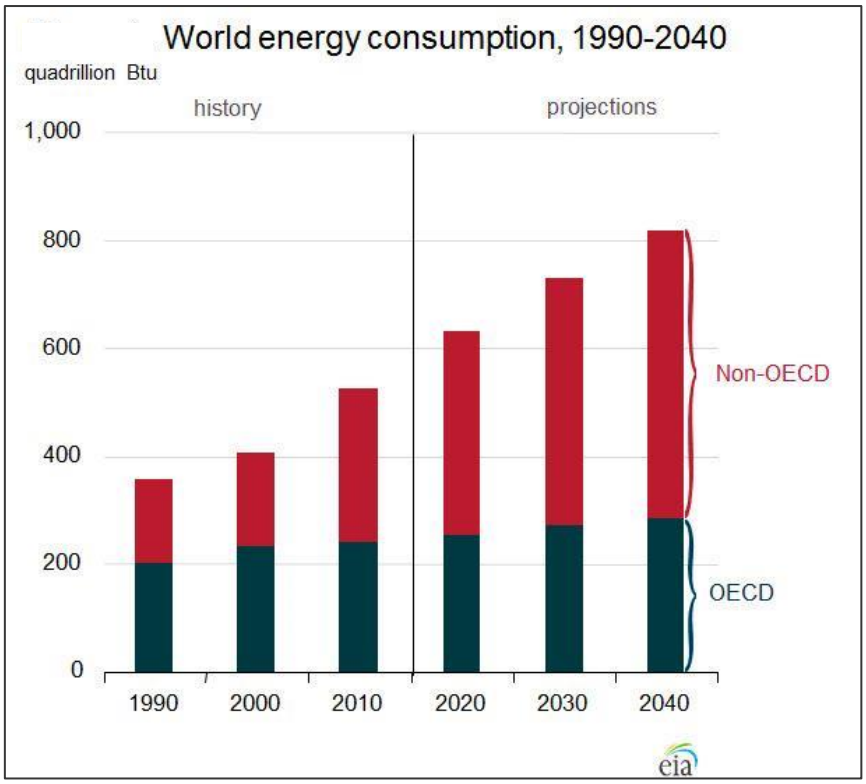

Figure 1 Estimation of energy world consumption from 1990-2040, illustrating the expected effect of growth in Non-OECD countries (International Energy Outlook 2013)

1.4. The concerns for the global warming

The 2013 International Energy Outlook issued by The International Energy Agency (IEA) predicts that global GDP will rise by an average of 3.6% per year from 2010 to 2040 and that global energy consumption will grow by 56% between 2010 and 2040 [4]. One of the major concerns is that, this increase in energy consumption will lead to an equal growth in greenhouse gas emmisions. It is predicted that this will increase average global temperatures by at least 2°C [5]. The World Energy Outlook, published in June 2013 by IEA predicts it is likely that average global temperatures will increase by up to 5.3°C due to greenhouse gas emissions from the projected growth in global energy consumption [6].

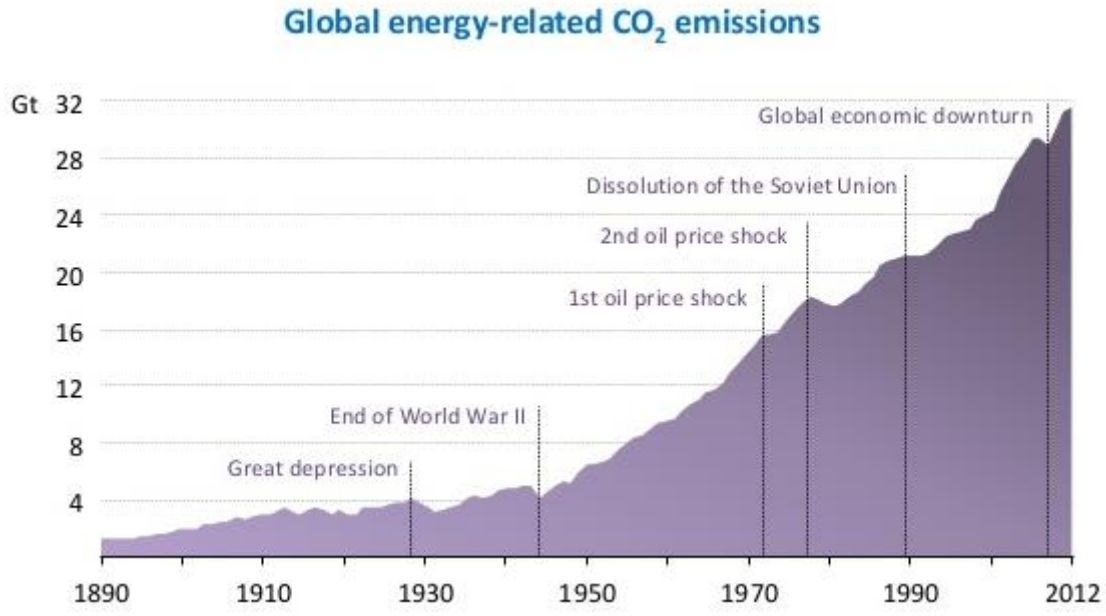

Figure 2 CO_2 emissions (in giga tons) trend point to a long-term temperature increase **(World Energy Outlook Special Report 2013)**

1.5. Environmental management system (EMS)

To address the negative impact of human activities on the environment, two formal, international environmental management systems have been developed. These are the Eco-Management Audit Scheme (EMAS), developed by the European Union [7] and ISO 14001 from the International Organization Standardization [8].[4] These two standards offer the possibility to have a final certification of compliance by a verified third party. Certification requires regular evaluations of the company's performance. Since ISO 14001 and EMAS were launched in the 90's, the number of sites and organizations certified with a formal EMS has been increasing [9][10].

[4] http://www.iso.org/iso/home/standards/management-standards/iso14000.htm

1.5.1. Eco-Management Audit Scheme (EMAS)

To address the negative impact of human activities on the environment, two formal, international environmental management systems have been developed. These are the Eco-Management Audit Scheme (EMAS), developed by the European Union [7] and ISO 14001 from the International Organization Standardization [8].[6] These two standards offer the possibility to have a final certification of compliance by a verified third party. Certification requires regular evaluations of the company's performance. Since ISO 14001 and EMAS were launched in the 90's, the number of sites and organizations certified with a formal EMS has been increasing [9][10].

1.5.2. Other options for environmental certifications

Some other options for environmental certifications will be mentioned, the Green Globe 21 certifications, The Swan and The European Union Eco Labels

1.5.3. Green Globe

Green Globe 21 is an organization that certifies tourism companies that practice sustainable business operations worldwide. Green Globe 21 was established with the support of the World Tourism Council and the World Tourism Association in 1994. During recent years there has been significant development within Green Globe 21 and the organization now aim to certify nearly thirty different aspects of tourism, as well as certifying communities and tourist destinations. The Green Globe certifications are verified by a third party [11].

1.5.4. The Swan

The Swan is the official Nordic eco-label. The companies that have been verified with the Swan label follow strict requirements relating to the environment and health. The objective of the label is to inform consumers of products which guarantee better environment and improved health [12].

[6] http://www.iso.org/iso/home/standards/management-standards/iso14000.htm

1.5.5. The EU Eco Labels

The European Community developed a Europe-wide voluntary environmental scheme called The EU Eco label, launched in 1992. The EU Eco label can be found on more than 17,000 products, and more than 1,300 licenses had been awarded by the end of 2011 [7].
The presence of the EU Eco label logo on certified products makes it easier for the consumer to recognize environmentally friendly and reliable products [13]. As can be seen in following figure, the number of EU Eco labels has increased exponentially since its launch.

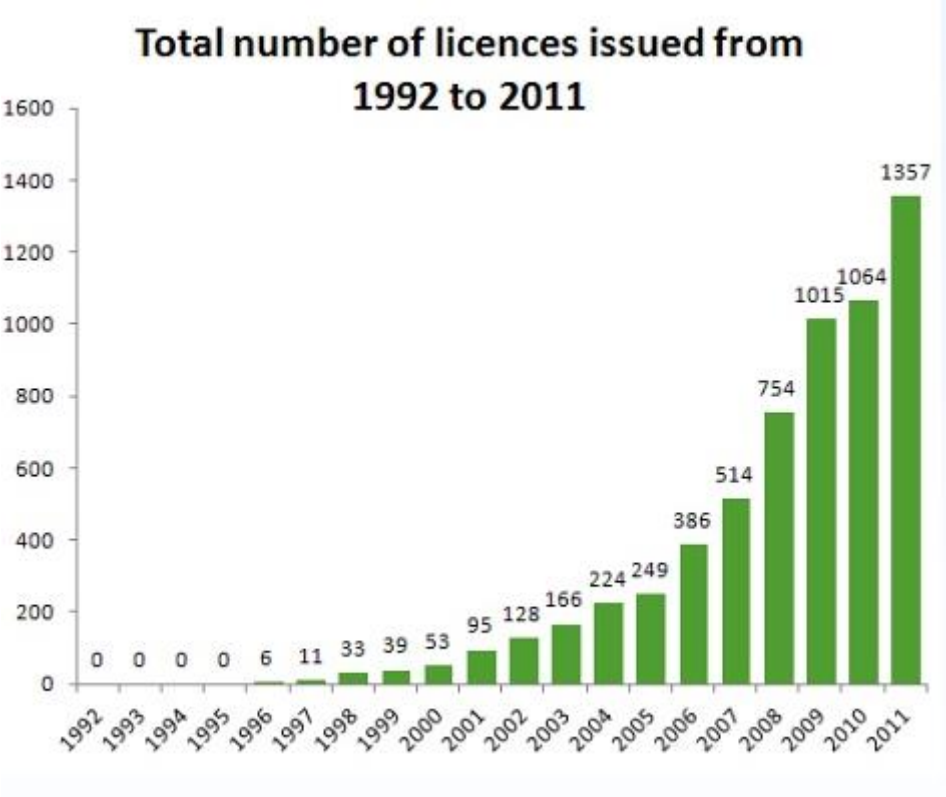

Figure 3 The annual count of EU Eco labels from year 1992 to 2011 (European Commission, Ecolabel, 2014)

1.6. ISO standards

The International Organization for Standardization (ISO) develops and publishes international standards. The ISO standard put in form of a document that outlines the requirements, specifications, guidelines or characteristics that a specific task/product should comply with. The document aims to ensure that products, services, material and processes are fit for their intended purpose [14]. The ISO has a membership of 160 national standards institutes from many countries, including those who are industrialized, developing, or in transition, in all regions of the world.[8]

1.6.1. ISO 14001

ISO 14001:2004 has been adopted as a national standard by more than half of the 160 national members of ISO. The aim of the standard is to support the reduction of pollution and environmental protection [8]. It helps companies both to manage the impact of their activities on the environment and to demonstrate sound environmental management practices. The standard is not limited to a specific profession, business or operation [16].

1.6.2. The purpose of the system

The aim is to help companies achieve environmental goals. ISO 14001 is not intended to be used to create non-tariff trade barriers or to increase or change the companies' legal obligations [17]. According to the ISO website, the benefits the companies gain by implementing the ISO 14001 standard [18] includes:

> "Reduced cost of waste management
> Savings in consumption of energy and materials
> Lower distribution of costs
> Improved corporate image among regulators,
> customers and the public"

[8] http://www.iso.org/iso/home.html

ISO 14001 covers multiple aspects of environmental management. These aspects fall under fields such as strategy, goal setting, implementation and monitoring of all the environmental factors that the company can control or influence.

1.6.3. The companies goals and the implementation

The ISO 14001 standard contains no quantitative criteria for minimum environmental performance. Companies will set their own goals for improvement, along with the plans on how these goals are to be achieved. The standard requires that companies make their own framework, to form the basis of an effective environmental management system. Companies who have implemented an environmental management system according to ISO 14001, can have the system certified by a third party [16].

1.6.4. How the system works (Plan-Do-Check-Act)

The ISO 14000 standards are designed to be implemented according to the Plan-Do-Check-Act (PDCA) cycle, as with all ISO management system standards. The PDCA cycle is conceptualized by figure 4 below. The stages of the PDCA cycle are as follows:

Plan: Companies make their own goals and design processes to achieve these goals. The plans have to be in accordance with their internal environmental policy.

Do: Is the implementation of the processes mapped out in the planning stage.

Check: Monitor and measure the processes in accordance with the environmental policy, targets, goals, legal and other requirements, then report the results of the work.

Act: Using and maintaining the environmental management system's performance through continuous review and improvement [8].

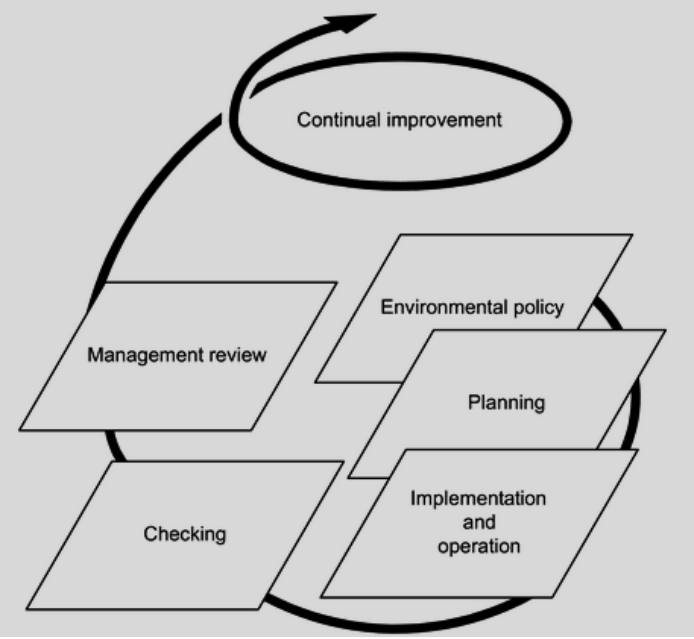

Figure 4 The Plan-Do Check-Act (PDCA) model (International Organization of Standardization, 2013)

1.6.5. ISO 14001 requirements

ISO 14001 puts emphasis on the company's internal and external communication. The environmental policy has to be easily accessible, both by the employees and by the customers.

Internal Communication

Possible internal communication methods to inform and activate the employees include communication via the intranet, employee meetings, training, notice board, suggestion box, and staff meetings.

External Communication

On the other hand, for external communication it is suggested that companies communicate with external stakeholders such as adjacent businesses, town councils and residents nearby the company [19].

1.6.6. The management review

The ISO 14001 process is led by the organization's management team. They have to evaluate the system regularly and to ensure the system is working as it should be. The system requires regular input from the management staff to ensure constant improvement and environmental performance. In order to achieve certification, the results from the review process shall be recorded [8].

1.7. Statistics

Since ISO 14001 was first introduced, approximately 286 thousand ISO 14001 certificates have been issued in 167 countries. The top three countries for the total number of certificates issued were China, Japan and Italy, while the top three for growth in the number of certificates in 2012 were China, Spain and Italy [20] as can be seen in figure 5.

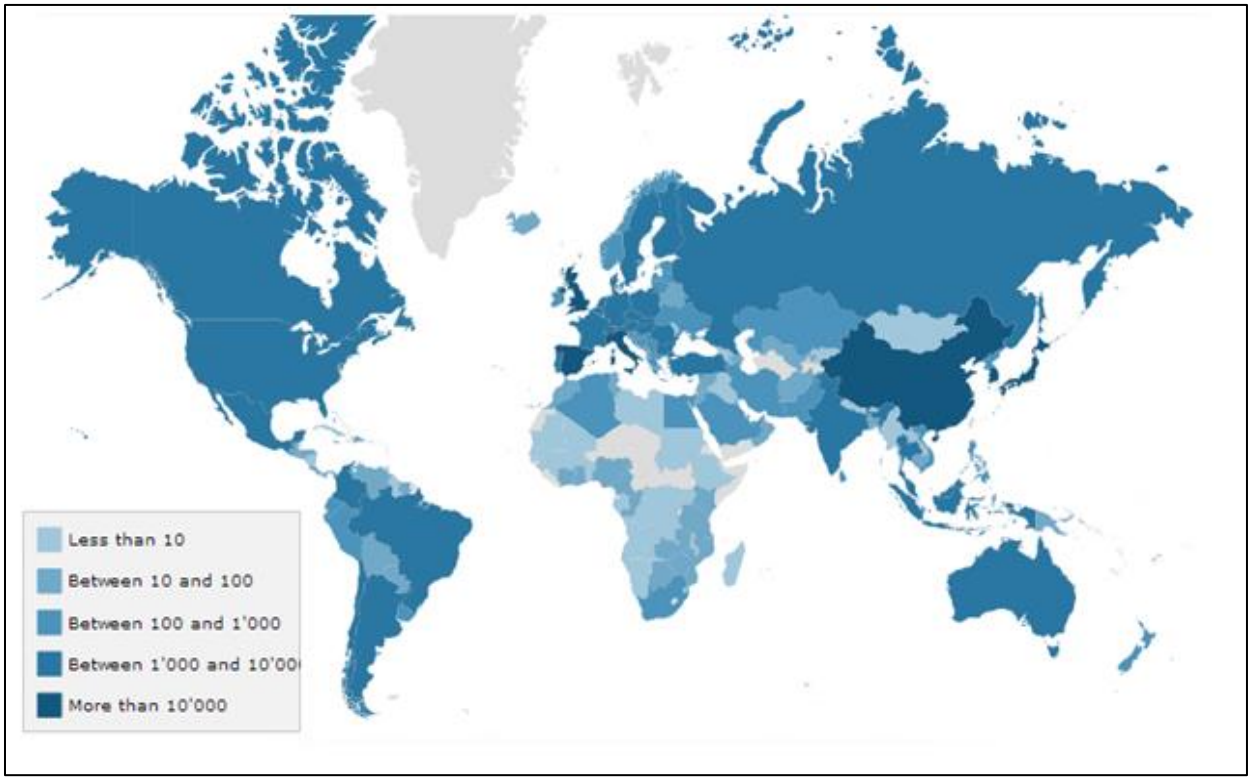

Figure 5 The world distribution of ISO 14001 certifications in 2012 (ISO Survey 2013)

1.7 1. The evolution in ISO standards

ISO standard certifications have being increasing yearly. The number of standard ISO 14001 certificates rose by 9% between 2011 and 2012 as can be seen below in table 1.

Table 1 The evolution of ISO certifications from 2011 to 2012 (International Organization of Standardization, 2013)

Standard	Number of certificates in 2012	Number of certificates in 2011	Evolution	Evolution in %
ISO 9001	1 101 272	1 079 647	21 625	2 %
ISO 14001	285 844	261 957	23 887	9 %
ISO 50001	1 981	459	1 522	332 %
ISO 27001	19 577	17 355	2 222	13 %
ISO 22000	23 231	19 351	3 880	20 %
ISO/TS 16949	50 071	47 512	2 559	5 %
ISO 13485	22 237	19 849	2 388	12 %
TOTAL	**1 504 213**	**1 446 130**	**58 083**	**4 %**

1.7.2. ISO 14001 statistics in Iceland

In recent years there has been an increase in the number of Icelandic companies that have implemented ISO 14001, as shown below in figure 6. In February 2010, 11 companies had implemented ISO 14001 standard, but in 2012, 29 companies in Iceland were certified [21] since the first certification was given to Rio Tinto Alcan in 1997 [22]. In spite of the sharp increase, there is quite difference in adoption of ISO 14001 between Icelandic companies compared to companies of neighboring countries.

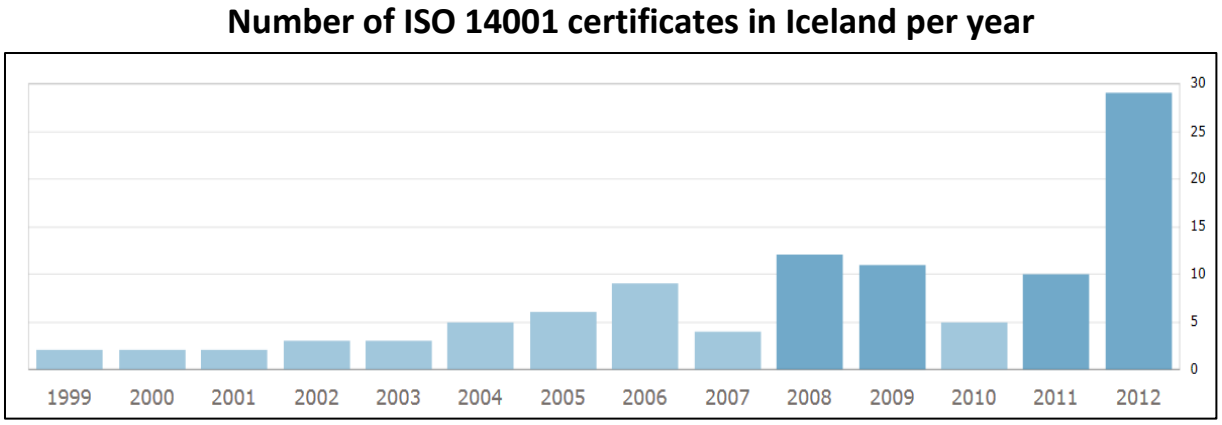

Figure 6 The number of of ISO 14001 certificates in Iceland per year (ISO Survey, 2013)

1.7.3. Comparison of Iceland and some neighbor countries

Data gathered from the World Bank and an ISO Survey show that Iceland has a considerably lower certification rate per capita than other countries, using data of population compared to total certifications. [23] Iceland is behind its Scandinavian neighboring countries, whilst Denmark, Sweden, and Norway have two to three times more per capita. The following table and figure is certification density based on population. Iceland's performance compared to some other neighbor countries.

Table 2 Certificates in Iceland compared to some neighbor countries [15, 16]

Country	Number of Certifications in 2012	Population	Units pr. Capita
Iceland	29	320.137	0,0001
Ireland	417	4.588.798	0,0001
Germany	7034	81.889.839	0,0001
Norway	824	5.018.869	0,0002
Finland	1310	5.414.293	0,0002
UK	15884	63.227.526	0,0003
Denmark	1756	5.590.478	0,0003
Italy	19705	60.917.978	0,0003
Sweden	3885	9.516.617	0,0004

[15] http://data.worldbank.org/indicator/SP.POP.GROW?order=wbapi_data_value_2012+wbapi_data_value+wbapi_data_value-last&sort=asc

[16] ISO Survey, http://www.iso.org/iso/home/standards/certification/iso-survey.htm?certificate=ISO%2014001&countrycode=IS#countrypick

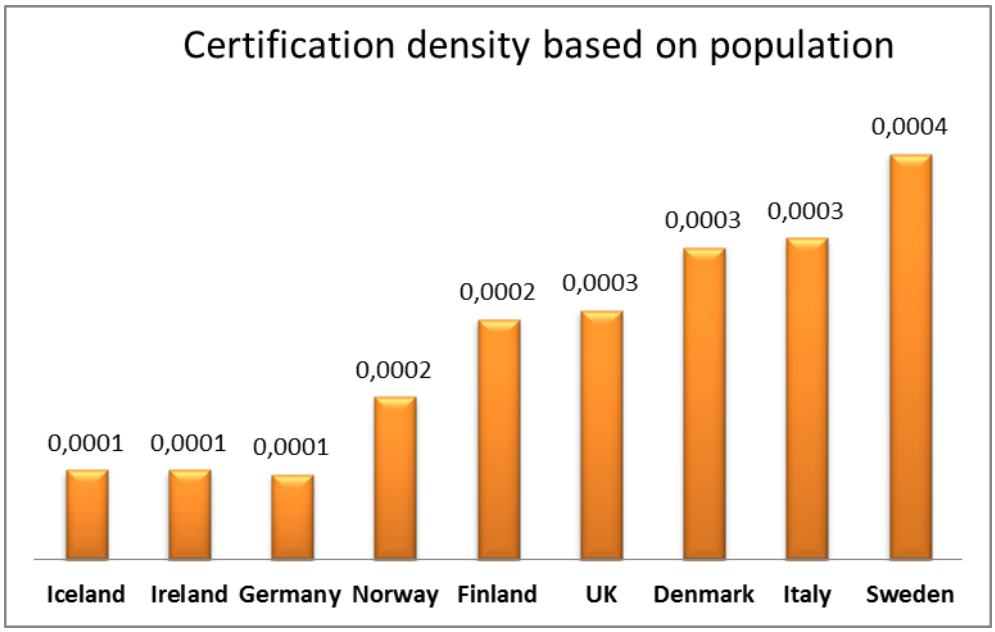

Figure 7 Certificates in Iceland and some neighbor countries[19, 20]

1.8. Regulations

1.8.1 Global

Several factors influence companies to adopt environmental policies. These factors include international standards, national laws and regulations, social responsibility, market incentives and general competiveness. Directives from the European Union and International laws have been issued with the aim to protect the environment. A cap and trades system has been designed by The EU with the aim on setting limits on the total amount of certain greenhouse gases that can be emitted [25] and as well the Directive 2009/28/EC which aims on increasing the share of energy from renewable sources [26].

[19] http://data.worldbank.org/indicator/SP.POP.GROW?order=wbapi_data_value_2012+wbapi_data_value+wbapi_data_value-last&sort=asc

[20] ISO Survey, http://www.iso.org/iso/home/standards/certification/iso-survey.htm?certificate=ISO%2014001&countrycode=IS#countrypick

1.8.2. The European Union Emissions Trading Scheme

The European Union implemented The Emissions Trading Scheme (EU-ETS) in 2005 for certain industries. One of its purposes was to partly fulfil their obligations under the Kyoto framework which has the objective to reduce greenhouse gas emissions [25]. The EU-ETS sets gradually lower caps on annual greenhouse gas emissions and in year 2020 it will have limits set at 79% of 2005 emissions, covering all the EU member states as well as Liechtenstein, Iceland, and Norway [27]. The aim is to reduce the cap gradually over time so that the total emissions fall and the trade system allows the factories, power plants and other installations in the system to sell their allowances [25].

1.8.3. Directive 2009/28/EC

The EU developed post-2020 climate policies according to future international policy developments and progress in the understanding of the science of global climate change. The "2020" climate and energy package was issued by Directive 2009/28, where the aim is to reduce CO_2 emissions by 20% from 1990 levels. The aim is to achieve this by raising the share of energy consumption from renewable sources to 20% in the EU. This is known as the 20-20-20 target.

For Iceland it means for example that in the year 2020 the share of energy from renewable sources in transportation shall be 10%, but Iceland is by now over the 20% level in their renewable energy consumption [26].

1.8.4. Local

1.8.5. Iceland as a part of the EU Climate and Energy Package

In 2009 Iceland expressed interest to join the EU Climate and Energy Package and also applied for formal discussion of a joint fulfilment agreement with the EU for an international climate agreement [28]. The same year the European Council welcomed Iceland to become a full member in the EU Climate and Energy Package by taking the same commitments as the EU members with regard to future international climate agreements [29]. Even though Iceland is not a member state of the European Union, the government has obligations through the European Economic Area (EEA). The Directive 2009/28/EC has been incorporated into to the

EEA and is implementing measures in Iceland subsequently. That means that Iceland has the same obligations as EU member states regarding environmental issues [26]..

1.8.6. Regulations from the Icelandic parliament

In 2013 the Ministries of Environmental and Natural Resources issued regulation 344/2013 on the free participation of companies and institutions in European environmental management (EMAS).The objective is to create conditions for the free participation of businesses and environmental organizations in the European Union EMAS [30].

In 1996 regulation 609/1996 was issued on the handling of packaging and packaging waste. The objective was to minimize adverse impact on the environment of packaging waste and to decrease packaging waste [31].

Regulation on waste management no. 737/2003 was agreed in the Icelandic parliament in 2003. The objective of this regulation was to promote minimal adverse effects from waste on the environment, particularly contamination of water, soil and air [32].

1.8.7. Green accounting

According the law no. 7/1998 on creating wholesome living for the public and protect the values inherent in a healthy and unpolluted environment, companies with polluting activities have to keep green accounting according and measure by numeric method the impact they have on the environment [33]. After that, companies in Iceland started to publish their green accounting and some published their own environmental reports on their website, such as Hotel Natura [34] and Hópbílar [35].

The Environmental Agency states that green accounting is an important element for environmental management and for companies that are evolving towards the environmental management system. They can work in preparing the first report on environmental accounting, the basis for the implementation of environmental management systems[25] [36].

[25] http://www.ust.is/einstaklingar/mengandi-starfsemi/graent-bokhald/

1.9. Research justification

The requirements to minimize the impact on the environment by reducing energy consumption, general waste, prevent pollution as well as an increased demand for environmental awareness have become a continuous goal of the public and of many governments [27].

ISO 14001 is one of the many methods which have been developed in order to meet these environmental goals. In general, discussions about addressing environmental issues often focus on the cost and the time it takes to resolve the issues, but discussions about potential benefits are not as common. The motivation for this research is to determine whether adopting ISO 14001 has any significant financial benefits.

This research also aims to determine whether it is financially beneficial for Icelandic companies, organizations, managers, or/and the boards of directors to take responsibility for their environmental impact by adopting ISO 14001. The motivation of studying the effects of ISO 14001 in Iceland is: it might be encouraging for companies, organizations, managers, or/and the boards of directors other to implement EMS.

Lack of quantitative researches from annual reports

A review of Icelandic literature found, there were no reports to date on benefits of adopting the environmental management system ISO 14001 by evaluating annual reports to gain quantitative insights.

1.9.1. Hypotheses and research questions

This research aims to answer the following hypotheses and research questions:

Hypotheses

H1. Companies have relatively higher gross profit margins after implementing ISO 14001.

H.2. Companies have a reduced relative operational cost after implementing ISO 14001.

Research questions

R.Q.1. Is it financially beneficial for Icelandic companies to implement ISO 14001?

R.Q.2. Do companies perform better in their operation after implementing the ISO 14001 standard?

2. Literature review

This chapter reviews literature from both Icelandic and foreign studies with different results. It is found that there is no consensus between researchers on whether it is financial beneficial to work according to an EMS.

A recent M.Sc. thesis by Hrafnsdóttir (2011) aimed to find out what the financial performance of production companies was in Iceland based upon their certification with ISO 14001 or with some other environmental labels. One of the hypotheses was related to this study, which was "A company's competitive advantage because of environmental issues has a positive impact on its financial performance". The results stated that the companies who had environmental certification or environmental management system of some sort had positive financial performance [37].

Another Icelandic M.Sc. thesis by Benónýsdóttir (2012) was based on interviews with managers of the companies and one of the questions was, "What do companies benefit from implementing and using an environmental management system? " The question covered marketing, economical effect, and improvements of the operation The results showed that improvements in the operation of the company was the main benefit was related to the implementation of EMS [38].

A B.Sc. thesis by Rögnvaldsdóttir (2007) aimed to find out what the benefits and disadvantages are of implementing ISO 14001. The paper also examined the costs and the time it takes to implement the system. The research was conducted among the eight companies that have implemented the ISO 14001 environmental management system. The study demonstrated that most of the participants noticed no disadvantages related to the implementation of ISO 14001. In most cases the return of the investment was less than 10 years and seven companies out of eight believed they had more advantage in the competitive market after the implementation, and seven out of eight companies stated that they had received a return on the investment of implementing ISO 14001. None of the participations regretted the implementation. The disadvantages were related to how much time the implementation took and the high initial cost [39] .

An article from Jónsdóttir (2004) was based on a study performed on the reasons that Icelandic companies have adopted the ISO 14001 standards or the official Nordic eco-label, The Swan [40] and the benefits that they have achieved. All the companies received benefit in improved operations but none of the companies with ISO14001 believed they had received a reward on the market [41]. By that time when the research was made, only 4 companies were certified with the ISO 14001 standard in Iceland

A recent study from Thakore, Lowe and Nicholls (2013) shows that there is a relationship between EMS certifications and economic performance. The object of the study was to analyze the impact of certification on financial performance of a certified company during the process of certification. The researchers compared a financial performance in return of sales of companies certified by ISO 14001 with companies that were not certified, over two time periods. An analysis of randomly selected paired companies showed a statistically significant relationship between financial performance and the certification process. The return on sales for long term performance was 4.01%, and for short term performance was 3.29% [42].

Thakore, Lowe and Nicholls (2013) claimed that an environmental management system certified to ISO 14001 helps companies to demonstrate a commitment to improve their environmental performance and to promote better economical performance. As can be seen in figure 8, they designed a model that shows the result of the implementation of the ISO 14011 standard.[43]

Figure 8 Model that describes the EMS certification and economical (Thakore, Lowe and Nicholls, 2013)

Thakore, Lowe and Nicholls (2013) stated in their the result, the reasason for better performance was attributed to several elements such as increased compliance, minimizing waste, better customer relationship, number of environmental improvement support programmes, reduced resource use, advisory and certification schemes, improved senior management commitment to increase work efficiency, and over all ’good management‘ practices [43].

Firms with better than average performance have a greater propensity to pursue certification, but there is no evidence that improvements in performance follow certification according to findings by Saizarbitoria, Azorín, and Dick (2011) [44].

Recent study tracked financial performance of publicly traded US firms between 1996 and 2005 to find out whether ISO 14001 leads to improved financial performance by Jong, Paulraj and Bloom (2013). The results showed in the short run that ISO 14001 certification made only a minor impact on the bottom-line. However, their study showed a significant financial improvement over the long term period with certification. The results suggest that firms need to educate shareholders of the long-term benefits of their actions towards the improvement of the environment. [45].

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The aim of study by Vries, Bayramoglu and Wiele (2012) was to find if the implementation of ISO 14001 found evidence for environmental and/or business improvements [46].

An empirical analysis by Nishitani (2010) studied the effects on firms’ economic performances after implementing environmental management systems. The main findings were that EMS implementation increases a firm’s value added through an increase in demand and improvement in productivity. The researcher claimed these results prove that there are many ways for EMS implementation to improve a firm’s economic performance [47].

Recently Paulraj and Jong (2011) explored how the US stock market reacts to ISO 14001 certification announcements. The results indicate that certification announcements of ISO

14001 have negative impact on stock performance. More importantly, the research showed that the shareholder wealth reduced because of these certifications announcements [48].

3. Methodology

This chapter discusses how the hypotheses stated in section 1.9.1. were tested and how the research questions were answered. First, this chapter covers the construction of the research and the data collection. It then discusses the three main parts of the study, which are: annual reports, interviews and questionnaires and internet survey.

3.1. The construction of the research

The study is threefold and the study group consists of all 29 companies in Iceland that are certified with ISO 14001. The reasons that the study is divided into three separate parts are:

- The annual report analysis provides a quantitative measure of performance for all the Icelandic certified ISO 14001 companies. The aim was to find if there is a significant difference in financial impact before and after certification.

- The second part interviews and questionnaires are both qualitative and quantitative. The sample set consists of is nine certified companies from as diverse fields in of the operation, from the population of all the certified ISO 14001 companies in Iceland. Used are semi-structured interviews consisted of interviews and questionnaire. The aim was to gain insight into how the managers experience the implementation process, and the effect on the operation after that implementation and how it affects the operation.

- The internet survey is quantitative. The population is all the Icelandic certified companies. The internet survey was distributed to the 29 ISO 14001 registered companies in Iceland. The aim was to compare the results to the interviews and the questionnaire.

3.1.1. Qualitative research

The aim of qualitative researches is to get deep understanding of situations and delve more deeply into people's interpretations motivations and understanding such as to understand different meanings that people experience [49].

3.1.2. Quantitative

Quantitative researches attempts accurate measurements of something. Quantitative data consist for example of coded responses of participants or numbers that have reduced or increased which may be statistical analyzed[49].

3.2. Data collection

The research is based on a combination of qualitative and quantitative methods. It builds the sources from historical data, reports from official organizations, Ministry of Environment, Ministry of Justice, regulations from the European Union and Commission and regulations from the Icelandic parliament, reviewed articles from recognized scientific journals, Icelandic theses, annual reports, recorded interviews, questionnaires and an internet survey

Multiple methods were used in order to increase the reliability of the results. The interviews, survey[27] and the questionnaire[28] were conducted entirely in Icelandic.

3.3. Annual reports

3.3.1. Population

The population was all the Icelandic certified ISO 14001 companies with accessible annual reports that had the required data available.

3.3.2. Data collection

Annual reports were gathered from all the ISO 14001 certified companies[29]. Annual reports were compared from four years before the certifications with annual reports from four years after the certification. The year of the certification was included in the years after the certification. The data was collected from the Directorate of Internal Revenue [50] and the annual reports were collected from Creditinfo[51]. The Directorate of Internal Revenue helped with access to the companies' social security numbers (ID number) and Creditinfo collected the data according to the social security number.

[27] Appendix B
[28] Appendix A
[29] Appendix C

3.3.3. Different information in the annual reports

Not all of the annual reports were qualified to use for the study. 14 annual reports out of 26 the researcher received were qualified for the research, whilst 3 of the 29 certified firms did not respond at all. The reason 12 companies were excluded from this part of the study was because the annual reports did not have all the required information, due to regulations about how companies are allowed to hand in the annual report to the Directorate of Internal Revenue. These regulations allow companies to hand in financial reports in summarized form upon fulfilment of specified requirements, called regulations on consolidated financial reports [52]. This authorization made it impossible to calculate some financial ratios due to a lack of data. This is discussed further later in this paper.

3.3.4. The calculations

The time range was four years before the certification and then then the four years after the certification. The year the company was certified was categorized as the year after, based on [42]. The study used two formulas for the calculations, discussed below.

3.3.5. The requirements for the annual reports

The annual reports had to fulfil the requirement to be able to calculate financial ratios. The annual reports had to be open and not in summarized form. For example office and other operating costs and factors in the annual report have to be itemized.

3.3.6. Financial ratios

Two financial ratios were used. The first was the financial ratio of the rate of operation cost versus the gross profit called the ‘Operating Cost Ratio’ and ‘Operating Profit Margin’. The reason was to be able to measure the impact of the cost decreases or increases. These two ratios were chosen in order to estimate the financial benefits and costs of adopting ISO 14001

3.3.7. Operating cost ratio

Gross profit is equal to a company's revenue minus the cost of goods sold (COGS). Operating Cost is defined the sum of ‘salaries and payable fees ’office and other operating costs’, and

‘depreciation of fixed assets’. Only calculations with ’office and other operating costs’, were used because of limitations of information in the annual reports [53]. [31]

The following equation shows the calculation for the operation cost ratio:

$$Operating\ Cost\ Ratio = \frac{Operating\ Cost}{Gross\ Profit}$$

3.3.8. Operating profit margin

The definition of profit margin is net income divided by revenues or net profits divided by sales [53]. It measures the share out of every dollar of sales that a company keeps in earnings. A higher profit margin indicates a more profitable company that has better control over its costs compared to its competitors.

Operating profit margin is also known as a firm's Return on Sales (ROS)[32]. Profit margin is used when comparing companies in similar industries. Operating Profit is equal to Operating Revenue minus the sum of Cost of Goods Sold, Operating Expenses, Depreciation and Amortization [53]**.** This is the profit earned from a firm's core business operations. This value does not include profit earned from the firm's investments and the effects of interest and taxes, also known as earnings before interest and tax (EBIT) or operating income.

[31] http://www.investopedia.com/terms/o/operating_profit.asp

[32] http://www.investopedia.com/terms/r/ros.asp

Net Sales (Revenues) is the amount of sales by a company after the deduction of returns, allowances for missing or damaged goods and any discounts allowed[33]. The following equation shows the calculation for the operation profit margin:

$$Operating\ Profit\ Margin = \frac{Operating\ Profit}{Net\ Sales}$$

3.3.9. Calculations and t-test

The average was calculated for each financial ratio in each period, four years before and four years after the certification. Both periods were then compared together with paired sample t-test to find evidence on different between periods. Paired sample t-test assesses whether there is a statistically significant difference between two averages [54]. T-tests were performed for both of the financial ratios the operating profit margin and the operation cost ratio. If the results from the t-test are under 5% that means ($p < 0.05$) the results are significant at 95% confidence level, if they are above the 5%, ($p > 0.05$) level the results are not is not significant at 95% confidence level [54].

3.4. Interviews and questionnaires

In this part interviews were taken as well as a multiple question questionnaire[34]. Both the interview and the questionnaire were performed in Icelandic. The questionnaire consisted of a set of multiple-choice questions.

[33] http://www.investopedia.com/terms/n/netsales.asp
[34] Appendix **A** Questionnaire to the respondents regarding the semi structured interview.

3.4.1. Population

Nine companies were selected for the interviews and questionnaires from diverse operational backgrounds, limited to the capital area. The number of interviews was limited due to how much time it takes to organize and perform detailed interviews. The interviews were with the managers of the 9 companies who were in charge of the environmental issues..

3.4.2. Questionnaires

The questionnaire consisted of a set of multiple-choice questions, in which participants could choose one or all the options. There was one background question, six multiple-choice questions and two open questions..

3.4.3. Interviews

The interviews were taken in order to gain additional insights into the companies' environmental management systems. The aim was to give the research an additional descriptive interpretation about what the managers are coping with, regarding the process of the implementation in their company.

3.4.4. The conduction of the research

The interviewees filled out the questionnaire, and were asked the questions verbally and the answers were recorded. Following each question was a discussion about the topic and the interviews in so called semi structured method were recorded. After that, the researcher translated the conversations and the answers from the questionnaire. That gave the research different perspectives from the different experiences of each of the managers.

3.4.5. Semi-structured interviews

Semi-structured interviews are a method used in social sciences, which allows the interviewees a chance to express themselves while structured interviews have a closed form that allows no diversity in the answers. This qualitative approach gives deeper insight into the matters and makes it possible to answer the research questions more accurately [55].

3.5. Internet Survey

The third part was the internet survey[35]. The purpose of the internet survey was to contact the whole population and to compare the survey results with those of the questionnaires. The questions were sent to the companies through the Survey Monkey program.

3.5.1 Population

The population was all Icelandic companies certified by the ISO 14001 standard, including the participant from the interviews and the questionnaire part. The researcher contacted all the twenty six certified companies by e-mail or by phone call and asked relevant managers for their permissions to participate. 21 out of the 26 contactable companies participated in the internet survey

3.5.2. Form of the survey

All the questions consist of 6 statements on a Likert scale. The scale consists of statements that express either a favorable or an unfavorable attitude towards a certain object of interest [49]. An open question was listed at the end of the survey to offer the participants the opportunity to express themselves if they had something to say that might provide a benefit to the research. The reason for using the Likert scale was because it is simple in use and thereby it's more likely get higher response rates.

3.6. Limitations and biases

This section discusses the limitations and biases specific to each of the three parts of the study.

3.6.1. Annual reports

There are several limitiations apparent in the reseach regarding the calculations based on the annual reports, which should be mentioned.

Some of the annual reports were not detailed enough to use the financial formulas presented. This limited the calculation of the financial ratios, as some reports did not include wages and

[35] Appendix B. Internet survey

related expenses, operational expenses or operational income. For this reason the study does not cover the wages and related expenses in the financial calculations in order to maintain consistency amongst the reports. Therefore the financial ratios discussed are a simplified version.

As mentioned by some interviewees, it might be difficult to measure the financial benefits of implementing ISO14001 using annual reports. This is because the figures are still so small compared to other portions of the operation cost.

3.6.2. Different time span

The time it takes for benefits from the implementation of ISO 14001 to appear in the annual reports can vary from company to company and also it takes time to write off the cost of the implementation. The time span of the results may be too short to have significant results.

3.6.3. Interviews and the questionnaires

If companies had previously implemented the ISO 9001[38] standard it will take less time to implement the ISO 14001 standard. If the both standards the 9001 and 14001 are being implemented at the same time it takes longer time. This impact was not possible to statistically quantify. Some questions in the questionnaire might assume that respondents would give positive answers that might have biased effect on the participants and as well on the results.

3.6.4. The financial crisis

Large statistical fluctuations in the data may exist due to the financial crisis that hit the Icelandic economy in 2008. The economic environment was very chaotic and unstable[39], which influenced the operation of many Icelandic companies. Data from eight out of fourteen annual reports came into the period of the financial crisis. It is difficult to assume that these numbers are significant because of the immeasurable effect of the unstable economic environment.

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[38] The 9001 standard is a qualitiy standard: http://www.iso.org/iso/home/standards/management-standards/iso_9000.htm

[39] http://www.sedlabanki.is/library/Skr%C3%A1arsafn/R%C3%A6%C3%B0ur--erindi-og-greinar/PM%202013%203%20Kynning%20Sami%C3%B0n%20LOKA.pdf

3.6.5. Internet survey

In two instances in the survey the rate of answers were rather high in the category “neutral”. In both cases it was related to financial questions. Question five was asked if there was a reduction in the operation costs and 48 % answered “Neutral”. Question eight asked if there was a financial benefit due to the implementation and 24% answered “Neutral”. This may be explained by the companies that were certified in 2012, who may not have had enough time yet to witness any measurable financial benefit. Also 63% of the population got certified in 2010 and have had limited measurable experience so far. Some statements in the survey might assume that respondents would give sometimes positive answers that might have biased effect on the participants and as well on the results.

3.6.6. The qualitative part

In the qualitative part interviews were conducted. The aim was to get deeper understanding and to give the research more descriptive interpretation about what the managers are coping with, regarding the process of implementation. There are no concrete results from that part. The answers and the discussions might be more positive because the standard and its implementation process is their responsibility of the persons being interviewed.

4. Results

This chapter covers the results from the three parts of the research: firstly the annual reports, secondly the interviews and questionnaires and finally the internet survey.

The results of the annual reports are in form of tables. The companies are numerically ordered and their names are not identified. The answers to each question from the interview and questionnaire part are shown as graphs (where possible) and are then followed by quotes from the interviews to clarify the results. The results of the internet surveys are also displayed in graphs.

4.1. Annual reports

The results from the annual reports are in two parts, first the operating profit margin and then the operating cost ratio

4.1.1. Operating profit margin (OPM)

The total average operating profit margin was found to increase by 2.2% after adopting ISO 14001. For operating profit margin the p-value is equal to 0.58 which is not a significant difference at a 95% confidence level with paired sample t-test. Companies who gained positive impact after the certification impact were 43% as shown in table 3.

Table 3 Operation profit margin results

company	avg before	std before	avg after	std after	difference	positive impact	year
1	29%	4%	44%	26%	15%	x	2007
2	3%	12%	9%	4%	6%	x	2011
3	4%	4%	-2%	9%	-6%		2002
4	4%	2%	4%	2%	0%		1999
5	17%	14%	21%	4%	4%	x	2010
6	-42%		5%	0%	47%	x	2012
7	7%	16%	-23%	14%	-29%		2010
8	28%	2%	43%	13%	15%	x	2006
9	14%	8%	11%	1%	-3%		2010
10	4%	2%	-1%	3%	-5%		2010
11	11%	2%	19%	2%	8%	x	1997
12	6%	2%	-3%	10%	-8%		2007
13	8%	2%	4%		-5%		2011
14	16%	1%	14%		-1%		2012
Total Avg	**7,8%**		**10%**		**2.2%**		
p-value	**0,58**						

There is no obvious correlation of higher operation profit margin after the certification as can be seen in following figure. Companies who showed better performance were 6 out of 14 and 8 out of 14 showed worse performance after the implementation.

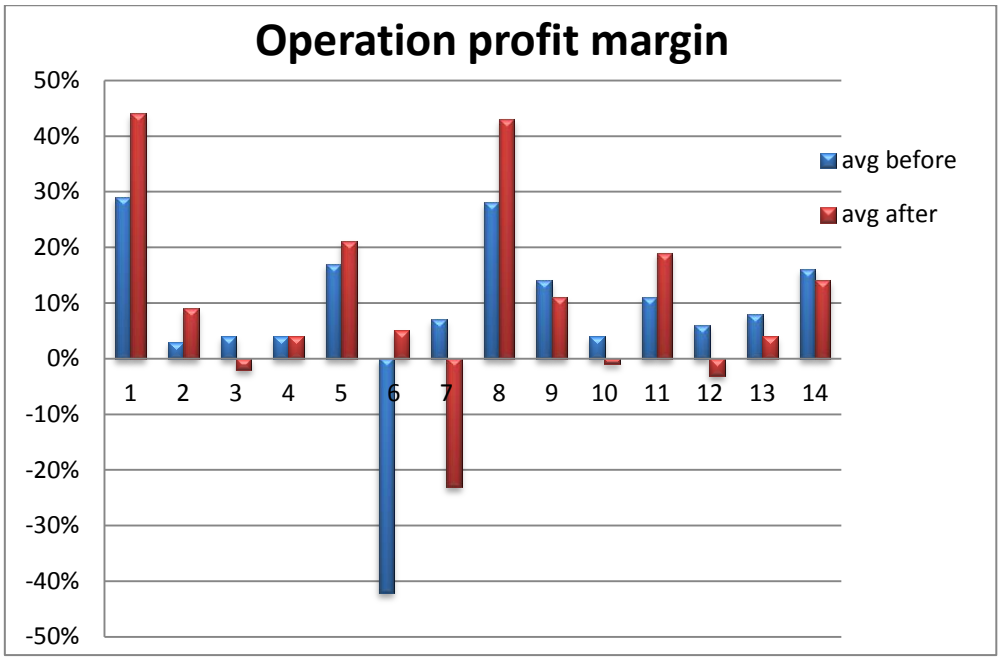

Figure 9 Comparison of the Operation profit margin before and after the certification

4.1.2. Operating cost ratio

For the total average operating cost ratio the total average margin decreased by 6%. For the operating cost ratio the p-value of the averages before and after ISO 14001 implementation equals 0.32. This is not a significant difference at a 95% confidence level using paired sample t-test. Companies who gained positive impact after the certification were 57 %.as shown in table 4.

Table 4 Operating cost ratio

company	avg before	std before	avg after	std after	difference	positive impact	year
1	30%	9%	22%	16%	9%	x	2007
2	38%	29%	33%	5%	6%	x	2011
3	37%	3%	36%	8%	1%	x	2002
4	57%	18%	36%	10%	20%	x	1999
5	24%	10%	24%	6%	0%		2010
6	89%		36%	26%	53%	x	2012
7	42%	25%	73%	32%	-31%		2010
8	23%	10%	33%	25%	-10%		2006
9	29%	7%	42%	5%	-13%		2010
10	71%	19%	35%	6%	36%	x	2010
11	34%	0%	28%	5%	6%	x	1997
12	68%		28%	38%	40%	x	2007
13	75%	4%	94%	12%	-18%		2011
14	70%	9%	77%				2012
Total avg	**49%**		**43%**		**6.0%**		
p-value	**0,32**						

There is no evidence of correlation between lower operating cost before and after the certification in figure 10. Companies who showed better performance were 8 out of 14 and 6 out of fourteen showed worse performance after the implementation.

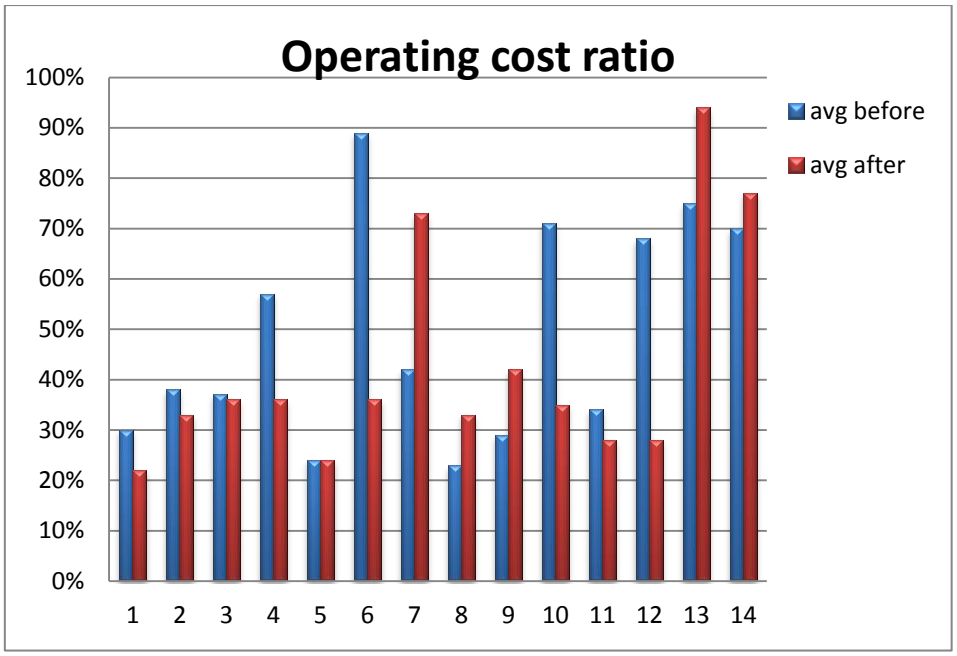

Figure 10 Comparison on the operation cost ratio before and after the certification

4.2. Interviews and questionnaire

The results of the annual reports are in form of tables. The companies are numerically ordered and their names are not identified. The answers to each question from the interview and questionnaire part are shown as graphs (where possible) and are then followed by quotes from the interviews to clarify the results. The results of the internet surveys are also displayed in graphs.

4.2.1. Does the company have ISO 9001 certification?

The companies who had ISO 9001certification before they implimented the ISO 14001 standard were 56%.

4.2.2. How long did the implementation process take?

The time taken to implement ISO 14001 varies, as shown in figure 11. If companies had previously implemented the ISO 9001[40] standard it took less time to implement the ISO 14001 standard. If the both standards the 9001 and 14001 are being implemented at the same time it takes longer time.

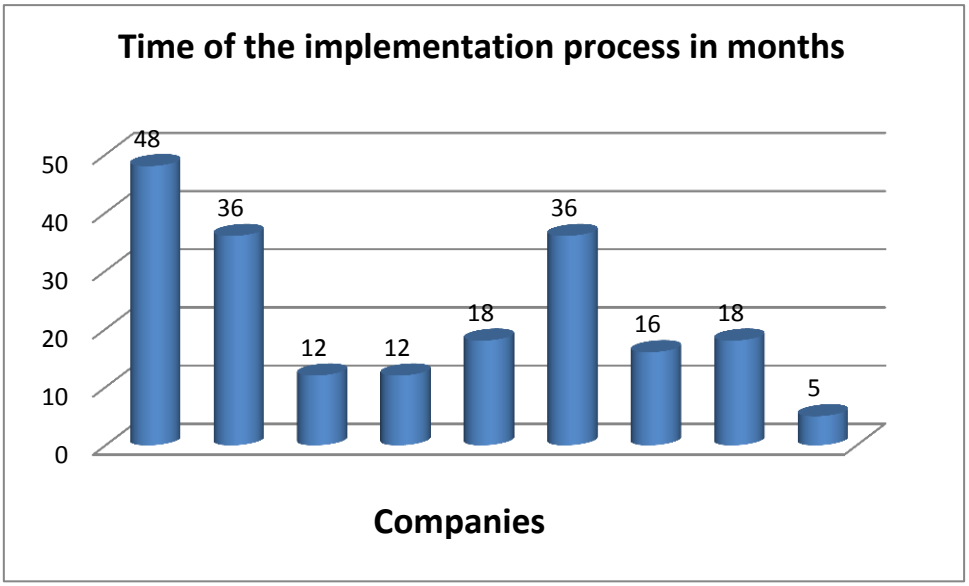

Figure 11 Time of the implemtation process in months.

Quotes from the interview regarding the question: "How long did the implementation process take?"

> "Implementation like this requires long time to adjust because you are changing the way you are thinking. That is why we decided in the beginning to give us a long time to adjust the system. Training and education of employees is one of the most important part, because this is not just about putting something eco-friendly and green labels, it comes into the security and service factors as well. This is not just about sorting garbage." (Office- and Environmental Manager in Transportation Company).

[40] The ISO 9001 standard is a qualitiy standard: http://www.iso.org/iso/home/standards/management-standards/iso_9000.htm

"Five months. We already had the ISO 9001 certification and the ISO 14001 certification came following that" (Environmental Manager and Consultant).

"It took four years to implement the system and the reason for that was we were going to win the world, we decided to do too much in the first run and we could not handle it. We reconsidered the goal and reduced the scope of the implementation. Then after that we added in more things into the system step by step" (Quality- and security manager in Container Company).

"One year and four months, it took longer time than we expected however we have to be realistic. You need good time to adjust the system" (Environmental and-Quality Manager in Service Company).

4.2.3. Why was ISO 14001 environmental certification pursued?

There were many reasons why the companies decided to pursue certification with the ISO14001 standard. In all the cases it was due to of internal decisions, butwith 78% also claiming that external reasons influenced their decision, as shown below in the figure 12.

Examples of internal reasons mentioned were that: it was to follow the company's environmental policy, the company had been concentrating on minimizing their environmental impact for several years and they wanted to do so better and got certified, and one interviewee wanted to be leading in this field.

Examples of external reasons mentioned were: influence from customers, they did not want to fall behind others in their field who had certification, and another said that they have responsibilities towards the environment.

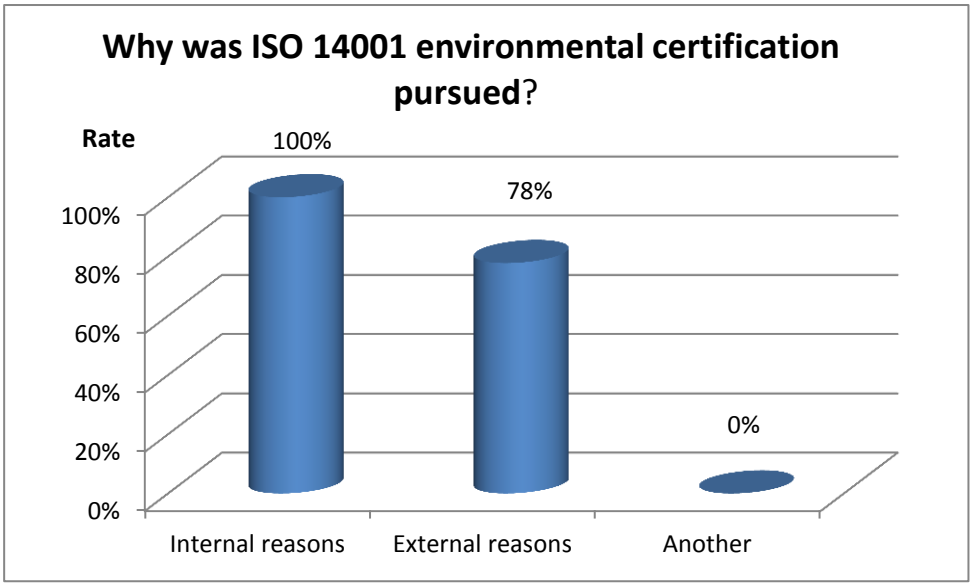

Figure 12 The rate of internal and external reasons to have the certification of ISO14001

Quotes from the interview regarding the question: "Why was ISO 14001 environmental certification pursued?

"There were several reasons for the adoption. One of them was because one of our costumers influenced us to be certified with ISO 14001, and as well we wanted to increase our competitive advantage on foreign market." (Office -and Environmental Manager, in Transportation Company)

We want to be leading in this field because we are a consult that assists firms in implementing these standards and as well because we work a lot on foreign markets. One third of our income comes from foreign markets so it makes our life easier to be certified." (Environmental Manager and Consultant)

"It was both because of internal and external reasons. The first idea came up by a student who was working for several years ago. He thought it would be a good idea to have the certification because we had been working a lot in an environmentally friendly way through the years. We thought about it for

a good while and then we decided that we could do better in environmental issues and started the implementation process." (Quality, Environmental- and Security Manager in Car Rental Company)

"The reason for implementing the system was to back-up our salesmen in their work." (Executive Director in Manufacturing Company).

"In the beginning it was an internal decision and as well because of requirements to be certified when you submit tender." (Quality- and Security manager in Container Company)

"There were both internal and external reasons for implementing the ISO 14001 standards. Green tourism is getting more and more in, and we don't want to get behind." (Supervisor of Environmental issues in Tourism business).

"There are many reasons for this certification. In the tourism business you have great responsibility towards the nature. It is important to minimize the impact on the environment and decrease the negative impact. One of the reasons is that foreign travel agencies require more for environmental certification in this business" (Human Resource Manager in traveling facilities).

"It was because of internal reasons. The company has an environmental policy and part of it is certain service stations will work according to the requirements of ISO 14001." (Environmental and-Quality Manager in Service Company).

4.2.4. What was the reason to get certification?

All respondents said that one of the reasons was to improve the company's image, 78% thought that it was important to increase the environmental awareness of the employees, 67% said social responsibility and the same rate mentioned it was because they were in an

environmental demanding operation. A summary of the responses can be seen in figure 13 below, showing the similar reasoning of the majority of the companies as to why they got certified.

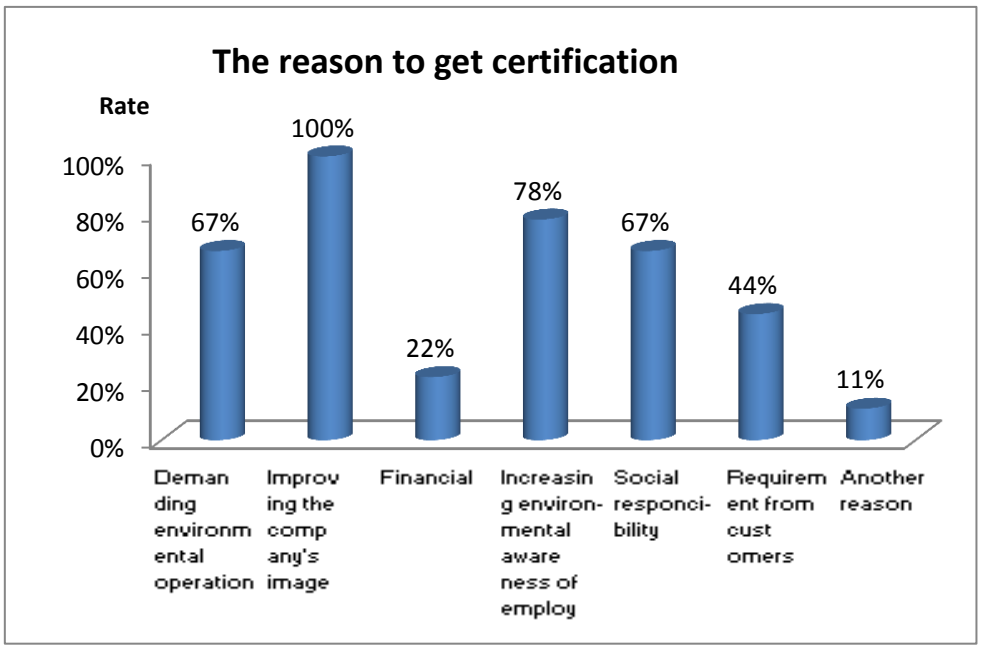

Figure 13 The reasons that influenced the companies get have certification by different categories

Quotes from the interview on the question:" What was the reason to get certification?

> "Our business is very environmentally demanding because the pollution is great. So we knew that by implementing the ISO system was just a positive thing for us, especially for our image. In our operation it is easy to gain a financial benefit because we are burning lot of oil. For each percent we reduce it leads proportionally to lesser pollution. You can imagine the price of oil today in this context." (Office –and Environmental Manager in Transportation Company).

> "The reason was for the company's image and improving the environmental awareness of our employees. We already had the ISO 9001 certification and the ISO 14001 came following that. In fact we want the company to be a

good role model. It is a large part of our operation in running the office, by recommending our customers environmental friendly solutions." (Environmental Manager and Consultant).

"One of the reasons was to increase the environmental awareness in general. That is important because we are working in an environmental demanding operation." (Quality, Environmental- and Security Manager in a Car rental Company).

"We were concerned for the health of our employees and with the implementation of the standard we removed unwanted chemicals and we brought into use new ventilation system." (Executive Director in Manufacturing Company).

"Green tourism is getting more and more common and we will fulfill our guest's requirements." (Supervisor of Environmental issues in Hotel business).

"We have seventy buses and they are burning fuel all twenty four hours per day. One way to reduce the environmental impact is that we use biodiesel and mixed it with fuel. We put a great emphasis on that our guides and the bus drivers are certain role models for the tourists. They are supposed to guide tourists in the best way in order to respect the nature." (Human Resource Manager in Travel industry).

"It was decided to make the company environmentally friendly in visible way. We wanted this not be just something on paper, this would be done, it would be done visible and there would be a meaning behind it. The only way to do this is to have a qualified verification. Then everyone knows about it, the employees, the owners, and stakeholders that it was both in theory and practice. So, ISO 14001 was chosen." (Environmental and-Quality Manager in Service Company).

4.2.5. What benefits does the ISO 14001 system deliver to the company?

Regarding the benefits the system ISO 14001 delivers to the company, everyone agreed that it provided at least some benefit in general. As can be seen in following figure, all the interviewers agreed that there was a notable decline in general waste, and nearly all of them had reduced their energy consumption. Around half thought that the purchasing of materials was more efficient, and that cost awareness had increased among the employees.

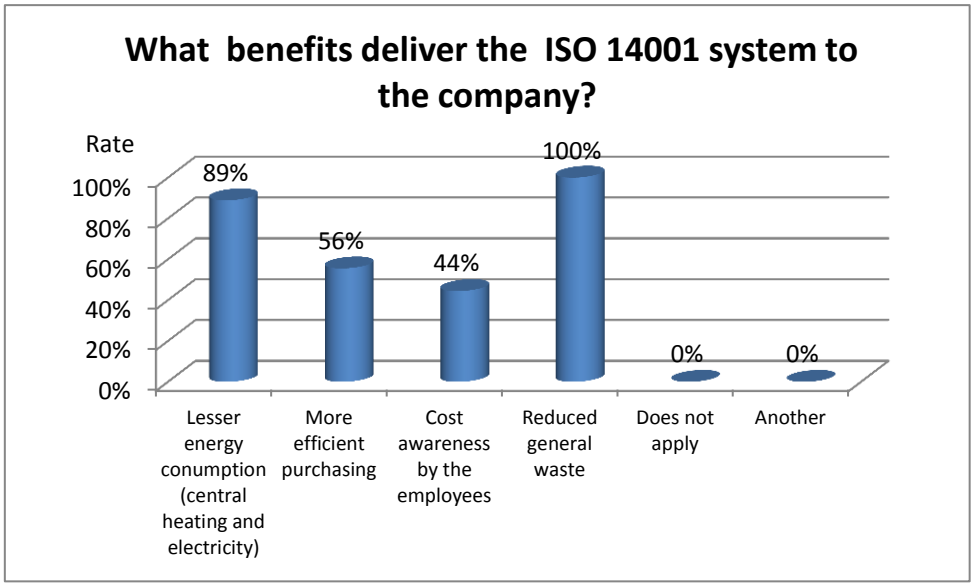

Figure 14 The benefits the system ISO 14001 delivers to the company by different categories

Quotes from the interview regarding the question: "What following benefits deliver the ISO 14001 system to the company?"

> "When you begin to be concerned about environmental issues, you are contributing social responsibility. When you have developed that kind of awareness, you are doing something positive for environmental issues and that is a benefit. The benefit is different in many ways. It requires more work but the atmosphere by staff changes. We work all our projects from

environmental perspective." (Office-and Environmental Manager in Transportation Company)

"I remember before the implementation, the paper usage was 33kg per employee, now we have decreased it down to 19kg. We have as well decreased the photocopying with a certain technique. But we have not calculated the economic impact yet." (Environmental Manager and Consultant)

"It is a fact the procurement became more economical and general waste decreased. We are recycling a lot and we put a great emphasize on that. We have better management in general. We have courses about environmental issues for our employees.

We send our people to environmental management courses where the staff is trained to e.g. save and control the usage of the chemicals they use in their work

It is very difficult to measure and evaluate the benefit from year to year because for example the weather conditions vary so much. One year the winter can be very cold and frosty that means we use more water. Next winter can be very warm so it is nearly impossible to compare the water usage. It is so much of variables that fluctuates and that affects the measurements. The way of thinking (in the company) has changed, even though we know that some numbers are not as we would like them to be, we know that we are improving ourselves but it is difficult to measure yet.

If we did not have the ISO 14001 we would not have as good control in our operation and the numbers had developed in another way. We have found some problems by monitoring the system e.g. there were problem in our heating system which we managed to fix and by that we decreased the general water usage." (Quality, Environmental- and Security Manager in a Car Rental Company)

"We are seeing reduction of energy usages, for example energy usage decreased by 2% last month. The next step is to establish a purchasing department to get more efficient and environmentally friendly procurement." (Quality- and Environmental Manager in Consultant Company)

"The benefit is mostly internally related to the operation cost, because of the new procedures. We have noticed that people are now more aware, things are more transparent now." (Quality- and Security Manager in Container Company)

"We are having very positive feedback from our customers. Employees are more involved than we expected because they are taking it one step further, for example by correcting the waste if the guests do not sort the waste in the right bin. There is greater awareness in general towards wastage.

The hotel has quit paying rent for the so-called mini bus that serviced their guests but instead they now get a card for public transportations." (Supervisor of Environmental issues in Hotel business)

4.2.6. Does the ISO 14001 system lead to financial gain?

The majority 78% said the system led to some financial gain. Some mentioned the working procedures require lesser work now. None of the interviewees disagreed as can be seen in figure 15.

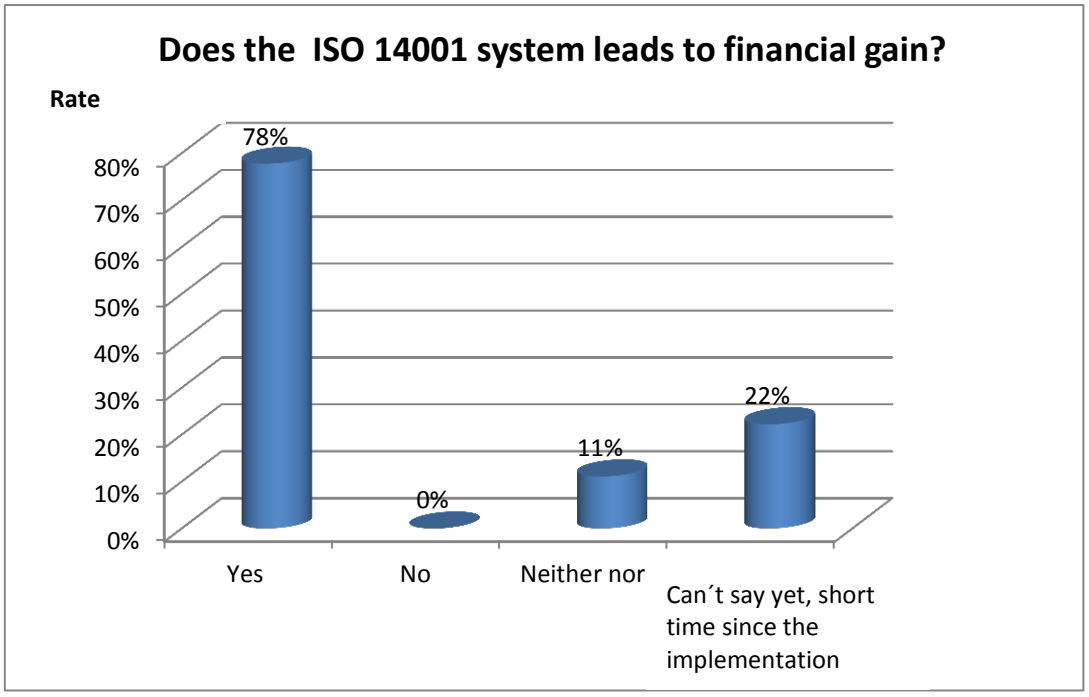

Figure 15 The rate of companies who claim the system leads to finacial gain

Quotes from the interview regarding the question: "Does the ISO 14001 system leads to financial gain"

"It is very important for the image of the company to train our employees to learn to decrease the oil usage in an environmental way. We reached 6% better utilization the first year and after that we are in 4% reduction. By improving and increasing the environmental awareness by the staff, you will get it back in plain cash." (Office-and Environmental manager in Transportation Company)

"Yes, it does lead to financial gain e.g., some working procedures require lesser work now, for example tenders on a foreign market It saves time and money." (Environmental Manager and Consultant)

"It is definitely a financial benefit from this in the long term but it is not possible to measure the first years because of fluctuation in the variables and due to technical problems it is not possible yet to see it in calculations. We

can see that it is definitely less energy usage after the implementation. So we know that it delivers benefits, but the breakeven point is not reached yet." (Quality,Environmental- and Security Manager in a Car rental Company)

"Yes, for example it is easier for us to participate in tendering offers." (Quality- and Environmental Manager in Consultant Company)

The certification is certain standard for the company and our place on a foreign market gets stronger because of that.The financial benefit is obvious in the operation." (Office-and Environmental manager in Transportation Company)

"Yes, we have decreased the usage of water, heat and electricity because we are monitoring the system." (Executive Director in Manufacturing Company)

"Regarding financial benefit we saw immediately certain opportunities. We have not reached the point to measure them. Certainly is a certain start-up cost which follows detecting new equipment. Now, we have the foundation and it costs but it will pay off in the long term." (Human Resource Manager in Travel industry)

"Probably there is a financial gain of using the standard but we have not put an effort to study that but in the long term I´m sure that it will be beneficial because we are continuously improving the environmental system. The next aim is to implement the system into the purchasing department which will be large factor." (Quality- and Cecurity Manager in Container Company)

"Yes there is no question about it as the results show in our environmental report." (Supervisor of Environmental issues in Hotel business)

"We believe that it is a financial benefit despite of pressure by the managers and more obligations by the company." (Human Resource Manager in the Travel industry)

"In one of our regular ISO checks the employees found out, that some of the refrigerators were not working as they were supposed to do. They used more energy than those who are in order. We trained one of our employees to take care of the maintenance of the refrigerators. With that we reached to save energy and repair costs.

Together the energy saving cost and reduction in repairing cost was a considerable amount of money.

"Yes, there is no doubt about it." (Environmental and-Quality Manager in a Service Company)

4.2.7. What do you think is the reason for a financial benefit?

The most common reasons mentioned for the financial benefits were increased awareness, training of employees, and improved monitoring of the system Next after that the objectives and increased competitive advantage were common reasons for a financial gain, as can be seen in Figure 16

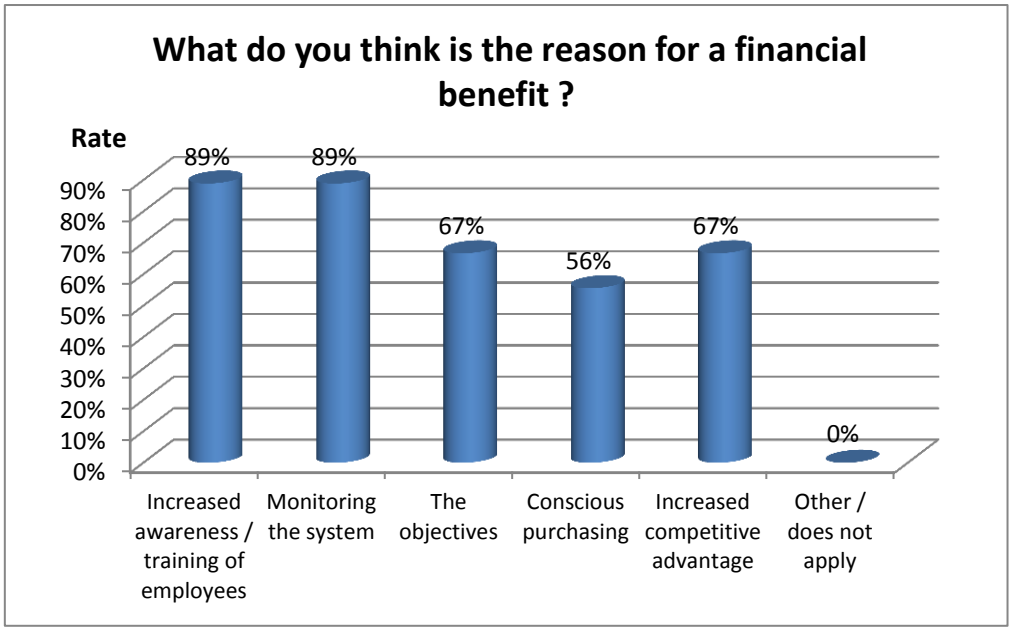

Figure 16 **Reasons for financial benefit by different categories**

Quotes from the interview regarding the question: "What do you think is the reason for a financial benefit ?"

"It is part of the system to monitor and manage our environmental impact. We have an advantage on the market which is based on the perspective from the customer. You are choosing a company when there is tender in progress, the company has certain credit for having ISO 14001 certification. It is a business that you can count on." (Office-and Environmental Manager in Transportation Company)

"The reason it is never just one thing. It is very important to monitor the performance, otherwise you don't know if you are on the right track. I would say that it is important and as well the target you are aiming for." (Environmental Manager and Consultant)

"In our consultancy practice credibility is very important to us. You will become more a trustworthy consultant if you have the ISO 9001, ISO 14001 and ISO 18001. You are more solid. By having these management systems

means that you have good organization in your practice, you have certain goals, you're doing this by integrity. Yes, I would say that, the credibility of this is important. One of our values is teamwork, courage and trust and that emphasizes these values." (Environmental Manager and Consultant)

"It's kind of hard to realize, it returns definitely financial benefits such as in the procurement, but if I summarize the total cost and what we have got in return, it is not possible to measure yet.

If somebody would ask me if I am making money out of it I could not tell until I´ve paid the cost. Increased awareness and education for the staff brings more satisfied customers." (Quality, Environmental- and Security Manager in a Car Rental company)

"Regarding the competitive advantage is difficult to assess because we have 80% market share." (Executive Director in Manufacturing Company).

"It is absolute by monitoring the system, the project itself has increased more the environmental awareness by the employees, they are more alert because they know the project will be evaluated regularly from a third party." (Quality- and Security Manager in Container Company).

"There is in general greater awareness by the staff on how to improve and optimize the operation." (Supervisor of Environmental issues in Hotel business).

"There is definitely a benefit for the company's image. It is an operational benefit when it comes to implementing working methods by certain standards, and coordinate working processes." (Human Resource Manager in Travel industry).

4.2.8. Has the system met the managers' original expectations?

There was 100% satisfaction among the participants with the system as can be seen in figure 17.

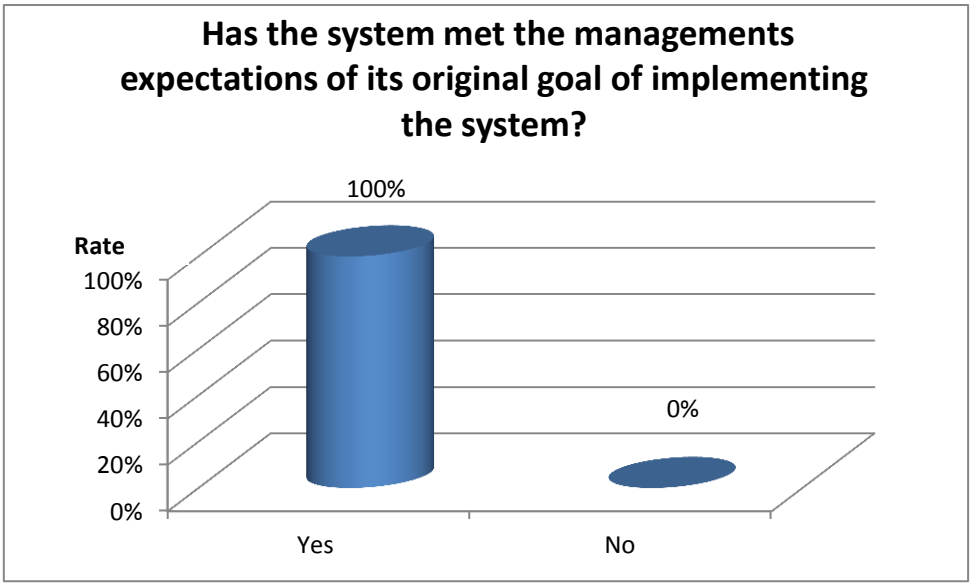

Figure 17 Has the system met the managers' expectations?

Quotes from the interview regarding the question: "Has the system met the managers' expectations of its original goal of implementing the system?"

> "Yes, yes it has. We like the ISO framework so well that we have decided to implement the ISO 9001 system as well. Now we are working on the base system for the implementation. The next step is to integrate the purchasing department to the system.
>
> This is an operation management system and it should always be like this, except that one it is registered and certified. This is nothing but common sense. The only difference about this system is that you register things and monitor them. When you have certification you will always have someone on your back, it must be like that so the system work as it should do. This is just a household with strict supervision.
>
> Environmental policy has no meaning if it is just some statement in a frame that you put on your wall, copied from websites from some companies. So many are just" all talk and no action", that just doesn´t work" (Office-and Environmental manager in Transportation Company).

“Yes I would say so. It leads to continuous improvements to being certified. It is a fortune that we did implement the standard for a long time ago and therefore we are up to date in this field. Thus we can offer our customers good solutions because we define ourselves as a company which has influence on social development, therefor all our work aims on that. It’s our social responsibility to think in that way “(Environmental Manager and Consultant).

“Yes absolutely, we did not have any expectations for financial gain. Overall we feel good about ourselves. We are just relaxed because we know that we are doing the right thing. We have reached about 80% of what we aimed for, from the beginning of the process” (Quality, Environmental- and Security Manager in a Car Rental company).

“Yes, and we would never go back where we were before“(Quality- and Environmental Manager in Consultant Company).

“It is beneficial, especially for our employees. All unwanted materials are gone and now we have good ventilation system “(Executive director in manufacturing company).

“Yes I think in general people are satisfied“(Quality- and security manager in Container Company).

“Yes, everyone is very happy. The cost is high in the beginning but, it´s worth it“(Supervisor of Environmental issues in the Hotel business).

“Yes in most cases, we believe it is a great benefit to have adopted certified management systems. It definitely helps in the operation and we're thinking of adding in more systems because the requirements of the market are increasing. This is part of strengthening our position on the market“(Human Resource Manager in the Travel industry).

"Yes it has, but it has changed from the original goals, we are still developing the system, this is continuous work. It never ends and it should never end. "(Environmental and-Quality Manager in a Service Company).

Other Quotes from the interviewees on the question: " Is there anything else you want say regarding this research

"Yes, the aim is to bring the environmental awareness to the customers and by that will generate "crowding-out effect" (Quality- and Environmental manager in Consultant Company).

"The project itself makes people more aware about the environmental issues. We are now in our second year and it's getting better and better "(Quality- and security manager in Container Company).

"The implementation has led to greater impact than we planned in the beginning, now we are constantly monitoring what we can do better. We got experts to help us in reducing the light usage, they switched out light bulbs, that all is mentioned in our environmental report. The goal was to increase the share of organic waste up to 54% and we have reached the goal and heating and electricity bills have declined significantly "(Supervisor of Environmental issues in the Hotel business).

"The staff comes up with ideas on what can be done better. Increased awareness and knowledge is a large part of this all. It has also accomplished more organized working methods and increased professionalism in the company. It is very important for the future, this is not something that should just concern us, it concerns everyone. It is crucial that as many people show responsibility towards theses matter"(Human Resource Manager in the Travel industry).

“If we didn´t have implemented the system we had never noticed several things that were not in good conditions if we had not been monitoring according to the system. For example one of the employees noticed the energy bill had risen rapidly. We looked into the matter, and found out that one of the radiators was not working as it should be. Lot of hot water just went constantly through the radiator without heating. This would not have been noticed if it had not been for weekly listings“(Environment and-quality manager in Service Company).

“We take action much sooner if there is a problem. We intervene problems right away and solve them¸ which otherwise had become a financial loss “(Environment and-quality manager in Service Company).

“It is more expensive to train new employees now, but it returns later in greater optimization of the working procedures. There is a certain start-up cost while you are implementing the system. The consulting service costs and that is ongoing work through the implementation process“(Environment and-quality manager in Service Company).

You have to have the right tools. Some of our staff have taken courses to be qualified to do internal assessment. That is an extra cost but at the same time we are finding problems by monitoring according to the system which is saving us money. It is useless to have environmental policy and not enforcing it“(Environment and-quality manager in Service Company).

4.3. Internet survey

This chapter reviews results from the internet survey. The survey was sent out to 26 companies, of which 21 companies completed the survey

4.3.1.Statement 1. There is less of general waste from the company after the implementation of ISO 14001

The responses suggest that there is less general waste from the company after the implementation of ISO 14001. As can be seen in follwing table and figure, nearly 86% agree on that there is less of general waste and 4.8% disagreed.

Table 5 There is less general waste from companies after the implementation of ISO 14001

Answers choices	Responses	
Agree	57%	12
Somewhat agree	29%	6
Neutral	5%	1
Somewhat disagree	5%	1
Disagree	0%	0
Not relevant	5%	1
Total	100%	21

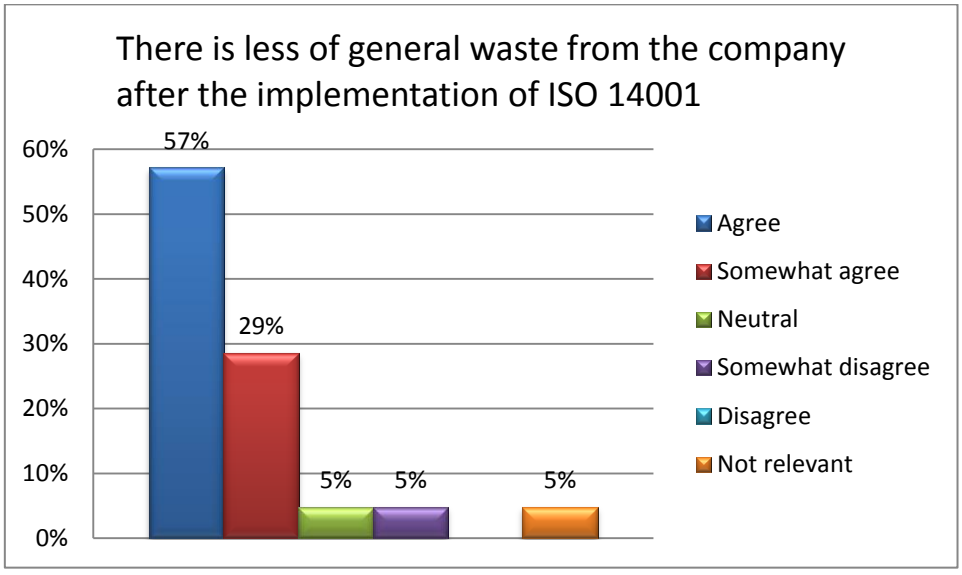

Figure 18 There is less of general waste from the company after the implementation of ISO 14001

4.3.2.Statement 2. Working with ISO 14001 encourages the employees to use more organized working procedures in their daily work

The results suggest that working with ISO 14001 encourages the employees to use more organized working procedures in their daily work. As can be seen in following table and figure 86% agreed, 5% disagreed and 10% were neutral.

Table 6 Working with ISO 14001 encourages the employees to use more organized working procedures in their daily work

Answers choices	Responses	
Agree	43%	9
Somewhat agree	43%	9
Neutral	10%	2
Somewhat disagree	5%	1
Disagree	0%	0
Not relevant	0%	0
Total	100%	21

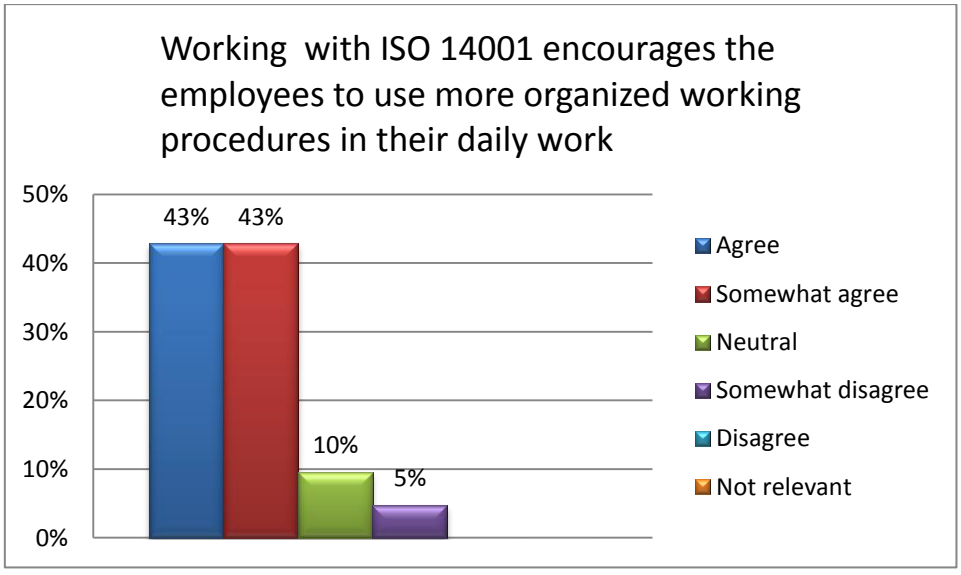

Figure 19 Working with ISO 14001 encourages the employees to use more organized working procedures in their daily work

4.3.3. Statement 3. Working according the ISO 14001 standard promotes economic awareness by the employees

The rate of 77% agreed that working according to ISO 14001 promotes economic awareness in the employees, whilst around 24% were neutral. These results are shown below in Table 7 and Figure 20.

Table 7 Working according to ISO 14001 standard promotes economic awareness by the employees

Answers choices	Responses	
Agree	10%	2
Somewhat agree	67%	14
Neutral	24%	5
Somewhat disagree	0%	0
Disagree	0%	0
Not relevant	0%	0
Total	100%	21

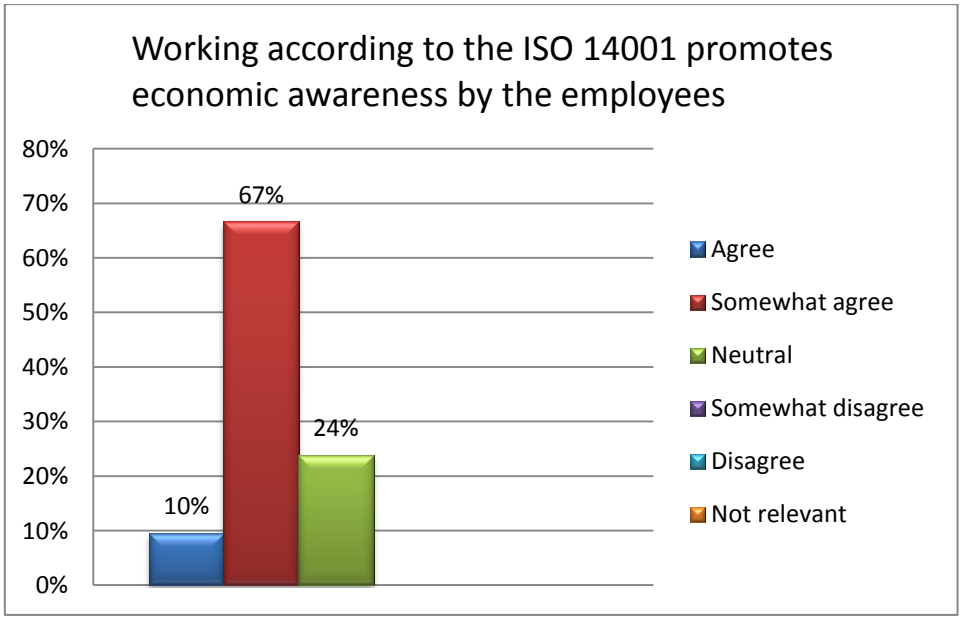

Figure 20 Working according to the ISO 14001 standard promotes economic awareness by the employees

4.3.4. Statement 4. The company is more competitive with ISO 14001 certification

The company is more competitive after being certified stated 86% of the respondents, 5% did not agree, and 10% were neutral. These results are shown below in Table 8 and Figure 20.

Table 8 The company is more competitive with ISO 14001 certification

Answers choices	Responses	
Agree	62%	13
Somewhat agree	24%	5
Neutral	10%	2
Somewhat disagree	0%	0
Disagree	5%	1
Not relevant	0%	0
Total	100%	21

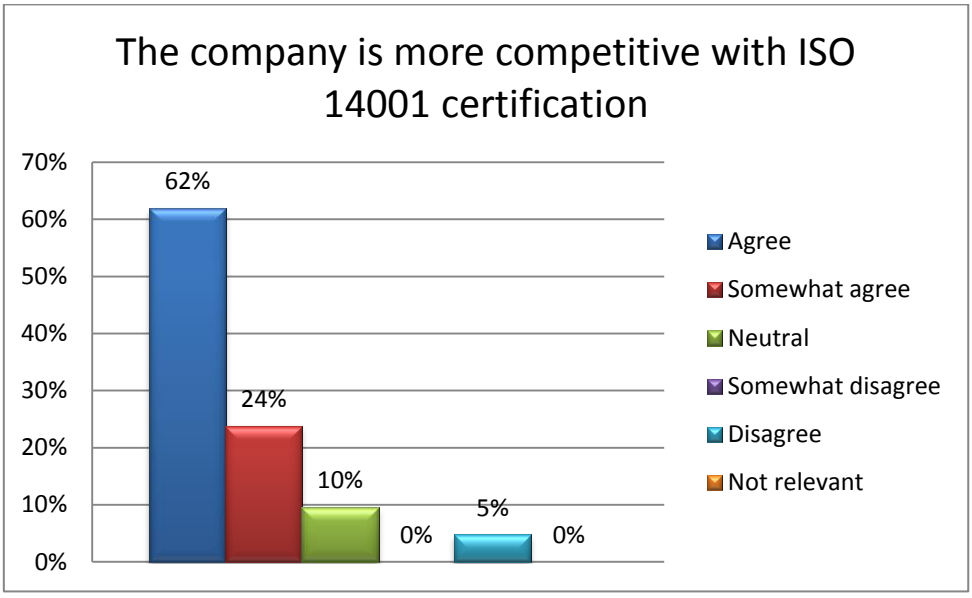

Figure 21 The company is more competitive with ISO 14001 certification

4.3.5. Statement 5. Implementation of ISO 14001 has led to operating cost have decreased in the company

The rate of 33% agreed that the operation cost have decreased and 5% disagreed. Nearly half of the answeres were neutral, as can be seen in following table and figure.

Table 9 Implementation of ISO 14001 has led to the operating cost have decreased by the company

Answers choices	Responses	
Agree	14%	3
Somewhat agree	19%	4
Neutral	48%	10
Somewhat disagree	0%	0
Disagree	5%	1
Not relevant	14%	3
Total	100%	21

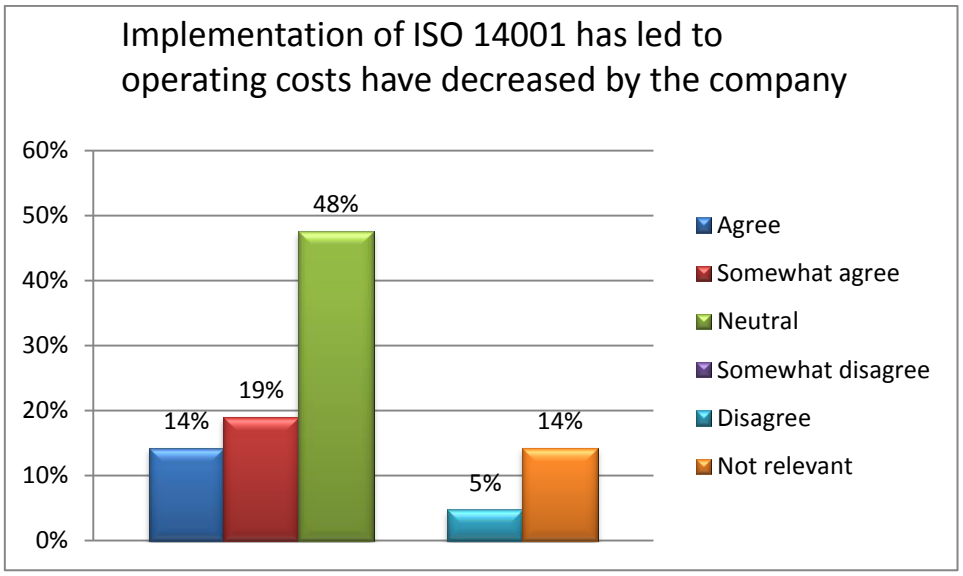

Figure 22 Implementation of ISO 14001 has led to the operating cost have decreased by the company

4.3.6. Statement 6. It improves the image of the company to be certified by ISO 14001

Nearly all respondents 95% agreed that the image of the company improves by being certified by ISO 14001, 5% were neutral and no one disagreed, as can be seen in following figure and table.

Table 10 It improves the image of the company to be certified by ISO 14001

Answers choices	Responses	
Agree	81%	17
Somewhat agree	14%	3
Neutral	5%	1
Somewhat disagree	0%	0
Disagree	0%	0
Not relevant	0%	0
Total	100%	21

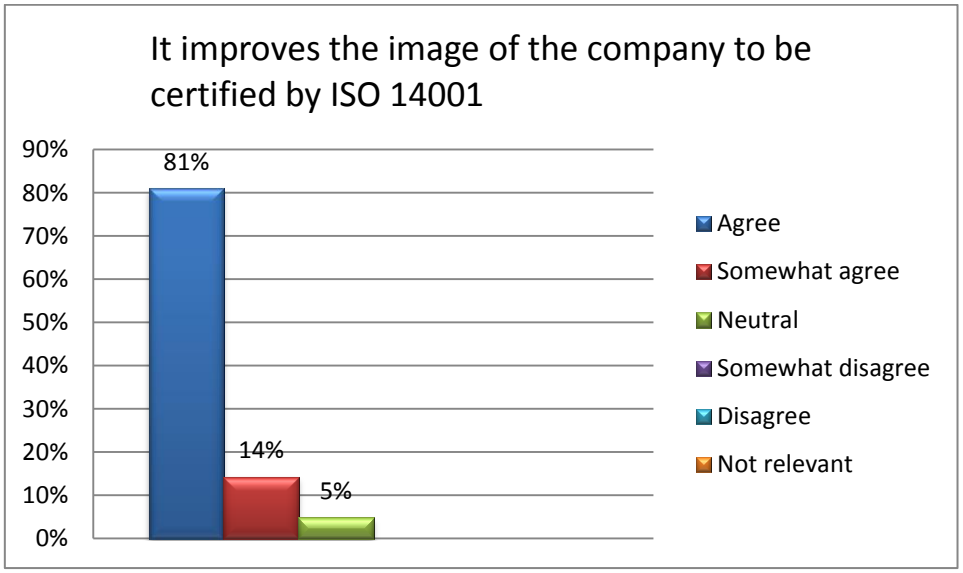

Figure 23 It improves the image of the company to be certified by ISO 14001

4.3.7. Statement 7. ISO 14001 has fulfilled the management expectations compared to original objectives of implementation of the standard

Following table and figure shows the standard clearly fulfills the management's expectations. Close to 86% agreed on that statement and 5% disagreed and others where neutral or the question was not relevant.

Table 11 ISO 14001 has fulfilled the management expectations compared to original objectives of implementation of the standard

Answers choices	Responses	
Agree	19%	4
Somewhat agree	67%	14
Neutral	5%	1
Somewhat disagree	5%	1
Disagree	0%	0
Not relevant	5%	1
Total	100%	21

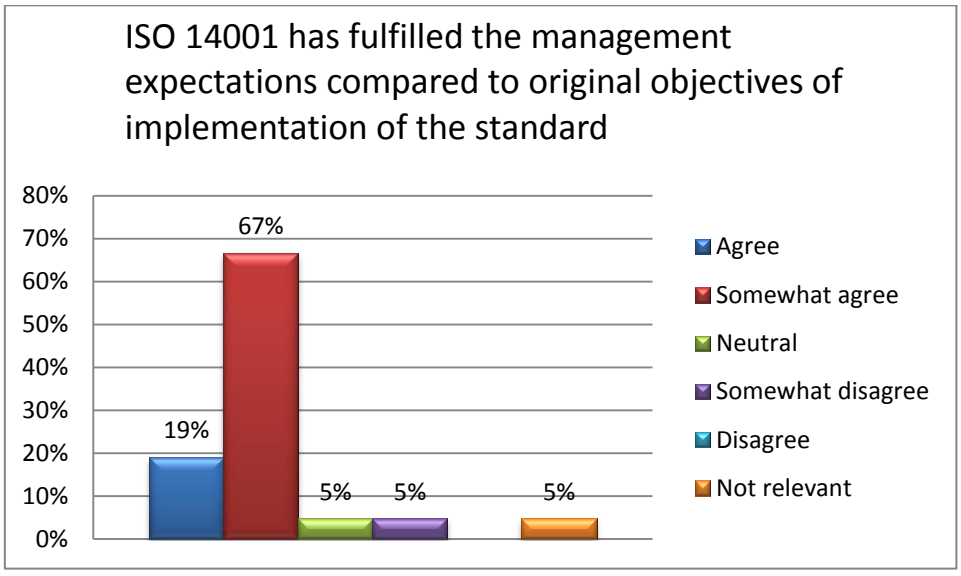

Figure 24 ISO 14001 has fulfilled the management expectations compared to original objectives of implementation of the standard

4.3.8. Statement 8. Implementation of ISO 14001 has led to financial benefit

57% of respondents believed that implementation of ISO 14001 led to a financial benefit. 10% did not agree, and the remaining 10% thought it was not relevant. 24% were neutral regarding this statement. 15 out of 26 companies were certified in 2010 or later, see table 12 and figure 24

Table 12 Implementation of ISO 14001 has led to financial benefit

Answers choices	Responses	
Agree	19%	4
Somewhat agree	38%	8
Neutral	24%	5
Somewhat disagree	10%	2
Disagree	0%	0
Not relevant	10%	2
Total	100%	21

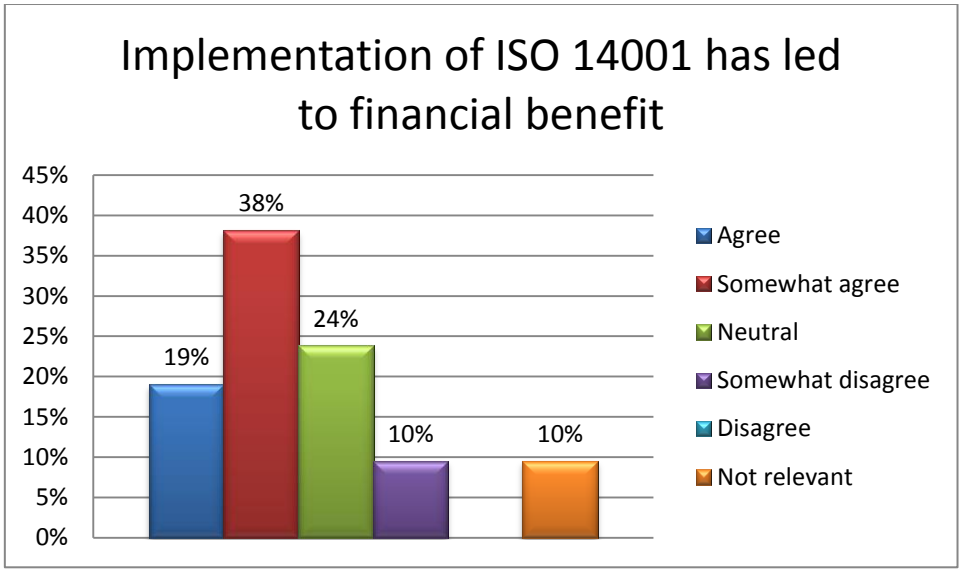

Figure 25 Implementation of ISO 14001 has led to financial benefit

4.3.9. Open question

The open question asked at the end of the Internet Survey was:

> *Is there anything else that you want to convey in relation to ISO 14001 in your company that could give interesting information relating to this investigation?*

The comments in response to that question were:

> "Implementation of ISO 14001 has greatly increased environmental awareness by the employees and measurements show that our employees are more aware about the importance protecting the environment than of the general public in Iceland".
>
> "In order to succeed you need effective training and education of employees to be constantly in progress"
>
> "We have not experienced that the average customer thinks about the ISO 14001"
>
> "Those who think about the standard are those who provide environmental award"

5. Discussions

The discussion sections first tries to answer the hypotheses and research questions that were raised earlier in the study. The results are then further interpreted and compared with previous research on the topic. Finally, the results are put into an Icelandic context and future studies are suggested.

5.2. Hypotheses and research questions answered

5.2.1. Hypotheses

H.1. Companies have relatively higher gross profit margins after implementing ISO 14001.

Result: There is no statistical significant financial benefit as measured by the operating profit margin. The p-value is equal to 0.58, which is not a significant difference at a 95% confidence level.

Hypotheses no. 1 is rejected.

H.2. Companies have a reduced relative operational cost after implementing ISO 14001.

Result: There is no statistical significant financial benefit as measured by operating profit margin. The p-value is equal to 0.32, which is not a significant difference at a 95% confidence level with a paired two tail t-test.

Hypotheses no. 2 is rejected.

5.2.2. Research questions

R.Q.1. Is it financially beneficial for Icelandic companies to implement ISO 14001?

The results showed that there was a minor financial benefit by implementing the environmental management system. The operation cost decreased slightly and the profit increased slightly. The results showed in the short run that ISO 14001 certification made only a minor impact on company profitability.

According to the annual reports, there is no evidence that indicates that Icelandic companies gained financial benefit from the implementation. The results do not show statistically significant differences after the certification.
More than half of the participants in the survey thought that the implementation led to financial gain, but 78% in the questionnaire part thought the implementation led to financial gain.

R.Q.2 Do companies perform better in their operation after implementing the ISO 14001 standard?

There are many results that indicate that companies perform better in their operation after implementing ISO 14001. The companies increased their competitive advantages and also improved their image according to the survey, interviews and the questionnaire part.

Many improvements were mentioned according to the survey, interviews and the questionnaire part, such as: more effective working procedures, higher environmental awareness of the employees, lesser waste. The implementation fulfilled the expectations of management staff compared to the original objectives they had befor the implementation of the standard.

5.1. Interpretations of the results

This section reviews some interpretations of the results. It also contains a summary of previous literature, and follows with a discussion of potential future studies.

5.1.2 Annual Reports

The results showed there was a minor financial benefit by implementing the environmental management. The total average operating profit margin was found to increase by 2.2% and for the total average operating cost ratio the total average margin decreased by 6%. This however was not shown to be statistically significant.

One might assume that if there had been financial stability over the period studied, the results from the annual reports might show better performances due to implementing the ISO 14001

5.1.3. General discussions

It might be assumed that all these factors (such as monitoring the system, training the employees, minimizing general waste, reducing energy usage, increased economical awareness by the employees and more effective working procedures) lead to a financial benefit indirectly. When a company is reducing waste, for example, it might save some money through reducing consumption expenses. Improvements in operational efficiency might be assumed to save time, and therefore save money and lead to financial benefit. When a company strengthens its competitive advantage and improves its image, it might be assumed that this leads to financial benefit

5.1.4. Summary of previous research

This section provides a summary of previous research that might support some of the statements made in this study regarding better operating performance and financial benefit over a long time period.

Hrafnsdóttir (2011) stated in her study that the companies who had environmental certification or an environmental management system of some sort performed better than other companies. Findings by Benónýsdóttir (2012) showed results that improvements in the operation were the main benefit of three factors that were studied related to the implementation. Jónsdóttir (2004) found evidence that all the companies who had adopted ISO 14001 standards, the official Nordic eco-label or The Swan felt they received benefit in improved operations but none of the companies with ISO14001 believed they had received a reward on the market Rögnvaldsdóttir (2007) stated that none of the participations in her study regretted the implementation. A study by Thakore, Lowe and Nicholls (2013) found that the return on sales for long term performance was 4.01%, and for short term performance was 3.29%. The results by Jong, Paulraj and Bloom, (2013) showed in the short run that ISO 14001 certification made only a minor impact. However, these same results showed a significant financial improvement over the long term period.

According to previous research, Icelandic companies might expect improvements in their operation and might assume as well that it is financially beneficial for Icelandic companies over long term period to implement ISO 14001.

5.1.5. Performance of Icelandic certified companies from another perspective

In addition to the annual reports and interviews, certified companies were also evaluated based on some other criteria which are not mentioned here. That is the annual award from the Environment Agency of Iceland and the selection by Creditinfo of the 'Outstanding Companies'.

The 'Outstanding Company' selected by Creditinfo

Annually Creditinfo awards Icelandic companies for being an 'Outstanding Company' according to the best score in the strength and stability assessments which are on based various key numbers and variables from their own records. Out of more than 33 thousand companies listed in the Creditinfo register, 462[44] companies fulfil the requirements by Creditinfo to be selected as an 'Outstanding Company'. 38% of the ISO14001 certified

[44] http://www.visir.is/thessi-fyrirtaeki-thykja-framurskarandi-a-islandi/article/2013130219851

companies were among the ‘Outstanding Companies’[56]. It should be noted that public organizations are not included on the list.

Kuðungurinn ‘The Conch’ award

The Icelandic Ministry for the Environment and Natural Resources provides recognition annually to companies for environmental issues. The award is called ‘Kuðungurinn’, or in English, The Conch. Seventeen companies have received the award since the first recognition in 1994 [57]. Seven companies out those who have been awarded are also certified by ISO 14001.Those companies are Gámaþjónustan, Borgarplast, Árvakur, Hópbílar, Orkuveita Reykjavíkur, Línuhönnun (Efla), Íslenska Gámafélagið.

5.2. Further studies

Further studies of the financial impact on Icelandic businesses might be difficult to conduct on the whole population in the financial environment as it is today. There are rather few companies certified with ISO14001, and a large part proportion of them provided annual reports with limited information. It might be valuable to conduct similar research after several years and when the economy environment will hopefully be more stable by then. Additionally, the time span in which to study the impacts of adoption ISO 14001 would likely be longer, so there might be more data available then which means that it is likely that there would be more data available

6. Conclusion

6.1. Comparison of results

This chapter reviews the comparison of results with literature as well as the results between the internet survey and the questionnaire.

6.1.1 Annual Reports

The results did not show any statistically significant evidence that supported a financial benefit after the certification. However, there was also no significant negative financial impact of pursuing ISO 14001 certification.

This is consistent with the results of Jong, Paulraj and Bloom, (2013) which showed in the short run that ISO 14001 certification made only a minor financial impact.

6.1.2. Questionnaire and survey

1. **Lesser waste**

In the survey nearly 86% agreed on that there was less of general waste from the company after the implementation of ISO 14001. That is in consistent with the result in the questionnaire where 100% agreed on that point.

2. **Employees use more organized working procedures**

Adopting ISO 14001 encourages the employees to use more organized working procedures in their daily work, as supported by 86% of interviewees. This supports the study by Thakore, Lowe and Nicholls (2013) where they state in their findings that the reasons for better performance are increased work efficiency, increased compliance to company procedure and *"over all good management practices".* No question was directly related to this in the questionniare, but a majority of the participants made similar statements in the interviews. Results in improved operation suports are demonstrated as well in the research of Jónsdóttir (2004).

3. More economic awareness by the employees

Roughly 76% agree that working according to ISO 14001 promoted economic awareness amongst the employees, and in the questionnaire 56% agreed that it improved the cost awareness of employees.

4. Competitive advantage

Company is more competitive since the certification stated 86%. That is consistent with the results from the questionnaires, where 67% agreed on more competitive advantage by being certified. This was also demonstrated in the results of studies by Hrafnsdóttir (2011) and Rögnvaldsdóttir (2007).

5. Reduction of operating costs

Implementation of ISO 14001 led to decreased operating costs as stated by 33% of the participants, whilst 5% disagreed and 48% were neutral. In the questionnaire 89% stated that the reduction of operating costs was due to lesser energy consumtion, 56% stated it was due to more efficient purchasing, 100% mentioned reduction in general waste and 44% stated that it was due to increased cost awareness of the employees.

6. Improved company image

In the survey 95% agreed that certification by ISO 14001 improves the company's image and 95% of participants in questionnaire stated the same. This is in coherence with Thakore, Lowe and Nicholls (2013) where they discuss better customer relationships.

7. Is the standard fulfilling expectations?

In the survey 86% agreed that ISO 14001 has fulfilled the management expectations compared to the original objectives they had for the implementation of the standard. This agrees with the results from the questionnaire, in which 100% agreed that the system had fulfilled the management expectations similar to results found by Rögnvaldsdóttir (2007)

8. Financial benefits

In the survey 57% of the participants thought that the implementation led to financial benefits, 10% disagreed, 10% thought it was not relevant, and 24% were neutral (i.e. saw no noticeable financial benefit). This is inconsistent with the findings from Thakore, Lowe and Nicholls (2013), Melnyk (2003) and Jong, Paulraj and Bloom (2013).

9. Reason for financial benefit

Improved monitoring the system, increased employee awareness, and training of the employees are the main reasons for financial benefit, as stated by 89% of respondents. Objective and increased competitive advantage was the reason for financial benefits amongst 76%, and 56% said conscious purchasing. In the survey, 77% stated that working according to ISO 14001 promoted economic awareness amongst the employees. This answers the reasearch question. Many reasons are mentioned by Thakore, Lowe and Nicholls (2013), and Nishitani (2010) stated that there are many ways available to improve a firm's economic performance.

Although in this research was not able to prove any financial benefit, it was not able to disapprove it either.

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Appendix A: Questionnaire from interview

Iceland School of Energy við Háskólann í Reykjavík

Hluti af rannsókn Erlu Bjarkar Sigurgeirsdóttur

til M.Sc. gráðu í Sjálfbærum Orkuvísindum

Spurningalisti um fjáhagslegan ávinning vegna innleiðingar á ISO 14001

Nafn fyrirtækis:_____

Nafn viðmælanda:_____

Titill: _____

Er fyrirtækið vottað með ISO 9001? ____Já _____ Nei

Markmið rannsóknarinnar er að kanna hvort og/eða hver er fjárhagslegur ávinniningur er af því að innleiða umhverfisstjórnunarkerfið ISO 14001.
Merkið x við viðeigandi svar, má vera fleiri eitt x við hverri spurningu.

Þar sem stendur „Annað“ vinsamlegast skrifið það sem við á.

1. Hvers vegna var ákveðið að fara í umhverfisvottun ISO 14001?

_____ Innri aðstæður, skv. ákvörðun innanhúss

_____ Ytri aðstæður, t.d, kröfur frá viðskiptavini, markaðssetning á erlendum vettvangi

Annað_____

_____

_____

2. Hve langan tíma tók innleiðingarferlið þar til að vottun var fengin?

_____ár/ og _____mán Ef langur tími af hverju?

3. Hver var ástæða þess taka inn umhverfissjórnunarkerfið ISO 14001?

_____ Umhverfiskrefjandi rekstur

_____ Bæta ímynd fyrirtækisins

_____ Fjárhagsleg

_____ Auka umhverfisvitund starfsfólks

_____ Samfélagsleg ábyrgð

_____ Krafa frá viðskiptavinum

Annað_____

_____

_____

_____

4. Hvaða ávinningi skilar ISO 14001 kerfið fyrirtækinu?

_____ Minni orkunotkun (hiti og rafmagn)

_____ Hagkvæmari innkaup

_____ Kostnaðarvitund starfmanna

_____ Minni almenn sóun

_____ Á ekki við

Annað_____

_____

_____

5. Leiðir umhverfisstjórnunarkerfið ISO 14001 til fjárhagslegs ávinnings

_____ Já

_____ Nei

_____ Hvorki né

_____ Ekki ennþá farið að skila sér(stutt frá innleiðingu)

6. Hverja telur þú vera ástæðuna fyrir fjárhagslegum ávinningi af ISO 14001?

_____ Aukin vitund/fræðsla starfsfólks

_____ Vöktun kerfisins

_____ Markmiðasetningin

_____ Meðvituð innkaup

_____ Aukið samkeppnisforskot

Annað_____

_____

_____

7. Hefur kerfið uppfyllt þær væntingar stjórnenda miðað við upprunaleg markmið á innleiðingu kerfisins?

_____

_____

_____

_____

8. Getur þú nefnt annan ávinning sem ekki hefur verið nefndur hér?

_____

_____

_____

_____

Appendix B: Internet survey

SurveyMonkey

ISO 14001 – Fjárhagslegur ávinningur

+ Add Page

+ Add Question▼

Q1

Edit Question▼

Add Question LogicMoveCopyDelete

1. Það er minna um almenna sóun hjá fyrirtækinu eftir innleiðingu ISO 14001.

- Sammála
- Frekar sammála
- Hvorki né
- Frekar ósammála
- Ósammála
- Á ekki við

+ Add Question▼

Split Page Here

Q2

Edit Question▼

Add Question LogicMoveCopyDelete

2. Að vinna eftir ISO 14001 hvetur til skipulagðara verklags starfsfólks við sín daglegu störf.

- Sammála
- Frekar sammála
- Hvorki né
- Frekar ósammála
- Ósammála
- Á ekki við

+ Add Question▼

Split Page Here

Q3

Edit Question▼

Add Question LogicMoveCopyDelete

3.Að vinna eftir ISO 14001 eflir kostnaðarvitund starfsmanna í rekstri.

- Sammála
- Frekar sammála
- Hvorki né
- Frekar ósammála
- Ósammála
- Á ekki við

+ Add Question▼

Split Page Here

Q4

Edit Question▼

Add Question LogicMoveCopyDelete

4. Fyrirtækið er samkeppnishæfara með ISO 14001 vottun.

- Sammála
- Frekar sammála
- Hvorki né
- Frekar ósammála
- Ósammála

Á ekki við

+ Add Question▼

Split Page Here

Q5

Edit Question▼

Add Question LogicMoveCopyDelete

5. Innleiðing ISO 14001 hefur leitt til þess að rekstrakostnaður hefur lækkað hjá fyrirtækinu.

Sammála

Frekar sammála

Hvorki né

Frekar ósammál

Ósammála

Á ekki við

+ Add Question▼

Split Page Here

Q6

Edit Question▼

Add Question LogicMoveCopyDelete

6. Það bætir ímynd fyrirtækisins útávið að vera með ISO 14001 vottun.

- Sammála
- Frekar sammála
- Hvorki né
- Frekar ósammálá
- Ósammála
- Á ekki við

+ Add Question▼

Split Page Here

Q7

Edit Question▼

Add Question LogicMoveCopyDelete

7. ISO 14001 hefur uppfyllt þær væntingar sem stjórnendur gerðu miðað við upprunaleg markmið á innleiðingu staðalsins.

- Sammála
- Frekar sammála

- Hvorki né
- Frekar ósammála
- Ósammála
- Á ekki við

+ Add Question▼

Split Page Here

Q8

Edit Question▼

Add Question LogicMoveCopyDelete

8. Innleiðing ISO 14001 hefur leitt til fjárhagslegs ávinnings

- Sammála
- Frekar sammála
- Hvorki né
- Frekar ósammála
- Ósammála
- Á ekki við

+ Add Question▼

Split Page Here

Q9

Edit Question▼

MoveCopyDelete

9. Annað sem að þú vilt að komi fram í tengslum við ISO 14001 í þínu fyrirtæki sem gæti gefið áhugave upplýsingar varðandi þessa rannsókn.

+ Add Question▼

Appendix C: List of certified companies

List of the certified companies in Iceland from The Icelandic Environmental Agency

28.08.2013

Sæl Erla.

En þér er velkomið að fá listan okkar. Það má að sjálfsögðu vera að hér vanti einhver fyrirtæki en þessi listi var fenginn með því að tala við Vottun hf., BSI Island, Stjórnvísi, Dokkuna ásamt því að "gúgla".

Kv. Elva.
Bestu kveðjur, Best regards
Elva Rakel Jónsdóttir
Teymisstjóri, Team leader
Svið sjálfbærni, Department for Sustainability

Eftirfarandi fyrirtæki og stofnanir á Íslandi eru með vottuð umhverfisstjórnunarkerfi samkvæmt ISO 14001 staðlinum (uppfært júlí 2013):

1 Actavis ehf.
2 Actavis Group PTC ehf.
3 Alcoa Fjarðaál
4 Árvakur/Landsprent ehf.
5 Borgarplast hf.
6 EFLA verkfræðistofa hf.
7 Flügger ehf.
8 Gámaþjónustan hf.
9 Hópbílar hf./Hagvagnar hf.

10 Höldur ehf. Bílaleiga Akureyrar
11 Icelandair hótel Reykjavík Natura
12 Íslenska Gámafélagið ehf.
13 Jarðboranir hf.
14 Landsvirkjun X
15 Mannvit hf.
16 N1 hf. starfsstöðvar:
- Þjónustustöð Bíldshöfða 2
- Verkstæði Bíldshöfða 2
- Þjónustustöð Fossvogi
- Þjónustustöð Hringbraut
- Þjónustustöð Borgartúni
- Þjónustustöð Háholt Mosfellsbæ
17 Orkuveita Reykjavíkur sf.
18 Reykjavík Excursions - Kynnisferðir ehf.
19 Reykjavik Geothermal Ltd.
20 Reykjavíkurborg - Umhverfis- og skipulagssvið
21 Rio Tinto Alcan/ISAL
22 Ræstingarþjónustan sf.
23 Steinull hf.
24 Toyota á Íslandi hf.
25 Umhverfisstofnun
26 Verkís hf.
27 Vífilfell hf.
28 VSÓ ráðgjöf ehf.
29 Össur hf.