



FINANCIAL BENEFITS OF AN ISO 9001 CERTIFICATION

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Abstract

Several companies in Iceland have received ISO 9001 certification in recent years. It has been researched qualitatively whether there is a financial benefit from getting ISO 9001 certification in Iceland but it has never been researched quantitatively. In this research all ISO 9001 certified companies that were operating in a competitive market in Iceland were compared to similar companies in an effort to find out if there was a financial benefit from becoming ISO 9001 certified. The result of this research is that there is a significant positive difference between ISO 9001 certified companies in Iceland and companies without certification. The certified companies had a significant higher gross profit margins and return on sales ratio. There was also a difference in financial health of the certified companies from the non-certified companies where certified companies had lower debt ratio than companies that were not certified.

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Keywords: Quality management systems, ISO 9001, financial benefit

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ABSTRACT

Several companies in Iceland have received ISO 9001 certification in recent years. It has been researched qualitatively whether there is a financial benefit from getting ISO 9001 certification in Iceland but it has never been researched quantitatively. In this research all ISO 9001 certified companies that were operating in a competitive market in Iceland were compared to similar companies in an effort to find out if there was a financial benefit from becoming ISO 9001 certified. The result of this research is that there is a significant positive difference between ISO 9001 certified companies in Iceland and companies without certification. The certified companies had a significant higher gross profit margin and return on sales ratio. There was also a difference in financial health of the certified companies from the non-certified companies where certified companies had lower debt ratio than companies that were not certified.

1. INTRODUCTION

International Organization for Standardization, here after ISO, is the world's largest standards organization in the world. ISO is based in Geneva and is a group of approximately 100 of the world's industrial nations (Kerzner, 2009). ISO has developed over 19.000 international standards for different industries all over the world (International Standards for Business, Government and Society, 2012). The ISO 9000 series was introduced in 1986 and centered around quality management. In the year 2008 almost 1 million companies in 176 countries had ISO 9001 certification. China had by far the most certified companies with 225.000 companies having ISO 9001 certification (The ISO Survey – 2008, 2009).

Iceland is a small country with 32.000 companies operating in Iceland or 0,1 per capita. The Icelandic economy was hit by a deep depression in 2008 after the collapses of all Icelandic commercial and investment banks. It is interesting to look at quality management in Iceland in that perspective. Several companies have adopted the ISO 9001 standard. In 2001 there were none but a year later 6 companies had ISO 9001 certification. In December 2005 43 companies had ISO certification, (Ingason, 2006) in 2010 there were 48 (Gunnlaugsdóttir, 2010) and finally now there are 53 companies certified according to an informal survey. Although most companies have a good experience from certification, no one has ever researched the financial benefits of it in Iceland with a quantitative method before (Sigurðardóttir, 2011). This topic has been researched abroad. Overall the results are inconclusive; some suggest that companies do better while others do not find evidence to the statement that ISO 9001 certification leads to better financial performance. In this research the aim is to find out if there is a financial benefit in Iceland and add these results to other research that has been done all over the world in recent years.

2. Literature

This section explains what quality and quality standards are and reviews the literature and other research about financial gain with the ISO 9001 standard. Firstly, what is quality? Most organizations will agree that defining quality is important. Kodak for example defines quality as follows: "Those products and services that are perceived to meet or exceed the needs and expectation of the customer at a cost that represents outstanding value." The ISO 9001 defines it as: "The totality of feature and characteristics of a product or service on its ability to satisfy stated or implied needs." Most companies also agree on the fact that quality is rather a process than a product (Kerzner, 2009). The need for quality management should therefore be obvious.

The origin of quality control is in the mid-20th century in the United States and Japan. Several key figures were involved in quality management in the beginning. Deming, who came up with the plan-do-check-act model, published a best-seller in 1986 "Out of the Crisis" where he described a 14 step process (Deming, 1986).

Joseph M. Juran is also one of the most important pioneers in quality management. He came up with the Juran-trilogy, which concluded that the three main factors in quality management were quality plan, quality control and quality improvement (Juran, 1986).

Feigenbaum came up with the idea of quality cost. He divided quality cost into four separate parts:

- Prevention cost: The cost from trying to prevent defects from occurring at all.
- Appraisal cost: The cost from detecting defects through inspection, tests and audit.
- Internal failure cost: The internal cost from dealing with defects by discarding and repairing items.
- External failure cost: The cost from dealing with defects that reach costumers. That cost is represented, for example, in loss of reputation (Feigenbaum, 1991).

Philip B. Crosby defined quality in accordance with demands from customers, not something that is good and looks good. He concluded that the best quality system is to prevent errors, not to monitor and react. The benchmark for quality is no defects and appraisal cost is the cost of quality. He assumed that this cost was 20% of earnings of manufacturing companies and 30% of earnings of service companies (Crosby, 1979)

Kaoru Ishikawa wanted to change how people thought in regard to continuous improvements in more aspects than making a good product and go the extra mile. He wanted managers to think about the feature of a product and service and improve quality of life. Ishikawa came up with the Ishikawa diagram, also known as the fishbone diagram that is used in analyses of industrial processes. It is the so called cause and effect diagram. He wanted to use analysis and involve the employees in quality circles (Ishikawa, 1986).

Quality management has in the last 20 years been revolutionized. The need for higher performance, faster product development and higher technological levels has for example increased the need for quality management. Quality management tries to balance between quality and cost to optimize customer needs. Total quality management, here after TQM, is an example of one of these methods. TQM is an ever-improving method to implement organizational elements into design, development and manufacturing efforts, to try to reduce cost but still meet the customers' expectation (Kerzner, 2009).

2.1 Researches

Helgi Þór Ingason wrote an article in *Dropinn*, the journal of *Stjórnvísí* in Iceland (2006). In his article he tried to find out whether ISO 9001 certified companies were relatively as many in Iceland as abroad, if number of the certified companies was increasing in Iceland and in neighbouring countries, and finally what position ISO 9001 had in quality management in general. He found out that Iceland had significantly fewer certified companies per capita than the comparison countries. The number of ISO 9001 certified companies was increasing in all countries except for Britain. The growth however was decreasing year by year which suggested that they would stop increasing within few years. Iceland seemed to be catching up more rapidly and the growth was increasing in Iceland. Finally he concluded that ISO 9001 was a method of quality management. Companies could do well in quality management without ISO 9001 but they would not achieve ISO 9001 certification without knowledge of quality management. Most would recommend ISO 9001 as a stepping stone towards a good quality management system and a way to influence the quality management culture within companies (Ingason, 2006).

Jóhanna Gunnlaugsdóttir did two surveys, in 2001 and 2010, about why companies got ISO 9001 certification and the benefits from certification. The main reason for certification was pressure from customers. It was surprising that 39% of those companies got certified because of government, international or customer requirements rather than for their benefit. The most common benefit from certifications was that it was easier to meet the requirements of the consumers and better management. Only 11.9% said that they got a competitive advantage over other companies after certification (Gunnlaugsdóttir, 2010).

In 2007 Laufey Karlsdóttir and Sigrún Hallgrímsdóttir wrote a paper about ISO 9001 in project management in Iceland. Their research form was a self-reported survey which was sent to 64 individuals which were working in 32 ISO 9001 certified companies and 64 individuals in 32 companies which were not certified. Their results were that there was no difference in regards to the four dimensions that they were researching. The dimensions were documentation, customer, responsibility and authority. On the other hand they found out that companies that had ISO 9001 certification were working by more formal processes than companies without ISO 9001 certification (Karlsdóttir & Hallgrímsdóttir, 2007)

A research done in 2011 by Laufey Sigurðardóttir also explored this subject. She did self-reported surveys that were sent to CEOs or quality managers of certified companies via e-mail. Her conclusions were that companies felt that there were great financial benefits with implementation of quality management systems (Sigurðardóttir, 2011). Bear in mind that the people that were questioned in this survey had invested heavily in quality systems and were probably not likely to speak badly about them publicly. No other published articles were found in Iceland about this subject although a few others have done case studies on the subject. That research was not open for public viewing.

Corbett, Montes-Sancho and Kirsch did a research on publicly traded manufacturing companies in the United States from 1987-1997. They compared over 1.000 companies' ROA and ROS, Tobin's Q and COGS/Sales to companies in the same industry with similar size and/or return on assets. They found out there was a significant financial benefit three years after certification (Corbett, Montes-Sancho, & Kirsch, 2005). Terziovski, Samson and Dow did research where they looked at manufacturing companies in New Zealand and Australia. They did a self-reported survey and found no positive effect on organizational performance (Terziovski, Samson, & Dow, 1997).

Han, Chen and Ebrahimpour researched manufacturing firms in USA and if and how ISO 9001 leads to better business performance. They used a Structural Equation Model to explain and predict the relationship between ISO 9001 certification, TQM practises, organizational competitiveness, customer satisfaction and business performance. They studied survey data from 441 companies for their research. Their result was that neither ISO 9001 nor TQM lead to significantly better business performance (Han, Chen, & Ebrahimpour, 2007).

Sharma studied the effect ISO 9001 had on financial performance of 70 companies registered in Singapore's Stock Exchange over six years. He studied the financial performance from three dimensions; profit margin, growth in sales and earnings per share. His results were that most companies showed some improvement. He concluded that the improvement companies showed was driven by operating efficiency and if companies were sincerely interested in quality management they could benefit from ISO 9001 (Sharma, 2005).

Certified companies in Portugal were studied in 2011 in the aim to find out the economic impact that ISO 9001 certification had on them. The researchers gathered financial statements from a public databank in Portugal. The study showed that companies motivated by internal reasons to get certified tended to do better than companies that were motivated by external reasons. On the other hand, out of the best companies in Portugal, non-certified companies seemed to do better by a significant amount (Sampaio, Saraiva, & Rodrigues, 2011). A similar study was done in Spain where financial statements were examined for 400 certified companies and 400 non-certified companies. On average the certified companies were doing significantly better (Heras, Casadesús, & Ochoa, 2001).

3. RESEARCH PROJECT

The goal of the research was to find out if ISO 9001 has financial benefits for companies in Iceland by exploring financial statements from ISO 9001 certified companies and comparing them to similar companies without certification. The hypotheses are the following:

- ISO 9001 certified companies have higher gross profit margin than non-certified companies since there is a lower manufacturing cost in companies with a certified quality management system.
- ISO 9001 certified companies have higher return on sales than non-certified companies, hence the reasons mentioned previously.
- ISO 9001 certified companies have higher equity ratio than non-certified companies.

The hypotheses will be tested with one sample t-test where population mean of ISO 9001 certified companies is compared with sample mean of non-certified companies. The alpha will be 0,05 so the critical value should be higher than 1,96.

There are other ways to measure profitability of companies and the financial advantages of certification. Since Iceland is a small market, often with few participants in each sector and a dysfunctional stock exchange, it is considered that these ratios best display the financial gain in Iceland.

3.1 Research methodology

The study is done by comparing sample to population. The two populations being compared in this research are companies in Iceland with ISO 9001 certification and non-certified companies operating in same sectors.

The sample in group one has to fulfill all the following requirements:

- Have ISO 9001 certification prior to 2010.
- Operate in a competitive market, excluding for example schools, public institutions and companies in a position of monopoly.
- Have a financial statement accessible with sales revenues.
- Have a similar company that is operating in the same or similar sector that has a financial statement with sales revenues.

The sample in group two must fulfill the following requirements:

- Be operating in the same or similar sector, using Standard Industrial Classification of Economic Activities number, as the company in group one.
- Have a financial statement with sales revenues.

First of all a list of certified companies in Iceland has to be gathered. Vottun ehf. has been certifying companies since 1991 and has a list of all the companies that have an active certification from them (List of certified companies, 2012). The rest of the companies were found through Google, Staðlaráð Íslands and BSI Iceland. Out of the 53 companies that have certification 23 of them fulfilled the requirements above. The most common reasons for exclusion were that organizations were not operating in a competitive market or did not have a sufficient financial statement accessible to public. The list of excluded companies and the reason for exclusion is in appendix A.

After gathering all the companies in group one, the comparison companies are decided. Those companies were not chosen at random. First of all the company had to fulfill the previous mentioned requirements. Then the company with the closest sales revenues, preferably higher than the ISO 9001 company, was chosen. In all incidents except for two the comparison company was operating in the same sector as the ISO 9001 certified company. The two exceptions were Pósturinn and DHL, where DHL is working in other postal and courier activities, and Distica and Actavis, where Actavis is a manufacturer of pharmaceutical preparations. In both cases the matches were considered close enough. The list can be seen in table 1.

Table 1 The companies and comparison companies

Iso company	Sector	Comparison company
Vinnslustöðin	Processing and preserving of fish, crustaceans and molluscs	Ísfélag Vestmannaeyja
Mjólkursamsalan	Liquid milk and cream production	Auðhumla
Sorpa	Treatment and disposal of non-hazardous waste	Sorpeyðingarstöð
Orkuveita Reykjavíkur	Steam and air conditioning supply	HS Orka
Distica	Wholesale of pharmaceutical goods	Actavis
ÍAV	Construction of commercial buildings	Ístak
Gagnaveita Reykjavíkur	Wired telecommunications activities	Míla
Alcan á Íslandi	Aluminium production	Norðurál
Skýrr	Information technology consultancy activities	Nýherji
EJS	Wholesale of computers, computer peripheral equipment and software	Opin Kerfi
Pósturinn	Postal activities under universal service obligation	DHL
Brimborg	Sale of new cars and light motor vehicles	TK bílar
Kögun	Ready-made interactive leisure and entertainment software development	TM Software Origo
Vífilfell	Manufacture of soft drinks; production of mineral waters and other bottled waters	Ólgerðin Egill Skallagrímsson
Marel	Manufacture of machinery for food, beverage and tobacco processing	Stálnaust
Norðurorka	Distribution of electricity	Rarik
Teiknistofan Tröð	Architectural activities	Landform
Almenna verkfræðistofan	Engineering design activities for industrial process and production	Hornsteinar arkitektar
Verkís	Engineering design activities for industrial process and production	Hatch Technologies
Strendingur	Engineering design activities for industrial process and production	Útrás
VSÓ ráðgjöf	Engineering design activities for industrial process and production	Verkfræðistofan Vista
Efla	Engineering design activities for industrial process and production	El-Rún
Mannvit	Engineering design activities for industrial process and production	HRV

When the two groups are ready, their financial statements from the years 2007 to 2010 are retrieved through Creditinfo. This is done regardless when the company was certified. It is considered that the process of certification takes more than three years so companies that are certified in the next two years are probably operating with an active quality management system. Since the ISO 9001 certified companies tend to have higher revenue, two searches are performed, the second one to exclude the impact from economics of scale. The same companies as in the first search are then divided into two groups, smaller companies and larger companies. For example if Vinnslustöðin has more revenue than Ísfélag Vestmannaeyja, Vinnslustöðin is categorized as a larger company and Ísfélag Vestmannaeyja as a smaller company. This is done with every company and every comparison company. Then, the study has four groups of 23 companies each with four financial statements. ISO 9001 certified companies versus non-certified companies and larger companies versus smaller companies. The financial ratios and 0,05 confidence intervals are calculated for all four samples. This is done regardless, since the whole population is the sample for ISO 9001 certified companies. Finally the one sample t-test is calculated and conclusions are drawn from the results.

4. RESEARCH RESULTS

When the hypotheses are put through the test it is clear that ISO 9001 certified companies do better than non-certified companies. Their success cannot be explained by the economics of scale which is clearly demonstrated in table 2.

Table 2 Result table showing means, standard deviation, number of incidents and confidence levels

Certified companies								
	Revenues	GPM	ROA	ROS	ROE	ROC	Equity %	
AVG	10.602 m isk.	45,1%	1,3	17,3%	5,9	8,1%	35,6%	
STDV	17.844 m isk.	26,0%	2,5	18,1%	9,7	30,3%	26,4%	
N	75	50	70	60	72	69	88	
UCL	11.068 m isk.	46,1%	1,4	17,9%	6,2	9,0%	36,2%	
LCL	10.135 m isk.	44,0%	1,2	16,7%	5,6	7,3%	35,0%	

Not certified								
	Revenues	GPM	ROA	ROS	ROE	ROC	Equity %	
AVG	7.309 m isk.	40,2%	3,5	9,7%	7,4	7,5%	26,9%	
STDV	10.095 m isk.	21,8%	10,9	13,5%	13,2	41,7%	38,0%	
N	80	64	66	61	62	54	86	
UCL	7.556 m isk.	40,9%	3,9	10,2%	7,8	9,02%	28%	
LCL	7.062 m isk.	39,5%	3,2	9,3%	7,0	6%	26%	

Larger companies								
	Revenues	GPM	ROA	ROS	ROE	ROC	Equity %	
AVG	12.611 m isk.	43%	2,4	13,9%	5,0	7,5%	31,5%	
STDV	17.797 m isk.	24%	7,4	14,3%	9,2	28,5%	29,5%	
N	72	50	71	57	63	70	88	
UCL	13.096 m isk.	43,5%	2,6	14,4%	5,2	8,3%	32,1%	
LCL	12.127 m isk.	41,6%	2,2	13,4%	4,7	6,7%	30,8%	

Smaller companies								
	Revenues	GPM	ROA	ROS	ROE	ROC	Equity %	
AVG	5.898 m isk.	42,2%	2,3	13,1%	8,1	8,3%	29,9%	
STDV	9.772 m isk.	23,3%	8,3	18,0%	13,0	43,6%	35,5%	
N	82	64	66	64	71	53	84	
UCL	6.131 m isk.	42,9%	2,6	13,6%	8,4	10,0%	30,7%	
LCL	5.664 m isk.	41,5%	2,1	12,5%	7,7	6,7%	29,1%	

The most significant results of the research are presented with figures on the following pages. The most interesting results are the difference in revenue, GPM, ROS and equity ratio.

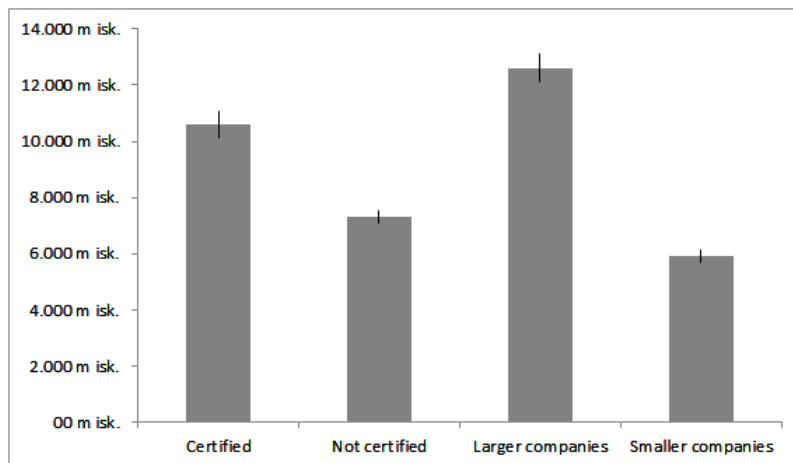


Figure 1 Revenue for all groups where the lines represents the confidence intervals

There is a significant difference between certified companies and non-certified companies in regards to revenue as can be seen in figure 1. This difference is the reason for categorizing them into larger and smaller companies; to exclude the

effects of economic of scale. The certified companies have almost 50% more revenue than the companies without certification.

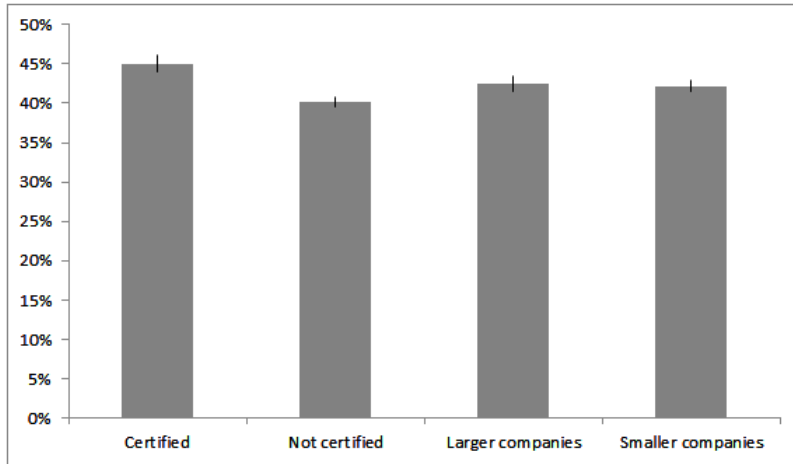


Figure 2 Gross profit margin

Although there is not a significant difference between larger companies and smaller companies, there is a significant difference between certified companies and non-certified companies. Certified companies have 12% higher gross profit margin than non-certified companies.

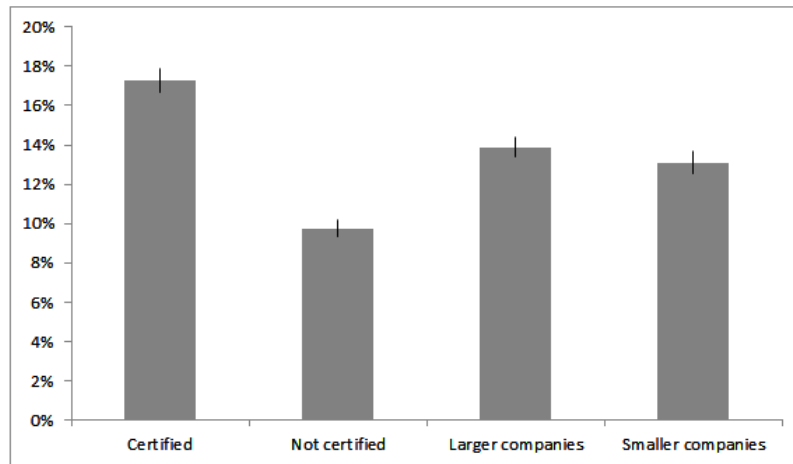


Figure 3 Return on sales

As can be seen in figure 3, the difference in return on sales between certified companies and non-certified companies is a staggering 77%. That difference cannot be explained by economics of scale since there is not a significant difference between larger companies and smaller companies.

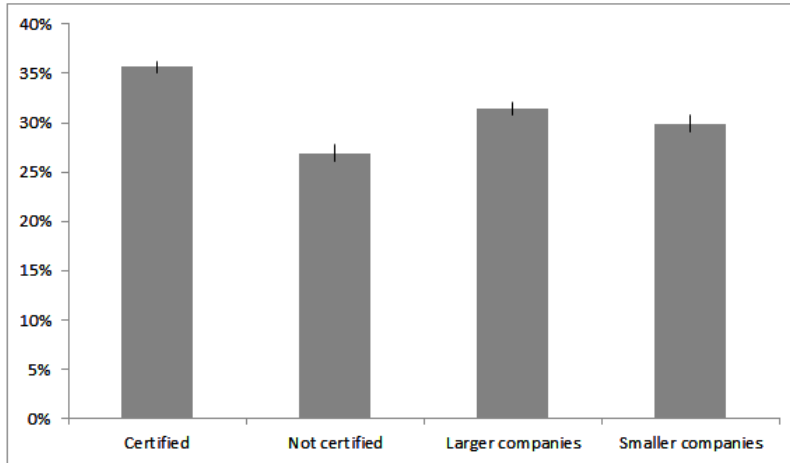


Figure 4 Equity ratio

The difference between certified companies and non-certified in regards to equity ratio is astounding. Some difference can be explained by economics of scale; larger companies tend to have higher equity ratio than smaller companies as seen on figure 4. The difference however, is a lot more in regards to certified companies versus non-certified companies.

4.1 Hypotheses

The results of hypotheses are listed below. The hypotheses are stated and the one sample t-test is calculated and compared with the population mean of the certified companies.

- ISO 9001 certified companies have higher gross profit margin than non-certified companies since there is a lower manufacturing cost in companies with a certified quality management system.

$$\frac{21,8\%}{\sqrt{64}} = 0,03 \quad \frac{45,1\% - 40,2\%}{0,03} = 1,7861$$

- *Hypotheses rejected*

- ISO 9001 certified companies have higher return on sales than non-certified companies, hence the reasons mentioned previously.

$$\frac{13,5\%}{\sqrt{61}} = 0,02 \quad \frac{17,3\% - 9,7\%}{0,02} = 4,3621$$

- *Hypotheses accepted*

- ISO 9001 certified companies have higher equity ratio than non-certified companies.

$$\frac{38,0\%}{\sqrt{86}} = 0,04 \quad \frac{35,6\% - 26,9\%}{0,04} = 2,1201$$

- *Hypotheses accepted*

4.3 Discussion

First of all there is a significant difference between ISO certified companies' revenue and the comparison group's. The first statement was that ISO 9001 certified companies should have higher gross profit margin. There is not a significant difference at $\alpha = 0,05$ between the gross profit margin of certified companies and non-certified companies. It can be stated with 93% certainty that there is a difference and certified companies are doing better.

However there is a substantial difference between certified and non-certified companies both in return on sales and equity ratio. If the companies are sorted into larger companies and smaller companies, there is not a difference between the groups in regards of return on sales.

Regarding equity ratio certified companies have a much higher equity ratio than non-certified companies. That cannot be explained by economic of scales since there is not a significant difference between larger and smaller companies.

As seen in table 3 most research points to that certified companies tend to do better or as well as non-certified companies. Some researchers have pointed out that companies that do well are more likely to seek ISO 9001 certification. Iceland seems to be no exception to that. It remains to be seen whether certified companies in Iceland do better because of the certification or that Icelandic companies that do well are more likely to seek certification.

Table 3 Summary of researches done on this subject

Research	Method	Result
Corbett, Montes-Sancho, & Kirsch, 2005	Quantitative	Positive impact
Gunnlaugsdóttir, 2010	Qualitative	Positive impact
Han, Chen, & Ebrahimpour, 2007	Quantitative	Insignificant difference
Heras, Casadesús, & Ochoa, 2001	Quantitative	Positive impact
Hróbjartsson, 2012	Quantitative	Positive impact
Karlsdóttir & Hallgrímsdóttir, 2007	Qualitative	Insignificant difference
Sampaio, Saraiva, & Rodrigues, 2011	Quantitative	Negative impact
Sharma, 2005	Quantitative	Positive impact
Sigurðardóttir, 2011	Qualitative	Positive impact
Terziovski, Samson, & Dow, 1997	Qualitative	Insignificant difference

These results are also interesting with regards to the Portuguese research which stated that companies that got certified because of internal motivation did better than companies that got certified for external reasons. Gunnlaugsdóttir's research from 2010 stated that 39% of companies in Iceland got certified because of external pressure. It would be interesting to compare those factors in Iceland. It would also be interesting to see how certified Icelandic companies would have performed if they had sought certification for internal reasons.

Creditinfo is an Icelandic credit related information company. Creditinfo issues a yearly list of model organizations operating in Iceland. Of those 32.000 limited companies in Iceland 245 made it on the Creditinfo list. To be able to make it on the list companies need to fulfill conditions, for example have a positive EBIT three years running and to have more than 20% equity ratio. Out of those 46 companies that were used in this research, three of them were ISO 9001 certified, Efla, Verkís and Alcan, and only Actavis was without certification and made on this list (Creditinfo, 2012).

5. CONCLUSIONS

The conclusion is that there is a financial benefit between ISO 9001 certified companies and those companies that are not certified. That difference cannot be explained by economics of scale since larger companies in these samples do not seem to be doing better by a significant amount than smaller companies. In regards to gross profit margin and return on sales, the certified companies have a substantial positive difference from the companies that are not certified. Plausible explanations for that could be, for example, that with better quality management systems there is lower quality cost. Even though there is a cost of having a certified quality system, the cost of not having one seems to be higher. Companies that have certified quality systems might also be able to bid higher in auctions since in some auctions the auctioneers will only accept offers from companies without a certified quality system if there is no company with certified quality systems that puts in an offer. This is particularly common in the construction, engineering and design industry. So in Iceland there is a real advantage of having an ISO 9001 certified quality system since your offer could be rejected even though it is the best offer because your company does not have a certified quality system. At last the reason might also be, as mentioned before, that companies that do better are more likely to have quality systems and also more likely to seek certification for its quality system.

It is difficult to draw a concrete conclusion based on a comparison of return on equity. Certified companies have a higher equity and assets ratio and lower debt ratio than companies that are not certified. Therefore, those companies have a lower return on capital, return on equity and return on assets. It depends on the rate of return, on equity, and interest rate of debts whether it pays off having more debts and therefore higher return on equity or lower debt ratio and lower return on equity. In the current economic climate in Iceland it is very hard to predict which is in fact better. In the long run it should be better to have a higher equity ratio and higher earnings. So it is safe to conclude that the financial health of the certified companies is better than the companies that are not certified.

5.1 Limitation and future research

There are some limitations to this research. Firstly the Icelandic market is small in scale and many companies are in a very dominant position. That made it hard to find good comparison companies in some cases. That was the reason for the few excluded companies. The Icelandic heritage for stock exchange is limited. Many companies have book value which is in no relation of the value of companies, which makes all the calculations of financial ratios regarding assets very limited. For example TK BÍlar has total assets 670.000 ISK but sales revenues of 13.500.970.000 ISK.

It is not possible to compare companies within individual sectors. Many sectors have only one certified company. In other sectors some companies have such a dominant position that all comparison is meaningless. However, with so many companies in so many sectors, it should be meaningful to compare companies with and without ISO 9001 certification.

Finally, some limitation of this research is that companies may have other quality systems than ISO 9001. For example all the fish plants in Iceland have some kind of quality systems which are required by their customers. In some cases these systems have higher standards than ISO 9001. That leads to the question whether in that case ISO 9001 certification is a prime example of quality systems for that industry.

It would be interesting to research the impact the certification made on the companies and compare it to how well similar companies were doing over the same period. That would answer the question of whether those companies do better because of the certification or if companies that do well are more likely to get certified.

6. ACKNOWLEDGEMENT

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Appendix A

The list of excluded companies and the reason for exclusion is in the table below.

Organisations name	Reasons for excluding	Sector
Blóðbankinn	Public institution	Hospital
BM Vallá	Insufficient financial statement	Manufacture of concrete products for construction purposes
Borgarplast	Insufficient financial statement	Manufacture of plastic packing goods
Bros - Gjafaver	Insufficient financial statement	Non-specialised wholesale trade
Capacent Gallup	Insufficient financial statement	Market research and public opinion polling
Fjöltækniskóli Íslands	Educational institution	Technical and vocational secondary education
Flugfjarskipti	Monopoly	Wireless telecommunications activities
Flugstoðir	Public institution	Service activities incidental to air transportation
Geislavarnir Ríkisins	Public institution	Other research and experimental development on natural sciences and engineering
GLÁMA/KÍM Arkitektar	Insufficient financial statement	Architectural activities
Hnit	Insufficient financial statement	Engineering design activities for industrial process and production
Höldur	No comparable company	Renting and leasing of cars and light motor vehicles
IGS-Flugþjónustan	Monopoly	Service activities incidental to air transportation
Jarðboranir	No comparable company	Test drilling and boring
Landsnet	Monopoly	Activities of production holding companies
Landsvirkjun	Monopoly	Production of electricity
Landsvirkjun Power	No comparable company	Activities of production holding companies
Lýsi	No comparable company	Manufacture of oils and fats
Marorka	Insufficient financial statement	Business and domestic software development
Menntaskólinn í Kópavogi	Educational institution	General secondary education
Plastprent hf.	No comparable company	Manufacture of plastic packing goods
Sementsverksmiðjan	Insufficient financial statement	Manufacture of cement
Set	No comparable company	Manufacture of plastic plates, sheets, tubes and profiles
Siglingastofnun	Public institution	Regulation of and contribution to more efficient operation of businesses
Slysavarnafélagið Landsbjörg	Non profit organization	Fire service activities
Veðurstofa Íslands	Public institution	Other research and experimental development on natural sciences and engineering
Verkmenntaskólinn á Akureyri	Educational institution	Technical and vocational secondary education
VSB verkfræðistofa	Newly certified	Engineering design activities for industrial process and production
YRKI arkitektar	Insufficient financial statement	Architectural activities
Össur	No comparable company	Manufacture of medical and dental instruments and supplies

Appendix B

The list of ISO certified companies and comparison companies and their SIC number.

Iso company	SIC number	Comparison company	SIC number
Vinnslustöðin	10200	Ísfélag Vestmannaeyja	10200
Mjólkursamsalan	10511	Auðhumla	10511
Sorpa	38210	Sorpeyðingarstöð Suðurnesja	38210
Orkuveita Reykjavíkur	35300	HS Orka	35300
Distica	46460	Actavis	21200
ÍAV	41201	Ístak	41201
Gagnaveita Reykjavíkur	61100	Míla	61100
Alcan á Íslandi	24420	Norðurál	24420
Skýrr	62020	Nýherji	62020
EJS	46510	Opin Kerfi	46510
Pósturinn	53100	DHL	53201
Brimborg	45111	TK bílar	45111
Kögun	62011	TM Software Origo	62011
Vífilfell	11070	Ölgerðin Egill Skallagrímss	11070
Marel	28930	Stálnaust	28930
Norðurorka	35130	Rarik	35130
Teiknistofan Tröð	71111	Landform	71111
Almenna verkfræðistofan	71121	Hornsteinar arkitektar	71121
Verkís	71121	Hatch Technologies	71121
Strendingur	71121	Útrás	71121
VSÓ ráðgjöf	71121	Verkfræðistofan Vista	71121
Efla	71121	El-Rún	71121
Mannvit	71121	HRV	71121