



ISO 9001 Certification of Engineering Consultancies

The Benefits From Different Perspectives

Sveinn Thor Hallgrímsson

Thesis of 12 ECTS credits

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at Reykjavík University in partial fulfillment
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Master of Project Management

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Supervisor:

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ISO 9001 Certification of engineering consultancies –

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Abstract

ISO 9001 is a very customer based standard and therefore it is interesting to explore the impact of the standard from different angles. The purpose of this study is to explore what engineering consultancies and their clients gain by ISO 9001 certification of the consultancies.

In an effort to put things into perspective the study was divided into three sections.

Firstly by using in-depth interviews with employees, Quality Managers and executives, of five engineering firms which cover approximately 80% of the private sector of the consulting engineers profession in Iceland. Secondly, by using a survey conducted among all employees in the same engineering firms. Thirdly by taking in-depth interviews with representatives of five major purchasers of engineering services in the country.

The most important finding of the study is that while the representatives and employees of the engineering consultancies are rather positive regarding the benefits of their ISO 9001 certification, the purchasers of engineering consultancy cannot find significant difference between certified companies and non-certified.

Keywords and phrases: Quality management, ISO 9001, Customer satisfaction, Engineering consultancies, Engineering firms

1.0 INTRODUCTION

The history of engineering in Iceland spans only just over a century. The first Icelandic engineer, Sigurður Thoroddsen, finished his education in Denmark in 1891. The Association of Chartered Engineers in Iceland was formed in 1912 and turned one hundred two years ago. The first decades the main effort of the engineers was to participate in road and bridge construction around Iceland where rural areas had until then mainly been accessible only by horses or by foot. They also played a vital part in the revolution of bringing Icelanders from the turf farms into modern buildings (Þórðarson, 2002). Most of them were employed by the public sector. Later, engineers started to form consultancies. These were relatively small until recently (the last decade or so) when some of the consultancies began to merge, mainly to be able to undertake bigger projects, both at home and abroad and to diversify. As an example of this, Verkís, one of the subjects of this paper is a merger of 6 consultancies. (Ólafsson, Kristjánsson, & Þórðarson, 2012). As the 21st century began the larger engineering consultancies seriously began to consider certifying their Quality Management Systems. The thesis sets out to explore what this development has brought about for the engineering consultancies and their clients.

Many surveys have been conducted on the ISO 9001 standard and a lot of papers have been written about them. Through the years it has been thoroughly examined what firms gain from ISO 9001 certification and what motivates them to seek certification. All of the bigger engineering consultancies in Iceland are ISO9001 certified and have been for several years, even though the Icelandic Building Act and The Icelandic Building regulation has an exemption until the 1st of January 2015 to fulfil demands regarding Quality Management Systems (QMS). Even then it will not be necessary to have the QMS certified, but if they are not certified they will need approval from “The Iceland Construction Authority” and will have to fulfil their demands (The Icelandic Building Act, 2010; Building Regulation nr. 112, 2012).

ISO 9001 is a very customer based standard and therefore it is interesting to explore the perspective of the purchasers of the service provided.

An attempt will be made to get further insights to the following research topics and to try to understand the context of things better by answering among others the following questions.

Through Interviews with Quality Managers and Management of certified engineering firms:

- Why did the firms decide to implement a Quality Management System?
- What have the engineering companies benefited from establishing a Quality Management System?

Through a survey conducted among employees of these engineering firms:

- How well do the employees know the QMS?
- What is the benefit of a certified QMS for the client?
- How does ISO 9001 certification affect company's competitive position?
- How important is ISO 9001 certification?

Through Interviews with representatives of large purchasers of engineering service:

- What are your requirements for engineering consultancies in terms of their QMS?
- How important is it for the engineering consultancies working for your organization to have a certified QMS?
- Is there a difference between the quality of work of ISO 9001 certified and noncertified consultancies?
- What is their opinion of the ISO 9001 standard?

2.0 LITERATURE REVIEW

ISO stands for International Organization for standardization. ISO 9001:2008 sets out the criteria for a Quality Management System and is the only standard in the ISO 9000 family which can be certified (although it is not a requirement). It can be used by any type of organization, large or small, regardless of profession. ISO 9001:2008 is implemented by over one million companies and organizations in over 170 countries. The standard is based on a number of quality management principles and has a strong customer focus. "Using ISO 9001:2008 helps ensure that customers get consistent, good quality products and services, which in turn brings many business benefits" (ISO, 2014).

FIDIC (International Federation of Consulting Engineers) was founded in 1913 by three European national associations of independent consulting engineers. FIDIC membership now covers 97 countries of the world. FIDIC publishes all kinds of material for their members, such as information for consulting engineers, project owners and international development agencies, contract documents and client/consultant agreements forms of contracts, standard pre-qualification forms, and business practice documents (FIDIC, 2014). In 1997 they, along with EFCA (European Federation of Engineering Consultancy Associations), issued the **Guide to the Interpretation and Application of the ISO 9001:1994 Standard for the Engineering Consulting Industry**. In 2001 they updated the guide to reflect the revised ISO 9001:2000 Standard. The guide is very thorough and its purpose was to seek to assist firms in the consulting engineering industry to implement the ISO 9001 standard in the best way possible. A number of fundamental changes were incorporated into the 2000 edition compared to the 1994 edition, one of them being greater customer orientation by focusing on identifying customer needs and expectations, and by providing customer service. Firms were now required to measure and monitor performance, as perceived by the customer, by establishing and implementing methodologies for assessing customer satisfaction (FIDIC, 2001). “ISO 9001:2008 contains no new requirements compared to the 2000 edition, which it replaces. It provides clarifications to the existing requirements of ISO 9001:2000 based on eight years’ experience of implementing the standard worldwide and introduces changes intended to improve consistency with the environmental management system standard, ISO 14001:2004” (ISO news, 2014)

Many articles have been written about ISO 9001 and the ISO 9000 series certification and financial improvement of companies. Some authors come to the conclusion that there is a direct link between ISO 9001 certification and financial improvement of companies (Beirã & Sarsfield , 2002; Kirche, & Khumawala, 2002; Sellers & Nicolau, 2002; Wayhan, Chow-Chua, Goh, & Wan, 2003; Naser, Karbhari, & Mokhtar, 2004; Dimara, Skuras, Tsekouras, & Goutsos, 2004;). Others claim that they cannot find evidence to sustain that theory (Lima, Resende Marcelo, & Hasenclever, 2000; Aarts & Vos, 2001; Heras, Casadesús, & Ochoa, 2001; Tsekouras,

Dimara, & Skuras, 2002; Martínez-Costa & Martínez-Lorente, 2003; Corbett, Montes-Sancho, & Kirsch, 2005).

Ari Hróbjartsson did research in 2012 where he looked at all ISO 9001 certified companies in Iceland and compared them to similar noncertified companies in an effort to find out if there was a financial benefit from the certification. The result of his research was that the certified companies had a significant higher gross profit and return on sales ratio. There was also a difference in financial health between the two groups, where certified companies had lower debt ratio than noncertified (Hróbjartsson, 2012). A paper published in *The International Journal of Quality & Reliability Management* in 2002 announced that when using a simple cross-sectional analysis method of comparing certified and non-certified firms the research group found a significantly better sales growth and profitability in the certified companies opposed to non-certified. However, when they analysed the difference between pre- and post-registration sales growth and profitability for the certified firms they found no evidence to support any link between ISO 9000 registration and improvements. They found out that the growth and profitability was consistently better than non-certified firms both pre- and post-registration. Their conclusion was that firms with superior performance are more likely to seek and acquire certification, not that certified firms are more likely to have superior performance (Heras, Dick, & Casadesus, 2002).

In a survey published in *European Journal of Operational Research* in 2003 findings show that quality, culture and motivation for adopting ISO 9000 certification are significant predictors of the benefits and values derived from such certification. The result indicate that organisations that gain ISO certification as a part of the company's continuous improvement strategy profited most in terms of performance outcomes. This was in contrast to those organisations whose QMS were implemented and certified because of external pressure such as meeting the demands from the market or government (Terziovski, Power, & Sohal, 2003). A survey published in *The International Journal of Quality & Reliability* in 2001 supports this (Singels, Ruel, & Water, 2001).

Jóhanna Gunnlaugsdóttir did two surveys in Iceland, in 2001 and 2010, about why companies acquired ISO 9001 certification and how they benefited from it. Her results were that the main reason for certification was pressure from customers. 39% of the companies got certified because of government, international or customer requirements rather than for the purpose of improving quality. The results indicated that the most common benefit from certifications was that it was easier to meet the requirements of the consumers and better management. Only 11.9% claimed that they got a competitive advantage over other companies after certification (Gunnlaugsdóttir, 2010).

A survey that was conducted amongst certified consultancies in Hong Kong to collect evidence regarding the suitability of applying for ISO 9001, among other things raises a question about ISO 9001 being used in knowledge-based services, since it was initially developed for the manufacturing sector. Quality Assurance Managers (QAMs) of the consultancies were asked whether they were totally satisfied with ISO 9001 for consultancy services. 63 % answered that ISO 9001 was an adequate system applicable to their services, while 37 % had reservations as to the suitability for the standard to their services (Tang & Kam, 1999).

3.0 METHOD

The purpose of this study was to explore what engineering consultancies and the purchasers of their service gain by ISO 9001 certification of the consultancies.

In an effort to put things into perspective the study was divided into three sections.

Firstly, a part of in-depth interviews taken by Dr. Helgi Thor Ingason with employees, Quality Managers and executives, of the five engineering firms that this paper is covering, Efla, Mannvit, Verkís, VSB Consulting Engineers, and VSO Consulting, was used. Together these firms employ about 80% of the Icelandic engineering private sector (Gylfason, 2014). What was relevant for this research is on what grounds these engineering firms decided to implement ISO 9001 and what, in their opinion, they have gained from it.

Secondly, a survey conducted by Dr. Helgi Thor Ingason, executed among all employees in these same engineering firms will be reviewed. A survey containing twenty four statements was sent to all employees of the engineering firms exploring their view on the ISO 9001 QMS, what their firm is benefitting from the ISO 9001 certification and what they think their customers will benefit from it. The options they were given as answers were strongly agree, agree, neutral, disagree and strongly disagree. The response rate was 38,4%. In this paper only nine of the statements will be reviewed. Those are statements regarding the QMS, competitive position, customers and customer satisfaction.

Thirdly in-depth interviews were taken by the author of this paper with representatives of five major purchasers of engineering services. The questions focused mainly on the demands these clients are placing on their suppliers and the quality of the service provided by the engineering firms.

The methods chosen in each case were given careful consideration. In the first set of interviews the aim was to gain knowledge about the implementation of ISO 9001 and how the engineering consultancies have benefited from it. The ones who are best suited to answer these questions are quality managers and executives of the firms that have had hands-on experience with QMS and how they have benefited the firms. The survey, conducted among all employees in these same engineering firms, was considered the best way to get the widest participation possible to gain insight into the views of all employees of these firms. The approach of using statements and giving five options as answers (strongly agree, agree, neutral, disagree and strongly disagree) was to facilitate the processing of the data obtained. In the second set of interviews with representatives of five major purchasers of engineering service, Interviewees with extensive hands on experience dealing with engineers and engineering consultancies were sought within the firms/organizations.

4.0 RESULTS

4.1 Interviews with representatives of engineering firms

Interviews were taken with representatives of five engineering consultancies in 2013 and 2014, as a part of research Dr. Helgi Thor Ingason was doing in a connection with writing a book on quality management. The interviewees were Quality Managers and executives of these firms. Two out of five questions asked were used in this thesis.

The engineering consultancies are:

EFLA Consulting Engineers present themselves as a general engineering and consulting company with widespread international activities and consultancy providing high quality solutions around the globe (Efla, 2014).

Interviewees: Magnús Matthíasson, Quality Manager and Helga J. Bjarnadóttir, Director - Environment

Employees: About 250.

ISO 9001 Certification from year: 2004 (Efla, Efla gæðavottun, 2014)

Mannvit define themselves as an “international consulting firm offering comprehensive engineering, consulting, management, operational and EPCM services. The company employs highly experienced engineers and technicians, who have successfully completed projects on almost every continent” (Mannvit, 2014). Mannvit was formed by a merger of several engineering firms (Kristjánsdóttir, 2014).

Interviewee: Laufey Kristjansdottir, Quality Manager.

Employees: About 300.

ISO 9001 Certification from year: 2005 (Kristjansdottir, 2014).

Verkís define themselves as a dynamic and progressive consulting firm that provides top quality services in all areas of engineering (Haraldsson, 2013). Verkís was founded in 1932, making it the oldest consulting firm in Iceland (Verkís, 2014).

Interviewees: Haukur Þór Haraldsson, Quality Manager and Sigþór Hallfreðsson, Quality Control.

Employees: About 350 employees

ISO 9001 Certification from year: 2007 (Haraldsson, 2013).

VSB Consulting Engineers present themselves as “an international engineering and consulting firm with a staff of experienced and internationally educated professionals in the fields of civil, mechanical and electrical engineering and constructing project management”(VSB, 2014).

Interviewees: Gisli Ó. Valdimarsson, Partner and Project Manager,
Stefán B. Veturliðason, Partner/Founder, Design, consultancy and Management,
Björn Gústafsson, Partner/Founder, General Manager,
Örn Guðmundsson, Partner and Project Manager,
Sveinn Áki Sverrisson, Partner and Project Manager

Employees: About 16.

ISO 9001 Certification from year: 2011 (Valdimarsson, Veturliðason, Gústafsson, Guðmundsson, & Sverrisson, 2013).

VSO Consulting “provides its customers with comprehensive engineering and management consulting with the goals of ensuring them the most efficient solutions for each task that produce tangible results for them and an edge in their field” (VSO, 2014).

Interviewee: Birna Guðbjörnsdóttir, Quality Manager

Employees: About 50.

ISO 9001 Certification from year: 2007 (Guðbjörnsdóttir, 2014).

Total employees of these engineering firms count about 970. That covers approximately 80% of the private sector of the consulting engineers profession in Iceland (Gylfason, 2014). Three of these firms, Efla (250 employees), Verkís (350 employees), and Mannvit (300 employees) can be classified as large enterprises. VSO Consulting (50 employees) is considered a medium-sized company while VSB is considered a small company as defined in EU law (EU, 2014):

1. number of employees and
2. either turnover or balance sheet total.

Company category	Employees	Turnover	or	Balance sheet total
Medium-sized	< 250	≤ € 50 m		≤ € 43 m
Small	< 50	≤ € 10 m		≤ € 10 m
Micro	< 10	≤ € 2 m		≤ € 2 m

Table 1: Definition of SME as defined in EU law

In this coverage only the number of employees is looked at, but not turnover or balance sheet total as EU Law provides. It was not considered necessary for this purpose.

Interviews were taken with representatives of these engineering firms. They were asked eight questions, but only two of these questions will be discussed in this survey.

a. On what grounds did you decide to implement a QMS?

There is a harmony in the answers regarding this matter. One of the reasons and driving force for the implementation of QMS in engineering enterprises was that the public sector adopted criteria to take into account that in the tendering procedures if bidders had established a QMS. The bidders got extra points if they could show a QMS and additional points if the QMS was certified. This meant that an engineering service could get work, even at a higher price, if they had a QMS.

Three of the representatives of the companies said that their companies are working internationally. One of the reasons for establishing a QMS was that it is the demand of the markets in the countries in which their companies are working that they have a certified QMS. They would not have gotten many of the projects they have been working on abroad without it. More reasons were mentioned but this seemed to carry the most weight.

One of the interviewees, for instance, said that his firm saw the need for a system to help coordinate procedures. The ISO9001 standard was seen as a new and practical tool, the academic community was starting to review quality management as an academic subject. Another one said:

“But equally important is that managers perceived and understood that when a company has become larger than 60 employees then they lose perspective, projects become larger and more complex, more manpower and increased complexity. This requires a methodology different from what works for small businesses and the implementation of quality management was the answer to that”.

b. What is the experience from establishing a QMS? Has it brought benefits, more satisfaction for customers, suppliers, employees, increased efficiency or economic benefits?

The interviewees were all rather positive towards their ISO 9001 certified QMS. They named among other things:

- It has made it easier to get projects, both domestic and abroad.
- Gives credibility stamp both with employees and customers.
- Employees do not want to turn back to the time when there was no QMS.
- Efficiency, transparency and uniform system are key elements resulting from the QMS.
- The QMS has unified the employees.

Only one of the interviewees claimed that their firm does regular survey on customer satisfaction. The results are used to determine where the firm is doing well and where there is a reason to do better. Note that there was no direct question about this.

4.2 Survey among employees of engineering firms

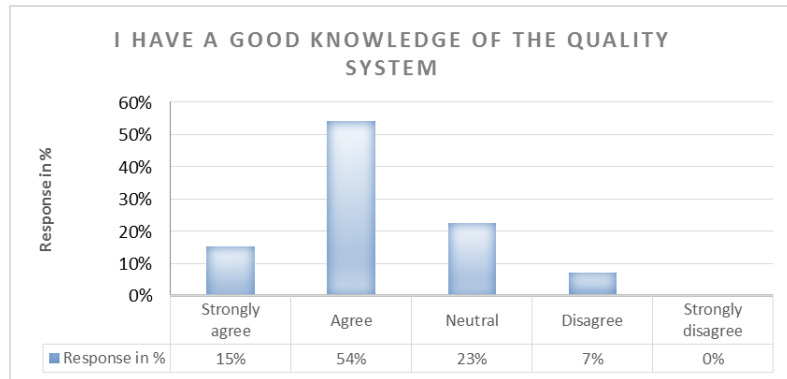
A survey was conducted among employees of five engineering consultancies in 2013 and 2014, as a part of a research Dr. Helgi Thor Ingason was doing in relation with writing a book on quality management. Ten out of twenty five statements expressed in the survey were used in this thesis.

The engineering consultancies are the same as discussed in section 4.1.

Total employees of these engineering firms count about 970. Response rate from the survey was 38,4%.

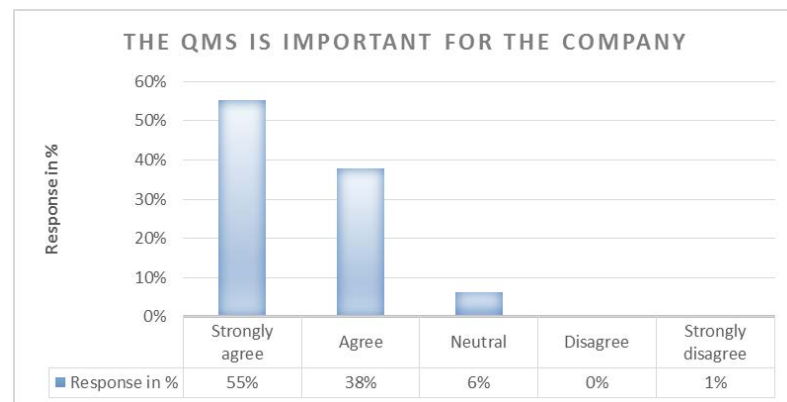
Graph 1: I have a good knowledge of the Quality Management System

69% of the employees agree or strongly agree.
23% are neutral.
7% disagree or strongly disagree.



Graph 2: The QMS is important for the company

93% of the employees agree or strongly agree.
6% are neutral.
1% disagree or strongly disagree.



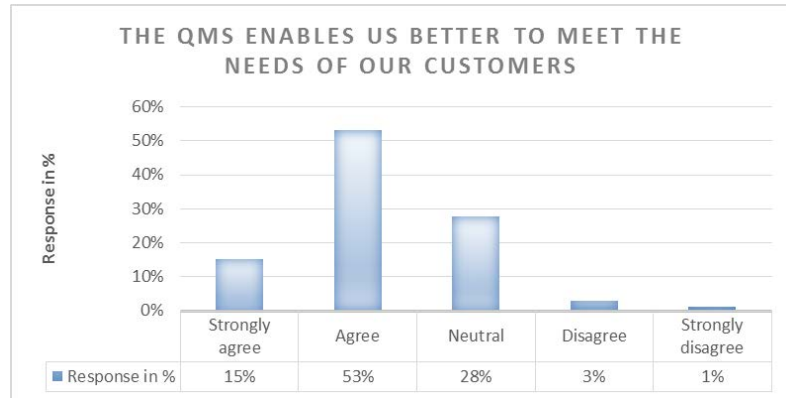
Graph 3: The QMS leads to more customer satisfaction

63% of the employees agree or strongly agree.
34% are neutral.
3% disagree or strongly disagree.



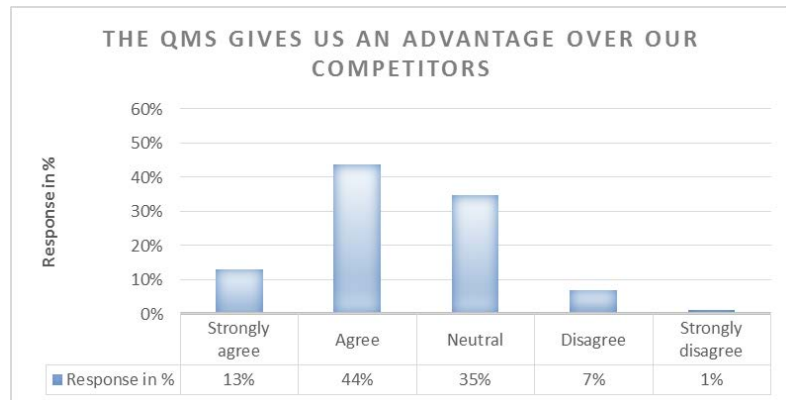
Graph 4: The QMS enables us better to meet the needs of our customers

68% of the employees agree or strongly agree.
28% are neutral.
4% disagree or strongly disagree.



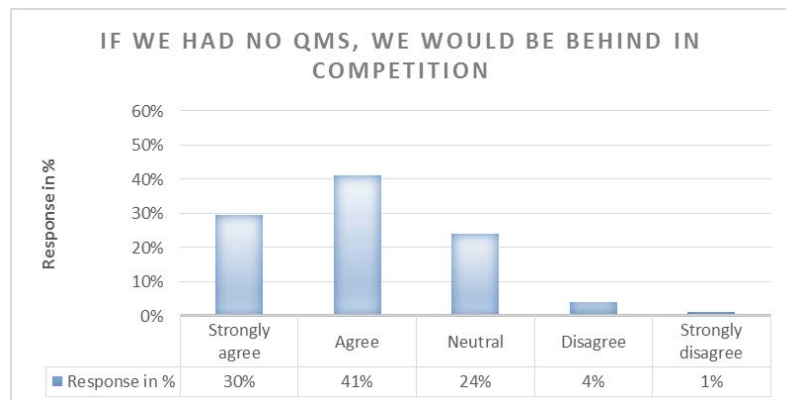
Graph 5: The QMS gives us an advantage over our competitors

57% of the employees agree or strongly agree.
35% are neutral.
8% disagree or strongly disagree.



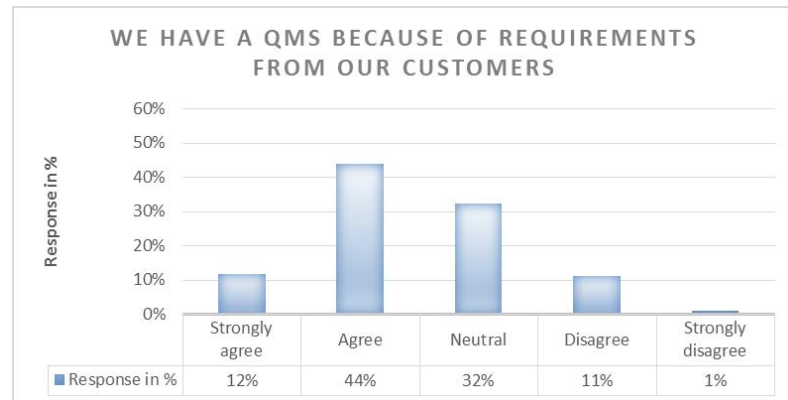
Graph 6: If we had no QMS, we would be behind in competition

71% of the employees agree or strongly agree.
24% are neutral.
5% disagree or strongly disagree.



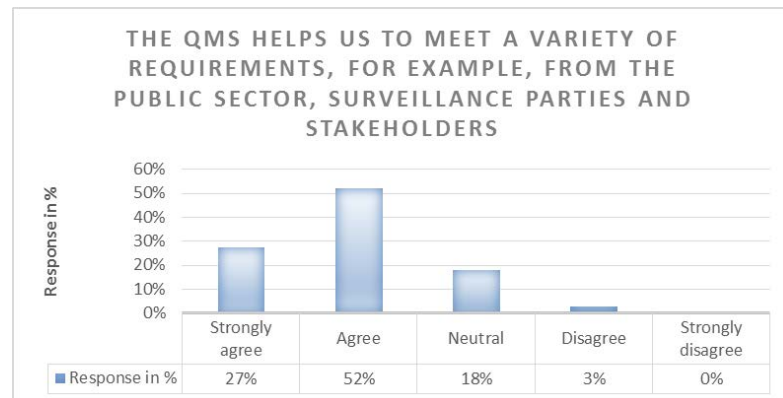
Graph 7: We have a QMS because of requirements from our customers

56% of the employees agree or strongly agree.
32% are neutral.
12% disagree or strongly disagree.



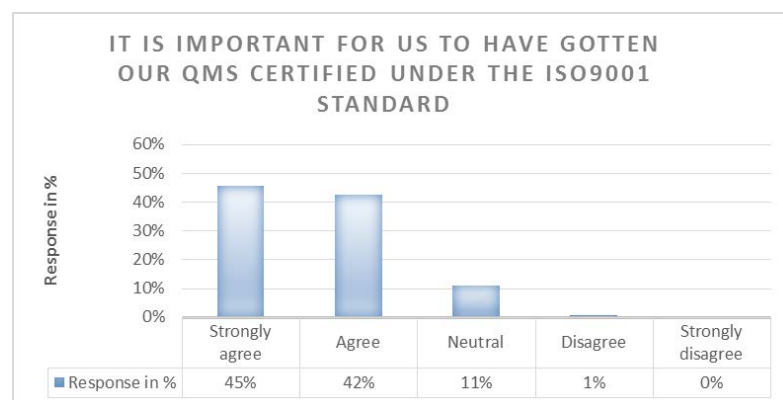
Graph 8: The QMS helps us to meet a variety of requirements

77% of the employees agree or strongly agree.
18% are neutral.
1% disagrees or strongly disagrees.



Graph 9: It is important for us to have gotten our QMS certified

87% of the employees agree or strongly agree.
11% are neutral
1% disagrees or strongly disagrees.



4.3 Interviews with representatives of purchasers of engineering service

Five representatives of large purchasers of engineering services were interviewed. Interviewees with extensive hands on experience dealing with engineers and engineering firms were sought within these firms/organizations.

These firms/organizations are:

FSR - Government Construction Contracting Agency

GCCA is a state agency, which is under the Ministry of Finance. GCCA administers government construction projects for ministries and government agencies and does consulting on technical matters, procurement and preparation of projects (GCCA, 2014).

Interviewee: Halldóra Vífilisdóttir, deputy CEO

Employees: 25 specialists, plus support services.

ISO 9001 Certification from year: 2012 (Vífilisdóttir, 2014).

Landsvirkjun (National Power Company of Iceland)

Landsvirkjun is owned by the Icelandic state and processes 75% of all electricity used in Iceland and is the country's largest electricity generator. Their main clients come from the aluminium industry as well as other power intensive industries (Landsvirkjun, 2014).

Interviewee: Guðmundur Pétursson, Senior Project Manager with Landsvirkjun Power (which manages National Power Company of Iceland international operations).

Employees: about 330.

ISO 9001 Certification from year: 2006 (Pétursson, 2014).

OR - Orkuveita Reykjavíkur (Reykjavik Energy)

OR is a public utility provider for the greater Reykjavík and other regions in the southwest and west of Iceland and provides electricity, hot water for heating, cold water for consumption, as well as maintaining sewage systems. Their service area extends to 20 communities and 67% of the Icelandic population (OR, 2014).

Interviewees: Kristjana Kjartansdóttir, Quality Manager and Ásdís Kristinsdóttir, Director of PMO (Project Management Office).

Employees: about 200, plus another 200 with subsidiaries (Kjartansdóttir & Kristinsdóttir, 2014).

ISO 9001 Certification from year: 1997 (Kjartansdóttir & Kristinsdóttir, 2014).

RARIK (Iceland State Electricity)

Rarik was established in 1946. Rarik is owned by the Icelandic state and is primarily a distribution company for electricity whose main purpose is the distribution of electricity in rural areas (Halldórsson, 2014).

Interviewee: Þórhallur Halldórsson, Manager, Design and Project Management.

Employees: A little over 200 with subsidiaries (Halldórsson, 2014).

ISO 9001 Certification from year: Not certified. They are working towards certification. They have a QMS (Halldórsson, 2014)

City of Reykjavík

Reykjavík is the capital of Iceland, with the highest population (120.000 residents) and the only city in Iceland. The interviewees work at the office of construction and maintenance.

Interviewees: Þorkell Jónsson, Deputy Office Manager for the Office of Construction and Maintenance and Guðmundur Pálmi Kristinsson, Project Manager.

Employees: About 8950 (Jónsson & Kristinsson, 2014).

ISO 9001 Certification from year: Not certified. They are working towards certification. They have a quality manual (Jónsson & Kristinsson, 2014).

Which requirements do your suppliers (of consultancy engineering firms) have to meet regarding QMS. Do you for instance demand a QMS? Do you demand a certified QMS? Do you demand certain features from the QMS of your suppliers? If so, which features?

Four of the agencies/companies said that they do not make demands. The biggest engineering firms were mentioned in this context, as Efla, Mannvit and Verkís. *„We do not demand any requirements, it is so common now that the consultancies have certified QMS“.*

The two parties that still do not have ISO 9001 certification say that they feel that they cannot demand a certified QMS while they have not acquired one themselves.

Only one party claims that they are making demands. They make demands depending on the size of projects. It is demanded in all but the smallest projects that the consultancies have a QMS. They however do not demand a certified QMS, mainly because the Building Act has an exemption until 2015 from a certified QMS. But they demand a defined QMS. They see it as one of their roles to be a leading force, to be a role model and to push the market forward and they see the QMS as a part of that.

How important is it for engineering firms/consultancies to have a certified QMS, when choosing consultants? Explain. Only one agency claimed that that it is important. *“It is a demand in some of our projects. If the engineering firm does not have it, it can result in them not getting the job. So if we make the demand we enforce it”.*

The others claimed that it was not important to demand this. As one of the interviewees said *“The big engineering firms all have certified QMS”*. Three of the others spoke in the same way.

In your opinion, should only consulting firms with certified QMS get to work for your firm/organization?

All parties that answered this question were unanimous that this is a question of the size of the projects. They think that it is logical in bigger projects to demand a certified QMS, but it would be alright to reduce the demand in smaller projects so that smaller engineering firms, which do not have certified QMS, can be eligible.

Is the quality of the work of consultancies with ISO 9001 certification in some way different from those who have not? If yes, in what way? Does it have to do with time, cost or quality of the service provided, professionalism, safety, environment, or something else?

Four of the interviewees said that they could not really find any difference in the service of the engineering firms with ISO 9001 certification versus noncertified. One of the interviewees said

"I have been dealing with these firms for about 20 years and I cannot see any difference. I would think that it would show within the firms rather than outwards".

One of the interviewees said that it is his impression that ISO 9001 had had a positive effect. In his opinion the firms with ISO 9001 are showing improvement by working according to structured procedures.

Have you experienced a change in quality of the service provided by an engineering firm, before and after receiving ISO 9001? If yes, in what way? (Does it have to do with time, cost, or quality of the service provided, professionalism, safety, environment, or something else?

Four of the interviewees said that they had not experienced that it has had a noticeable impact. Two of them though pointed out that they did not really have the comparison, because the large engineering consultancies have been ISO 9001 certified for so long. One of the interviewees said that he thought that the engineering firms that he has been dealing with had been exercising work methods that go well with ISO 9001 prior to receiving certification. Another one said that he has been following one of the bigger engineering firms during their ISO 9001 process. He feels that he can sense that there is more professionalism and the structure and the approaches are more assertive.

What is your opinion of the ISO 9001 standard? Do you have a positive or negative perception towards it? What if anything do you believe that it has delivered to purchasers of service of those companies that have gotten ISO 9001 certification?

The answers to this question were in general rather positive. To give examples:

"I think that it is important for the bigger firms to have ISO 9001, especially those who are working abroad. I think they would not get projects without having it, the demands are lot higher".

"Quality certification alone does not guarantee quality in projects. It ensures procedures and coordination but does not deliver quality technically, but it can do it. This is also a matter of attitude/sentiment and ambition and how the firms want to operate. But I have full confidence in these systems".

5.0 Discussion

The most important finding of the study is that while the representatives and employees of the engineering consultancies in question are rather positive regarding the benefits of ISO 9001 certification, the purchasers of engineering consultancy cannot find significant difference between certified companies and non-certified.

The first study group (chapter 4.1), representatives of engineering consultancies (Quality Managers and executives) claim that they got certification largely because of demands from the public sector, it was also named as impetus for certification that the firms are working internationally and the foreign markets are demanding certification. It was also stated that it was necessary when firms are growing to obtain ISO 9001 certification to keep perspective. There were positive feedbacks regarding the experience from obtaining a Quality Management System (QMS). Remarks such as *“employees do not want to turn back to the time when there was no QMS”* and *“efficiency, transparency and uniform system are key elements resulting from the QMS”* sustain that.

The second study group (chapter 4.2), which are employees of these same firms, share similar views on the benefits of ISO 9001 certification; they claim that they have a good knowledge of the QMS, that the QMS is important for their companies, they are rather positive that the QMS enables them better to meet the need of their customers, that QMS puts them ahead in completion and that it helps them to meet a variety of requirements from different parties. It also says a lot that 93% of employees, asked in the survey, agree or strongly agree that the QMS is important for the company and 87% of them agree or strongly agree that it is important for them to have their QMS certified under the ISO 9001 standard.

The third study group (chapter 4.3), representatives of clients of engineering consultancies are more neutral in their standing towards the Impact of ISO 9001 certification. They claim (all but one) that they are not making demands towards their consultancies, that they cannot find a difference between certified and noncertified companies and that it is logical in bigger projects to demand a certified QMS, but they could be reduced in smaller projects.

Table 2 sums up this difference in views. The first two groups are joint on the left side, the third group is on the right side.

Quality managers, executives and employees of engineering consultancies	Representatives of clients of engineering consultancies
Engineering consultancies have ISO 9001 certification largely because of pressure from the public sector (56% of employees agree or strongly agree, 32% are neutral, 11% disagree)	We are not (all but one organization) making demands towards the engineering consultancies
It is important for engineering consultancies to have a certified QMS (93% of employees agree or strongly agree)	It depends on the size of the projects if a certified QMS should be required.
A certified QMS gives engineering consultancies advantage in competition (57% of employees agree or strongly agree, 35% are neutral)	We cannot find a significant difference in performance between certified and noncertified companies
The QMS helps engineering consultancies to meet a variety of requirements for example from the public sector (77% of employees agree or strongly agree, 18% are neutral)	
It is important for engineering consultancies to have their QMS ISO 9001 certified (93% of employees agree or strongly agree)	

Table 2: Different views between employees of engineering consultancies and employees of their clients.

This difference in view towards the importance of the ISO 9001 standard is interesting.

These findings could mean that owners and managers of engineering consultancies and other firms have to rethink how they are monitoring and using data obtained to improve the service to the client. It looks like the engineering consultancies are content with their QMS, but it does not seem to be resulting in more customer satisfaction. It is interesting in this context to hear remarks from a client as *"I have been dealing with these firms for about 20 years and I cannot see any difference. I would think that it would show within the firms rather than outwards"*. One would think that if a QMS is working within the firms and is strengthening the infrastructure, then it is should also be showing outwards in better service.

In the same way this could as well mean that the clients (purchasers of engineering service) should look at the way they are performing their evaluation of their suppliers. According to the ISO 9001 standard they should have established a criteria for selection, evaluation and re-evaluation of their suppliers and should be able to evaluate them more systematically and answer questions about quality of service received with more certainty. This would be helpful when choosing consultants and in preselection for tenders.

These findings could also support articles that indicate that quality culture and motivation for adopting ISO 9000 certification are predictors of the benefits and values derived from such certification. When firms are primarily getting ISO 9001 certification to respond to external pressure, such as demands from the public sector, it could result in them adopting minimal approach to derive certification and therefore achieve limited internal performance improvements (Terziovski, Power, & Sohal, 2003; Singels, Ruel, & Water, 2001). Even though the driving force for obtaining ISO 9001 for the engineering services was pressure from the public sector, some of them were as well starting to think about quality issues as a way to strengthen their infrastructure and as a tool to keep perspective when the firms were getting larger. So this might as well be different between engineering consultancies. Since we are looking at the engineering consultancies covered in this thesis as a whole, it is not easy to speculate about this.

A survey that was conducted amongst certified consultancies in Hong Kong among other things raises a question about ISO 9001 being used in knowledge-based services, since it was initially developed for the manufacturing sector. It cannot be seen that either the representatives of the engineering consultancies nor the employees of these consultancies would agree to this question, since they are rather positive towards the ISO 9001 standard and the benefits resulting thereof. But if in fact the benefits are not getting delivered through to the clients, then that is something to be looked at.

The employees of the engineering firms claim that they got ISO 9001 certification because of demands from the public sector and the employees of the purchasers of the service claim that they are not making demands towards their consultancies. Is it possible that they have softened

the demands after most of the larger engineering consultancies got certification? As one of them said and three others spoke in the same manner „*We do not demand any requirements, it is so common now that the consultancies have certified QMS*”.

6.0 CONCLUSIONS

The study was set out to explore what engineering consultancies and the purchasers of their service gain by ISO 9001 certification. The aim was as well to map a whole profession in one country by reaching employees of engineering consultancies that employee about 80 % of the engineering private sector in Iceland and to gain understanding of the context of the interaction between them and their customers. This was done by interviewing employees both of the engineering consultancies and employees of the purchasers of their service. Further information was obtained by using a survey conducted among employees of the engineering consultancies in question.

The most important finding of the study is that while the representatives and employees of the engineering consultancies in question are rather positive regarding the benefits of ISO 9001 certification, the purchasers of engineering consultancy cannot find significant difference between certified companies and non-certified. A few other defined questions were answered during the process.

Through interviews with quality managers and management of engineering firms the findings were that the driving force for the implementation ISO 9001 was pressure from the public sector; some had already started to look at QMS as a tool to keep perspective as the firms were growing; and that the interviewees are generally content with their Quality Management Systems. They feel that their QMS have for example made it easier to get projects both domestic and abroad, that it gives credibility stamp both with employees and customers and that the employees do not want to turn back to the time when there was no QMS.

Through a survey conducted among employees of these same engineering firms the finding was that the employees know the QMS fairly well, that they feel that the ISO 9001 certification enables them better to meet the needs of their customers, that the certification puts them ahead of their competitors and they think that it is very important for their firms to have ISO 9001 certification.

Through Interviews with representatives of large purchasers of engineering service the finding was that four out of five companies / organizations asked claim that they do not make any demands regarding QMS from engineering consultancies working for them, that it is not that important for engineering consultancies working for them to have a certified QM system and that it is more important for larger engineering consultancies to get ISO 9001 certification, for the smaller ones it is not that important.

7.0 Limitations and further research

The study has some limitations. Regarding all the interviews, it is inevitable that the answers received are the interviewees own perspectives on things. Other interviewees within the same firms/organizations might see the same things totally different. This applies to all the interviews used in the research. Regarding the survey conducted among employees of the engineering firms, the result only shows point position, that is it only shows the employees views towards thing as they are now. There is no comparison of their views before and after their firms acquired ISO 9001 certification. Regarding the interviews with representatives of purchasers of engineering service and looking at the questions, some of them are complex and have several sub-questions in them. This could result in that not all of the sub-questions are answered by all of the interviewees. The lines might have been clearer if the questions would have been simpler and shorter. The study population might also have been larger in those interviews to obtain more views. Questions to the representatives of the engineering consultancies about how they are monitoring customer satisfaction and how they are using the obtained data would have

been helpful. Likewise questions to the representatives of the clients about how they are performing their evaluation of suppliers.

Since employees of the engineering consultancies/firms and the purchasers of their service seem to have a different opinion of the quality of service provided, it could be interesting to gain further insight to that by researching two things:

- How the engineering firms are monitoring customer satisfaction and how they are using the data obtained to improve the service to the client.
- How the purchasers/clients of engineering consultancy, at least the ones with ISO 9001 certification, are performing their evaluation of suppliers.

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