

BAŞAK MANDERS

Implementation and Impact of ISO 9001



**IMPLEMENTATION AND IMPACT OF
ISO 9001**

Implementation and Impact of ISO 9001

Implementatie en effect van ISO 9001

Thesis

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Chapter 1.

Introduction

1.1. Research topic

With the increased global competition, organizations are forced to produce high quality products and continuously improve themselves to survive. There are many quality management approaches used by organizations to achieve these objectives such as lean management, Six Sigma, TQM, etc. The most common approach is ISO 9001. The ISO 9001 quality management standard has been implemented by more than one million organizations in 187 countries since its introduction in 1987. A newer version of ISO 9001 is planned to be introduced in 2015. Even though the standard is widely used by organizations to gain both operational and market benefits, the studies on the impact of ISO 9001 report mixed findings. A large body of literature reports positive impact. However, some studies reveal negative results. Therefore, the aim of this dissertation is to find out what are the impacts of ISO 9001, and to better understand the differences in the current literature. Even if we cannot give a full explanation, we want to contribute further insights about the various effects of ISO 9001. In the following subsections we will first introduce ISO 9001. Then, we will explain the research objective and questions. Finally, we will give an overview of this dissertation.

1.1.1. What is ISO 9001?

The aim of this sub-section is to provide an introduction to ISO 9001, its history, its aim, its requirements and its diffusion.

1.1.2. History of ISO 9000

The story of the ISO 9000 standards dates back to World War 2 (WW2). Before the war, it was customary for military authorities to inspect large military projects such as the building of war ships. With the increased demand for these ships in WW2, the ships had to be produced faster by building them in pieces first and then putting the pieces together at a later stage. These pieces had to be measured and controlled by military authorities; therefore the allied forces developed the first "MIL-SPECS" (Military Specifications).

After WW2, attention to organization's quality was added to the standards apart from product requirements and "MIL-Q9858" was introduced. This was the forerunner of "AQAPs": Allied Quality Assurance Publications. At a certain moment in time the NATO partners agreed for economic reasons that when they place an order from a member country, military authorities in that member country could supervise the production. The path to certification was created. In 1963, the first AQAP which provided requirements for contractual suppliers' organizations came into existence. When a company wanted to do business with the military, the organization's quality was first checked by a group of military staff. If the company in question met all the requirements, it received the AQAP certificate. This became a requisite for doing business with the military. It did not take long for civil bodies, certification organizations, to take over the inspection activities. Because of the positive experience with this quality assurance in military production, the civil side got interested in it: Why not apply the same approach in business-to-business environments? Standards were necessary for assuring quality; therefore some countries developed quality assurance standards based on the military AQAPs. Because of the continuous increase in cross-border trade, the necessity to have an internationally accepted set of criteria increased. This resulted in the ISO 9000 standards (van Bruggen et al., 2002).

1.1.3. ISO 9000 family of standards

The International Organization for Standardization (ISO) published the ISO 9000 series of standards in 1987. This series of standards “provide guidance and tools for companies and organizations who want to ensure that their products and services consistently meet customer's requirements, and that quality is consistently improved” (ISO, 2014c). These standards have been developed to guide organizations of all types and sizes to implement and operate effective quality management systems (ISO, 2005). Within this series of standards, the ISO 9000 family includes four different standards.

ISO 9001:2008 (ISO, 2008b) sets out the requirements for a quality management system where an organization can demonstrate its capability to deliver products and services that fulfil customer and regulatory requirements and aims to increase customer satisfaction (ISO, 2005; ISO, 2009c).

ISO 9000:2005 (ISO, 2005) describes fundamentals of quality management systems and explains the vocabulary used in the ISO 9000 family of standards. It aims to create a basic understanding of quality management described in ISO standards. Moreover, it introduces eight Quality Management Principles and the use of the process approach for continual improvement (ISO, 2005; ISO, 2009c).

ISO 9004:2009 (ISO, 2009a) gives guidelines on effectiveness and efficiency of a quality management system. It aims to help organizations in managing long-term success. It is recommended for organizations that are willing to extend the benefits gained from ISO 9001 and to systematically and continually improve the organization’s overall performance. It is used to extend benefits gained from ISO 9001 to the parties that are interested in or affected by an organization’s operations. These include employees, owners, suppliers, partners and society in general (ISO, 2005; ISO, 2009c).

ISO 19011:2011 (ISO, 2011) provides guidelines for internal and external auditing of quality management systems and environmental management systems. It includes information on the audit programs, how to conduct an internal or external audit, and auditor competence. It provides an outline of how an audit program should operate and how audits should be conducted (ISO, 2005; ISO, 2009c).

1.1.4. Principles of ISO 9000

ISO 9000 series of standards are based on eight quality management principles. These principles can be used by organizations as a framework to improve performance (ISO, 2012a).

Table 1.1. Eight quality management principles (ISO, 2005, p. v-vi)

| | |
|-------------------------------------|--|
| <i>Customer focus</i> | “Organizations depend on their customers and therefore should understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations.” |
| <i>Leadership</i> | “Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives.” |
| <i>Involvement of people</i> | “People at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit.” |

| | |
|---|--|
| <i>Process approach</i> | “A desired result is achieved more efficiently when activities and related resources are managed as a process.” |
| <i>System approach to management</i> | “Identifying, understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its objectives.” |
| <i>Continual improvement</i> | “Continual improvement of the organization's overall performance should be a permanent objective of the organization.” |
| <i>Factual approach to decision making</i> | “Effective decisions are based on the analysis of data and information.” |
| <i>Mutually beneficial supplier relationships</i> | “An organization and its suppliers are interdependent and a mutually beneficial relationship enhances the ability of both to create value.” |

1.1.5. Different versions of ISO 9001

Four different versions of ISO 9001 have been published by ISO until now. The 1987 version of the ISO 9000 series of standards included three standards for quality assurance: ISO 9001, ISO 9002 and ISO 9003. ISO 9001:1987 is the model for quality assurance in design, development, production, installation and servicing. ISO 9002:1987 is the model for quality assurance in production, installation and servicing. It is almost entirely identical to ISO 9001:1987 but it does not cover the creation of new products. ISO 9003:1987 is the model for quality assurance in only final inspection and testing. The second version of the ISO 9000 series was released in 1994. It stressed the importance of preventive actions. The third version combines ISO 9001, 9002 and 9003 into one standard, ISO 9001:2000. In this version a broader concept of quality management has been introduced. Improving customer satisfaction has become one of the performance measurements. Additionally it puts more emphasis on the process approach and on active involvement of management. ISO 9001:2008, the last version, is basically the same as the previous one. It aims to explain the existing requirements in a clearer way. In 2015, ISO is planning to release a new version of ISO 9001. The 2015 version focuses on the identification of risk and risk control. Moreover it requires top management to take a more active role in aligning quality policies with business needs (ISO, 2014d).

1.1.6. Introduction to ISO 9001:2008

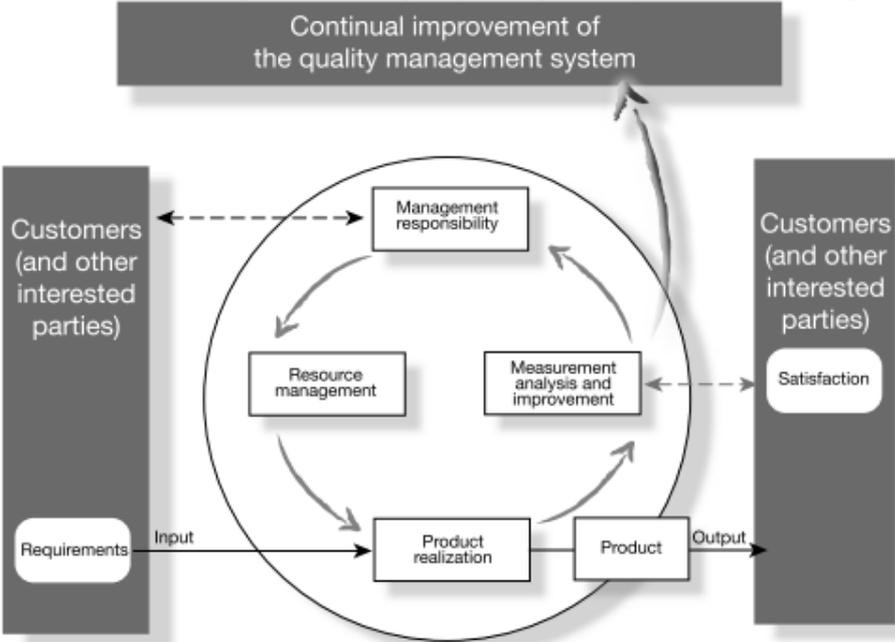
ISO 9001:2008 promotes the adoption of a process approach when developing, implementing and improving the effectiveness of a quality management system, to meet

customer requirements and enhance customer satisfaction. A “process” can be defined as a “set of interrelated or interacting activities, which transforms inputs into outputs” (ISO, 2008a, p. 3). Organizations need to identify and manage numerous linked processes to function effectively. The output of one process often forms the input of another process. “Process approach” is the “application of a system of processes within an organization, together with the identification and interactions of these processes, and their management to produce the desired outcome” (ISO, 2008b, p. v). ISO 9001 aims to encourage the adoption of a process approach.

The model of such a process-based quality management system is presented in Figure 1.1. The process approach helps organizations to control the linkages between processes and the interfaces between the functional hierarchies of the organization. This approach emphasizes the importance of (ISO, 2008b, p. v-vi):

- “Understanding and meeting requirements,
- the need to consider processes in terms of added value,
- obtaining results of process performance and effectiveness, and
- continual improvement of processes based on objective measurement.”

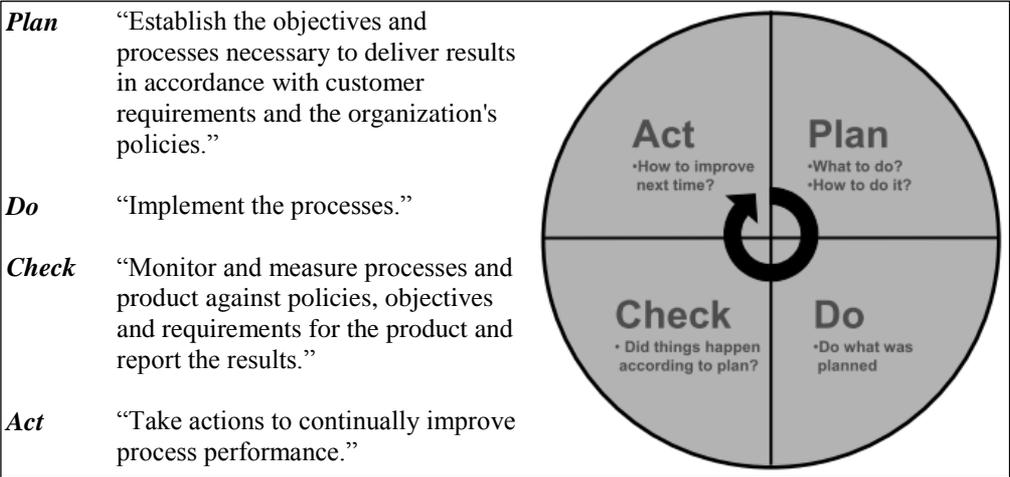
Figure 1.1. Model of a process-based quality management system (ISO, 2009c, p. 2)



Each process has customers and other interested parties, either external or internal, that have needs and expectations of the process. These interested parties provide inputs for the organization and define the expected outputs of the process. The organization should then gather data about process performance, in particular about the satisfaction of interested parties (in the case of ISO 9001: the customers). These data should be analyzed to decide if there is any need for corrective action or improvement. These activities require allocation of resources like materials and people. Inputs and outputs can be tangible (such as equipment or materials) or intangible (such as energy or information). The organization should make sure that all the processes are adding value to the organization and their objectives and scopes are well aligned. Effectiveness and efficiency of processes can be evaluated through internal or external reviews (ISO, 2008a).

In addition, the well-known “Plan-Do-Check-Act” (PDCA) can be used to define, implement and control corrective actions and improvements (ISO, 2008b). The PDCA concept can be applied to all kinds of processes from simple operational activities to high-level strategic processes (ISO, 2008a). See Figure 1.2 for a brief description of PDCA.

Figure 1.2. PDCA methodology (ISO, 2008a, p. 11)



1.1.7. Requirements of ISO 9001:2008

As mentioned before, all requirements of ISO 9001:2008 are intended to be applicable to all organizations, regardless of their type, size and products. ISO 9001:2008 specifies requirements for a quality management system where an organization (ISO, 2008b, p. 1):

- “Needs to demonstrate its ability to consistently provide product that meets customer and applicable statutory and regulatory requirements, and
- aims to enhance customer satisfaction through the effective application of the system, including processes for continual improvement of the system and the assurance of conformity to customer and applicable statutory and regulatory requirements.”

Clauses 4 to 8 of ISO 9001:2008 describe the requirements. Clause 4 indicates the general requirement for the quality management system. It requires organizations to establish, document, implement and maintain a quality management system and continually improve its effectiveness. Moreover, it requires organizations to have documented statements of a quality policy and quality objectives, a quality manual, documented procedures and records of some processes to ensure the effective planning, operation and control of processes.

Clause 5 describes requirements on management responsibility. It requires top management to provide evidence of their commitment to the development and implementation of the quality management system and to continual improvement of its effectiveness. Top management should make sure that customer requirements are determined and met to increase customer satisfaction. Top management is also responsible for the quality policy. Moreover, top management should make sure that measurable quality objectives are defined at relevant functions and levels within the organization. Furthermore, top management should ensure that responsibilities and authorities are determined and communicated. Finally, top management should review the quality management system at planned intervals.

Clause 6 states requirements on resource management. It requires organizations to identify and provide resources to implement and sustain the quality management system and continually improve its effectiveness, and to increase customer satisfaction.

Clause 7 describes requirements on product realization. It requires organizations to plan and develop the processes needed for product realization. Organizations should identify and review requirements related to the product. Organizations should also identify and implement effective arrangements for communicating with customers. They should plan and control the design and development of products. Moreover, organizations should make sure that purchased products conform to purchase requirements. Organizations

should evaluate suppliers and select suppliers based on these evaluations. Finally, organizations should monitor and measure equipment that is used to measure the conformity of product.

Clause 8 lists requirements on measurement, analysis and improvement. Organizations should measure customer satisfaction, quality management system processes, and characteristics of the product to make sure that product requirements have been met. Organizations should conduct internal audits at planned intervals. Organizations should make sure that nonconforming products are identified and controlled, and not delivered to customers. Organizations should determine, collect and analyze appropriate data to identify improvement opportunities. Finally, organizations should continually improve the effectiveness of the quality management system.

1.1.8. ISO 9001 audits and conformity assessment

Organizations can implement three types of conformity assessment. First party conformity assessment is conducted internally. ISO 9001 prescribes organizations to conduct internal audits at planned intervals to make sure that the quality management system is working. Based on their evaluation of their own system, organizations can present a self-declaration of conformity. Second party conformity assessment is conducted by customers. Customers may want to check the reliability of the quality management system at suppliers and audit organizations before they make their purchase decisions. On the other hand, organizations may invite their customers to audit the quality system. Third party conformity assessment is conducted by a third party, in most cases an independent certification body. Organizations are not required to be certified, but if they want, they may hire a certification body to give written assurance that they conform to the standard (ISO, 2014c). Table 1.2 demonstrates these three different conformity assessment options.

Table 1.2. Conformity assessment options (ISO, 2011, p. v)

| Internal auditing | External auditing | |
|------------------------------------|-------------------------------------|---|
| | Supplier auditing | Third party auditing |
| Sometimes called first party audit | Sometimes called second party audit | <ul style="list-style-type: none"> – For legal, regulatory and similar purposes – For certification |

Certification is “the provision by an independent body of written assurance (a certificate) that the product, service or system in question meets specific requirements”

(ISO, 2014a). The International Organization for Standardization does not issue any certification. Instead, certification can be obtained from a third party organization that is accredited by an accreditation body. Accreditation is “the formal recognition by an independent body, generally known as an accreditation body, that a certification body it operates according to international standards” (ISO, 2014a).

1.1.9. Costs of ISO 9001 certification

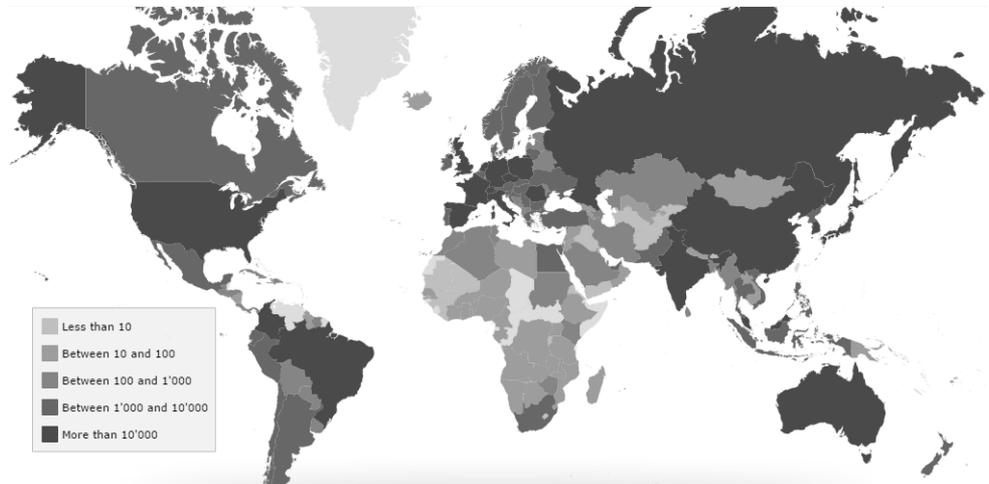
ISO 9001 certification cost has three components. First, organizations have to build up a quality management system. Second, organizations may want to have outside help and hire consultants. Third, organizations have to pay certification audit costs. The total costs are also dependent on the company size, number and type of products, and the existing state of the quality management system (Stevenson and Barnes, 2002). Especially, if the organization does not yet have a quality management system in place, building a system according to ISO 9001 costs time and thus money. According to the Quality Systems Update report, certification costs around US\$245,200 (Weston, 1995). Another survey study found that large organizations spend more than US\$1 million for certification. Smaller organizations (annual sales about US\$25 million) spend on average US\$250,000 and annual maintenance costs of more than US\$70,000 (Zuckerman, 1994). Gunnlaugsdóttir (2002) found in study conducted in Iceland that, on average, 5000 man-hours were needed to obtain certification. In total, certification costs approximately US\$133,000. This includes 53.8% for internal costs, 38.5% for consultants, and 7.7% for registration fees.

According to Stevenson and Barnes (2002), employee training costs US\$4,000 to US\$5,000 for a single site. A core group of employees receiving a one-day introductory training costs about US\$500 per person. Consultants cost around US\$800 to US\$1,600 per day. Registration costs are on average is US\$10,290, ranging from US\$3500 to US\$20,400. Registration costs could reach US\$40,000 for large companies. Surveillance over the 3-year period costs around US\$3,000 to US\$4,000 (ISO registration costs, 1994, as cited in Stevenson and Barnes (2002)). According to a study conducted by Casadesú and Karapetrovic (2005b) at 2002 in Catalonia, companies need a minimum of €8,500 annually to maintain the quality system.

1.1.10. Diffusion of ISO 9001

ISO 9001 has become an important global management standard for conducting business worldwide. Figure 1.3 shows the world distribution of ISO 9001 certificates in 2013. Up to the end of December 2013, more than one million certificates had been issued in 187 countries (ISO, 2013a).

Figure 1.3. World distribution of ISO 9001 certificates in 2013 (ISO, 2013b)



The ISO 9000 standards were initially based on the BS 5750 series of quality assurance system standards developed by the British Standards Institution (BSI). As a result, when the first certificates were issued in 1987, already 6,000 companies in Britain had BS 5750 certificates (Abdul-Aziz et al., 2000). BSI, with British government's support, played an active role in increasing ISO 9001's diffusion. European Union's recognition of ISO 9001 certification increased ISO 9001's diffusion in Europe (Anderson et al., 1999; Guler et al., 2002; Peach, 1995). When European firms started to impose the standard on their suppliers abroad, these foreign suppliers imported the standard into their own countries. Then they spread the standard to other firms in their own countries (Corbett, 2006). Overall, several coercive and cognitive mechanisms lead to global diffusion of ISO 9001. Coercive mechanisms include legal rules, sanctions, and market induced requirements. Cognitive mechanisms include popularity of ISO 9001, proclivities for formal organizational solutions like ISO 9001, and position in relation to others who have already adopted ISO 9001 (Mendel, 2002).

Figure 1.4. Number of ISO 9001 certificates per country (Drawn based on the numbers from ISO survey 2013 (ISO, 2013a))

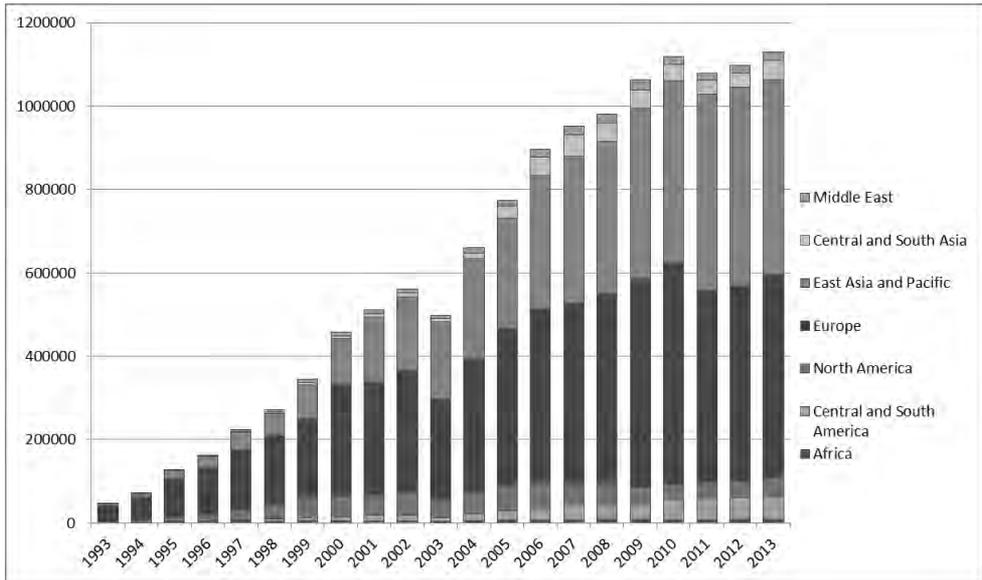
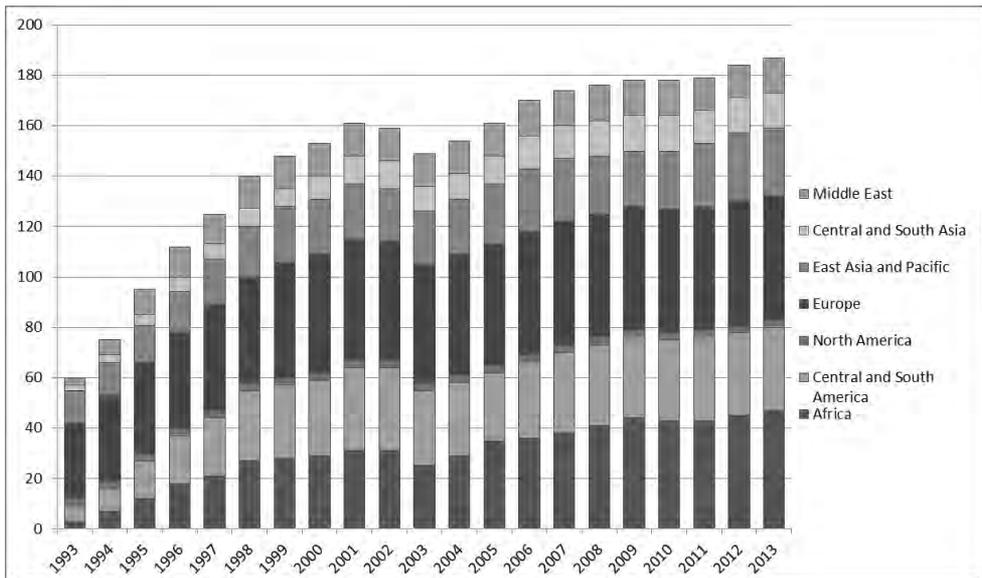


Figure 1.5. Number of countries / economies in which ISO 9001 is being used (Drawn based on the numbers from ISO survey 2013 (ISO, 2013a))



As shown in Figure 1.4 and Figure 1.5, the total number of certifications and the number of countries that issued certifications continue to increase. There is an exceptional

decrease in the numbers in year 2003, which can be explained by the changes made in the standard. When the ISO 9001:2000 version was introduced, companies were given three years to adapt their quality management system to the new version of the standard. Since the requirements of the standard were tightened, it is possible that some companies had difficulties in complying with the new standard and lost their certification.

The top three countries for the total number of certificates issued in 2013 were China, Italy and Germany. The top three countries for growth in the number of certificates in 2013 were Italy, India and USA. These numbers are presented in Table 1.3 and Table 1.4.

Table 1.3. Top 10 countries for ISO 9001 certificates in 2013 (ISO, 2013a)

| Order | Country | Number of certificates |
|--------------|----------------|-------------------------------|
| 1 | China | 337033 |
| 2 | Italy | 160966 |
| 3 | Germany | 56303 |
| 4 | Japan | 45990 |
| 5 | United Kingdom | 44585 |
| 6 | Spain | 42632 |
| 7 | India | 40848 |
| 8 | USA | 34869 |
| 9 | France | 29598 |
| 10 | Brazil | 22128 |

Table 1.4. Top 10 countries for ISO 9001 growth in 2013 (ISO, 2013a)

| Order | Country | Number of certificates |
|--------------|-----------------|-------------------------------|
| 1 | Italy | 23975 |
| 2 | India | 12248 |
| 3 | USA | 8692 |
| 4 | Germany | 4602 |
| 5 | Australia | 3938 |
| 6 | Colombia | 3510 |
| 7 | China | 3163 |
| 8 | Taipei, Chinese | 2578 |
| 9 | Indonesia | 2498 |
| 10 | Greece | 2497 |

1.2. Research objective and questions

As described in the previous sub-section, ISO 9001 certification has been obtained by more than one million organizations in 187 countries. Despite its widespread adoption, the question remains if companies can really achieve the benefits they expect. To answer this question, researchers have examined the impacts of ISO 9001 certification, since the first

companies started implementing the standard. Unfortunately, after 25 years of research there is still a lack of consensus about the impacts of ISO 9001 certification.

A large body of literature reports positive effects of ISO 9001 certification on different performance measures. For example, Naveh and Marcus (2005) conducted a survey study in 924 organizations and found that the use of ISO 9001 in daily practice and as a catalyst for change is positively related to operating performance and business performance. However, a few studies find evidence pointing towards negative effects of the certification. Yeung et al. (2011) conducted a longitudinal study with 185 pairs of manufacturing companies in the United States. They demonstrated that ISO 9001 certification had a significant negative impact on return on assets, especially in the first two years after certification. Yet at the same time, some studies indicated that an ISO 9001 certificate does not lead to any substantial changes in business performance. For example, Martínez-Costa et al. (2009) surveyed 713 companies in Spain to explore the impacts of two different versions of the standard, ISO 9001:1994 and ISO 9001:2000. They found out that ISO 9001:1994 certification had a significant positive effect only on flexibility and ISO 9001:2000 certification had a significant positive effect on design quality and a negative effect on fast delivery. However, they indicated that even if the effects were significant, the effects sizes were very small, therefore they could be ignored.

Even though there are many studies available, these examples of empirical studies show a lack of agreement among researchers about the relationship between ISO 9001 certification and business performance. Despite the fact that empirical studies do not agree on the benefits of the certification, firms still continue to allocate resources to acquire or retain certification. Therefore, in Chapter 2 we try to draw generalizable conclusions about the relationships between ISO 9001 certification and financial performance by using meta-analysis. This chapter contributes toward answering the following research questions: To which extent does ISO 9001 certification impact firms' financial performance? Are there any moderating factors that influence the relationship between ISO 9001 certification and financial performance?

Even though there are 187 countries in which companies obtained ISO 9001 certification, most of the studies about the impact of ISO 9001 are based on data collected from companies located in a single country. We think that the national differences can

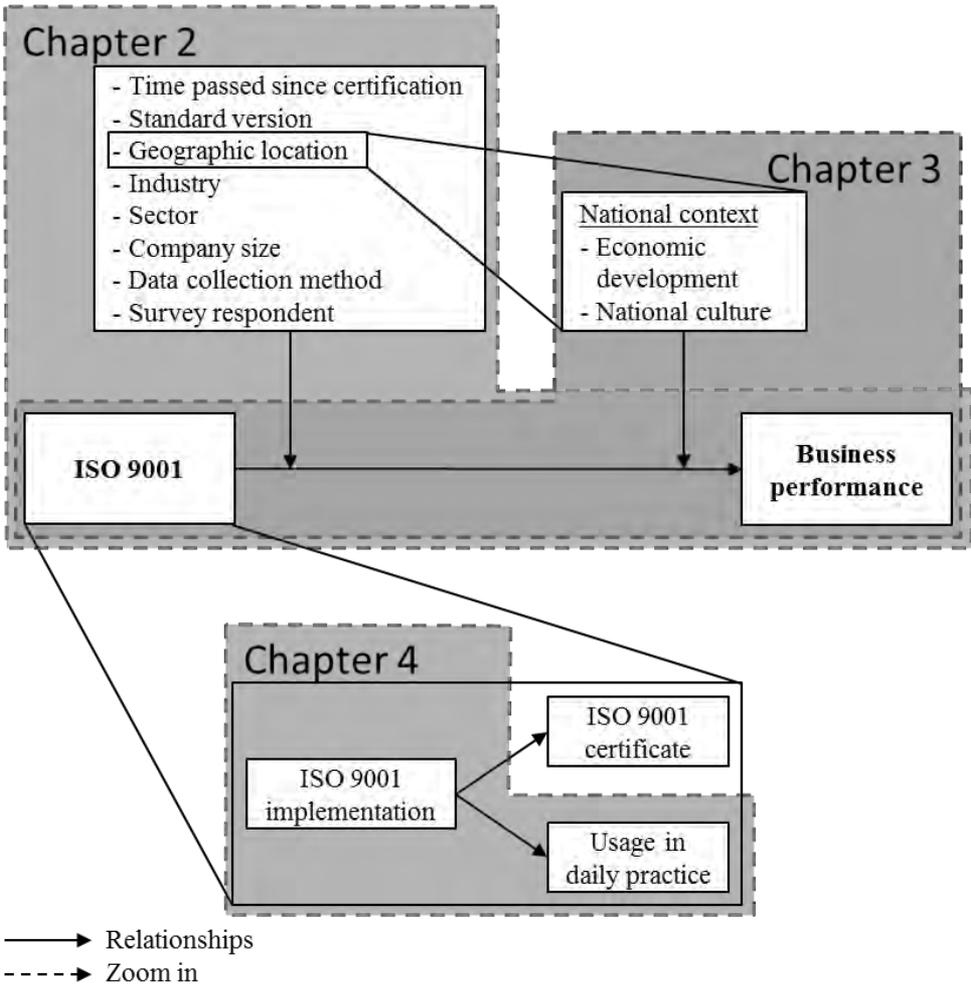
potentially explain some of the mixed results. Moreover, scholars have also questioned the global applicability of management theories. Zhao et al. (2006, p. 466) note, “although most management theory was developed in the Western hemisphere, it is often assumed to be universally applicable.” ISO 9001 also aims to be globally applicable (ISO, 2014b). Therefore, in Chapter 3 we investigate the performance benefits of ISO 9001 worldwide and whether national differences can explain the mixed impact of ISO 9001. Since it is difficult to collect large scale data from different countries, we use again a meta-analysis method to analyze (existing) data from 24 countries. This chapter contributes toward answering the following research questions: 1. Do organizations in different countries benefit differently from ISO 9001 implementation? 2. How do national differences affect ISO 9001 performance? Specifically, do national culture and economic development of a country affect the performance of ISO 9001?

In Chapter 2, we discuss that differences in benefits reaped might be explained by the extent to which companies use ISO 9001 in their daily operations. Companies might have ‘real’ systems according to the requirements and principals of the standard, more rigid systems (focusing on control but less on improvement) or systems that hardly function in practice (‘window-dressing’), with all kinds of options in-between these three extremes. Some studies indeed found that companies adopt the ISO 9001 standard at different levels. However, the literature still assumes that implementation in a company is either real or window-dressing. The ISO 9001 standard specifically requires involvement of employees in the quality management system, but even if a company implements the standard substantially, there may be some employees who are not actually using the standard in their daily activities. Yet there is no study actually studying the antecedents of employee involvement in an ISO-9001-based QMS. Therefore, in Chapter 4 we investigate employee participation in ISO-9001-based QMS by using an exploratory case study method and provide a theoretical framework for both academics and practitioners. This chapter contributes toward answering the following research questions: Under what conditions do employees get involved in ISO 9001? More specifically we investigate: Under what conditions do employees get involved in standardized work practices and continuous improvement practices related to ISO 9001?

1.3. Research overview

After this chapter, Chapter 2 provides an examination of the relationship between ISO 9001 certification and a company's business performance by means of meta-analysis, and aims to find the true effects of certification. It also examines the impact of some theoretical and methodological moderators on ISO 9001 - business performance relationship. This chapter, co-authored by Henk de Vries and Knut Blind, is submitted to a journal. Chapter 3 presents a meta-analysis to investigate the benefits of ISO 9001 worldwide and the role of national culture and economic development. This chapter is joint work with Henk de Vries and Kevin Linderman, and is submitted to a journal. Since Chapters 2 and 3 are both about the impact of ISO 9001 certification and they both use meta-analysis method, there are some overlaps between these two chapters. Chapter 4 examines the question under what conditions employees get involved in standardized work practices and continuous improvement practices related to ISO 9001 by using an exploratory case study methodology. This chapter, co-authored by Kevin Linderman and Henk de Vries, is being prepared for submission. Finally, Chapter 5 discusses the findings and provides future research ideas. Figure 1.6 illustrates the structure of the dissertation.

Figure 1.6. Research overview



Chapter 2.

Impact of ISO 9001 certification on financial performance: A meta-analysis

Abstract

The ISO 9001 standard for quality management has been implemented by more than one million organizations worldwide and has received considerable attention in management research. However, findings in the literature about the impact of ISO 9001 certification on financial performance are not consistent. Some studies show positive effects, some report neutral or mixed impacts, and some even identify negative effects. This study examines the relationship between ISO 9001 certification and a company's financial performance by means of meta-analysis, and aims to find the true effects of certification. An in-depth analysis of 92 studies spanning from the first publication of ISO 9001 in 1987 to 2012 gives evidence that ISO 9001 certification helps companies to increase their revenues. However, it does not necessarily decrease their costs, improve their overall financial performance or increase their stock market value. Moderator analyses prove the existence of substantive moderators such as the length of the period since certification, standard version, geographic location, industry sector, and company size. It also shows that methodological moderators apply when studying the relationship between ISO 9001 certification and financial performance. More specifically, we find that results based on surveys and those based on perceptions of quality managers are positively biased. We develop a conceptual model to interpret our findings and to guide further research.

Keywords: ISO 9001; Company performance; Meta-analysis

2.1. Introduction

In 1987, The International Organization for Standardization (ISO) published the ISO 9000 series of standards for quality management, based on earlier military (e.g., MIL-Q9858) and British standards (BS 5750) (Zeng et al., 2005). ISO 9001 offered a set of standards that provided a framework for quality management from manufacturing to delivery. For many firms, the ISO 9001 standards have provided the method to meet the demands of

global competition. Although acquiring ISO 9001 certification can be quite expensive, many firms still see it as a worthwhile investment that will bring significant returns via increasing sales and decreasing costs.

Meanwhile, ISO 9001 has been implemented by over one million organizations in 187 countries (ISO, 2013a). Despite widespread global adoption of the certification, the question remains if companies can really achieve the benefits they expect. To answer this question, researchers have examined the impacts of certification since the first companies started implementing the standard. Unfortunately, after 25 years of research there is still a lack of consensus about the financial impacts of ISO 9001 certification.

A large body of literature reports positive effects of ISO 9001 certification on different performance measures. For example, Naveh and Marcus (2005) find that the use of ISO 9001 reduces quality costs and increases annual sales and profit margins. However, a few studies find evidence of the negative effects of certification. For example, Yeung et al. (2011) show that certification has a significant negative impact on return on assets, especially in the first two years. Despite the fact that studies do not agree on the benefits of the certification, firms still continue to allocate resources to acquire or retain certification. Given the importance of ISO 9001 among practitioners, and its significance in operations management research, additional research is necessary to gain a generalized understanding of the relationship between ISO 9001 certificate and financial performance.

There are several methods to conduct research into this relationship. One is a replication study. However, there are already many studies about the link between ISO 9001 and financial performance. Therefore, a replication study would only add to the pile of existing conflicting conclusions. Another option is to conduct a literature review. Most of the previous literature reviews have been qualitative (Psomas and Fotopoulos, 2009; Rusjan and Alič, 2010; Sampaio et al., 2009). However, due to the large number of existing studies and the diverse design, context, and measurement of these studies, qualitative integration of research findings may lead to imprecise syntheses (Hunter and Schmidt, 2004). A recent paper by Boiral (2012a) is the first paper that reviews the literature quantitatively, but it does not go beyond reporting the percentage of studies that found a positive effect of certification. Meta-analysis is an alternative method. It allows researchers to critically examine and integrate research findings across different studies

quantitatively. However, the use of meta-analysis is still limited, although it is increasing in the management field (Capon et al., 1990; Carney et al., 2011; Chen et al., 2010; Crook et al., 2008; Gooding and Wagner III, 1985; Stahl and Voigt, 2008; Wu and Lederer, 2009). Our study is the first comprehensive, large-sample and meta-analytic review about the impact of ISO 9001. It aims to draw generalizable conclusions about the relationships between ISO 9001 certification and financial performance.

Specifically, the meta-analysis in this paper contributes toward answering the following research questions: To which extent does ISO 9001 certification impact firms' financial performance? Are there any moderating factors that influence the relationship between ISO 9001 certification and financial performance? Answering these questions is important for several reasons. First, given the undecided debate among researchers, it is crucial to better understand the interaction between ISO 9001 certification and financial performance, and other factors that may impact this relationship so that we can achieve a generalized understanding of this relationship and develop an agenda for future research on this topic. Second, since ISO 9001 has been implemented by over one million companies worldwide, it is important for these organizations, as well as for companies wishing to implement ISO 9001 in the future to know if and how they can achieve increased financial performance.

The remainder of the paper is organized as follows. The next section extensively reviews the relevant literature. Section 3 describes the meta-analysis research method and the procedure for conducting the meta-analysis. The results of the meta-analysis are presented in Section 4. In Section 5, we discuss our findings and in the last section, we conclude and discuss managerial and theoretical implications.

2.2. Literature review and hypotheses formulation

The literature on ISO 9001 started to emerge at the end of 1980s and much has been written in journal articles since then. A large body of literature finds a direct positive relationship between ISO 9001 and financial performance (Dick et al., 2008; Lima et al., 2000; Martínez-Costa et al., 2009). However, other studies do not consistently support the existence of benefits from ISO 9001 certification. A few studies reveal a negative relationship (Aarts and Vos, 2001; Yeung et al., 2011). Some report that ISO 9001 has no significant effects on financial performance (Dick et al., 2008; Lima et al., 2000; Martínez-

Costa et al., 2009; Sila, 2007) and others identify mixed results (Benner and Veloso, 2008; Nwankwo, 2000; Singels et al., 2001; Terziovski and Power, 2007; Yahya and Goh, 2001), with some companies benefiting and others not, or some showing positive results for some financial indicators and not for others.

The ISO 9001 standards provide guidelines to help organizations regardless of their type, size and product range to consistently provide products that meet customer and statutory and regulatory requirements, and to enhance customer satisfaction through continuous improvement. By conforming to these guidelines, companies are expected to increase their productivity, efficiency, product quality, customer satisfaction and therefore their financial performance, and indeed this is what several researchers have found (Corbett and Kirsch, 2005; Heras et al., 2002; Terlaak and King, 2006). Therefore, our first hypothesis is:

H1. ISO 9001 certification leads to higher financial performance.

Besides examining the effect of the ISO 9001 certification on overall financial performance, it is also important to investigate where these possible financial benefits may come from. The literature (Benner and Veloso, 2008; Sharma, 2005) gives two different explanations of how ISO 9001 certification could lead to higher financial performance. According to the first explanation, performance improvements arise from internal developments. Certification is expected to boost learning and development among employees (Rusjan and Alič, 2010). More specifically, it increases the qualifications of employees, the dissemination of knowledge among employees, the commitment of employees to quality and continuous improvement, and consequently it improves the work motivation of employees. Certification is also expected to improve processes (Rusjan and Alič, 2010). Particularly, it enhances the clarity of procedures by well-defined and documented processes, clear task responsibilities, and documentation of results. It also improves quality planning, control and decision making, reduces non-conformities, rework and scrap, and improves the handling of non-conformities. Hence, it improves productivity, process effectiveness, and product or service quality. These impacts together are expected to decrease operational costs. Accordingly, we develop our second hypothesis:

H2. ISO 9001 certification leads to lower costs.

According to the second explanation, performance improvements arise from external developments. Companies apply for ISO 9001 certification not only to improve their internal operations, but also to increase their competitive advantage in the market. Besides internal motivation, customers' expectations (Santos and Escanciano, 2002), contractual requirements (Brown and van der Wiele, 1995), legislation (Terziovski et al., 2003), and public procurement policies (Brown and van der Wiele, 1995) may lead companies towards certification. Furthermore, pressure to follow certified competitors (Gotzamani and Tsiotras, 2002) may motivate companies. ISO 9001 certification requires firms to focus on customers and their needs. This should improve customer satisfaction, lead to a better company image, and should help to retain existing customers and to acquire new ones (Rusjan and Alič, 2010). Additionally, the effects of the certification on increasing revenues can be explained by signaling theory. A famous example of signaling theory (Spence, 1973) is that college diplomas help to distinguish high productivity job applicants from low productivity ones, independently of whether students have learnt anything while attending college. ISO 9001 certification may work in the same way and act as a market signal. Many markets are characterized by information asymmetry in the sense that customers often lack full knowledge about the characteristics of the product and its supplier (Blind, 2004; Terlaak and King, 2006). Quality standards like ISO 9001 can partly solve this problem. They help to distinguish companies that guarantee a stable product quality from companies that might be less reliable in this sense. Consequently, an ISO 9001 certified company may be able to gain an advantage vis-à-vis its non-certified competitor (Terlaak and King, 2006). This competitive advantage is expected to increase companies' revenues. We therefore hypothesize that:

H3. ISO 9001 certification leads to higher revenues.

Last, investors are known to value certification. First of all, increased revenues and cost savings could pass along to consumers and investors (Docking and Downen, 2009). Second, besides expected internal and external benefits, certification also shows that the company has been approved by an independent third party. This shows the market that the company meets the requirements of a widely accepted international standard, and therefore will also fulfill the requirements of its stakeholders (Beirão and Cabral, 2002). We therefore hypothesize that:

H4. ISO 9001 certification leads to higher stock market value.

The inconsistent results about the relationship between ISO 9001 certification and financial performance have led researchers to look for moderating variables. Scholars have considered the following factors to influence the link between ISO 9001 and financial performance: the industry in which the firm operates (Quazi et al., 2002), firm size (Yeung et al., 2003), the version of the standards (van der Wiele et al., 2005), the time passed after the certification (Terziovski et al., 2003), implementation process (Arauz and Suzuki, 2004), auditing style (Poksinska et al., 2006), management commitment (Terziovski and Power, 2007), motivation (Huang et al., 1999; Llopis and Tarí, 2003), being first or second mover (Martínez-Costa et al., 2009), and the existing quality culture (Lee et al., 2009).

Beside these moderating variables, researchers have also examined mediating variables that are considered to have an indirect effect on performance through their influence on ISO 9001 implementation. These include learning (Linderman et al., 2004; Naveh et al., 2004), an advanced quality management system (Romano, 2002) and internalization of the standard, in other words, usage of the standard in daily practices (Naveh and Marcus, 2004; Sroufe and Curkovic, 2008).

We also analyze the existence of some theoretical and methodological moderating variables in this study. Specifically, in terms of theoretical moderators, we examine the effects of short and long term measurement of the impact of the certification, the version of the standard, geographic location, the sector the company is operating in and the size of the company. In addition to the substantive moderators suggested by ISO 9001 theory, several methodological moderators might also explain the variance in findings about the relationship between ISO 9001 and financial performance. The first methodological variable is the data collection method. It is related to whether the data is collected from surveys and depends on respondents' perception, or whether it is collected from databases and depends on more objective measures. The second methodological moderator is the role of survey respondents in the company. As a conclusion we develop the following hypothesis:

H5. *The relationship between ISO 9001 certification and firms' financial performance is influenced by moderating factors.*

This overview of empirical literature shows a lack of conformity among researchers about the direct and indirect relationship between ISO 9001 certification and financial performance. We need to analyze the research findings meta-analytically to obtain more generalizable conclusions.

2.3. Research method

2.3.1. Quantitative integration of research findings

Different methods can be used to integrate research findings across studies (Hunter and Schmidt, 2004). Qualitative methods are the most commonly used option, whereby the results of the studies are taken at the face value and the reviewer brings findings together (Hunter and Schmidt, 1990). According to Hunter and Schmidt (1990), qualitative methods are too flexible, unsystematic, can be easily biased by the reviewers, and are imprecise, because the studies differ in terms of design, context, and measurement measurement (Damanpour, 2010; Hunter and Schmidt, 1990). Another method is to integrate the research findings by using quantitative methods, whereby a systematic integrating procedure is used. However, Hunter and Schmidt (1990) question the effectiveness of pulling out information and bringing out the cumulative weight of prior studies. For instance, some quantitative studies analyze the general research characteristics like methods, themes, procedures and count them to outline a research topic without examining the relationship between constructs (Das and Handfield, 1997). Other quantitative studies categorize positive, negative and non-significant relationships between variables, and then calculate the mean number of these relationships (White, 1996). However, such methods do not allow effect sizes to be incorporated and sample variances to be corrected. Meta-analysis does not have these disadvantages and allows us to better integrate current research findings on the financial impacts of ISO 9001 certification in a quantitative way.

Meta-analysis was founded by Glass (1977) and can be defined as “the quantitative cumulation and analysis of effect sizes and other descriptive statistics across studies” (Hunter and Schmidt, 1990). Meta-analysis helps to obtain more reliable and valid conclusions, because besides the direction of the relationship, effect sizes, samples sizes and error values are also taken into account. Effect size statistics are the indexes given in studies to represent the results. They indicate the strength of the relationship analyzed in a study. The effect sizes given in the studies could be used directly to estimate the

distribution of actual effects if the studies are conducted perfectly (Glass, 1977). However, empirical research is vulnerable to errors of different types, also known as “artifacts”. Therefore, it is important to find out how these artifacts affect the results and what the relationships would be like without those artifacts (Hunter and Schmidt, 2004). The most commonly observed artifact is the sampling error. Sampling error could be reduced by replication studies, but meta-analysis alone also helps to improve estimations of the population. Hunter and Schmidt (2004) explain that the reason for this is that the sampling errors of individual studies cancel one another, and the average sampling error approximates to zero when studies are integrated by using meta-analysis techniques.

For aforementioned reasons, general patterns of causality can be identified and the cumulative knowledge base can be improved by using meta-analysis (Hunter and Schmidt, 2004). It has been widely used by scholars to systematically analyze the existing empirical literature and to extend theory, since it does not require access to original study data (Camisón-Zornoza et al., 2004; Chen et al., 2010; Damanpour, 1991; Gerwin and Barrowman, 2002; Mackelprang and Nair, 2010; Montoya-Weiss and Calantone, 1994; Nair, 2006). There are several meta-analysis procedures available (Cooper, 2009; Hunter et al., 1982; Lipsey and Wilson, 2001). The meta-analysis of correlation method developed by Hunter and Schmidt (2004) is the most commonly used one. However, the literature about the impact of ISO 9001 mostly reports other effect sizes than correlations (such as arithmetic means and proportions). Therefore, we will use the method developed by Lipsey and Wilson (2001), since it fits better for the kind of analysis we need, and it has recently been applied by several researchers (Angeli et al., 2008; Carney et al., 2011; Ellis, 2006; Stahl and Voigt, 2008). The sampling and coding procedures and the information regarding the meta-analytic procedures used in this research will be explained in the next three subsections.

2.3.2. Sampling

Empirical studies about the impact of ISO 9001 on business were collected in four steps. First, we conducted a detailed computer search of Business Source Premier, ABI/INFORM Global and Scopus databases for peer reviewed scholarly journal articles. Conference papers and dissertations were not included. We searched for the terms ((impact OR value OR factor OR benefit OR performance OR affect OR effect) AND ("ISO 9000" OR "ISO

9001")) in the titles, keywords or abstracts of the articles. The studies are in the English language only, and the period covered is from 1987 to present (April 2012). We also searched the top 10 journals¹ which published the highest number of articles about the impact of ISO 9001 to catch the studies which had already been published in the journal but not yet included in databases. Additionally, we searched primary academic journals in the area of management. We selected the top journals in this category according to their 5-year impact factor in Thomson Reuters and chose the top 20 journals² which are likely to publish research on ISO 9001. The lists represent a reasonably comprehensive approach to locate relevant studies related to ISO 9001. We found 1347 articles.

Second, we examined abstracts and titles of these 1347 candidate studies to identify the related articles. We selected articles that empirically investigate the relationships between ISO 9001 and business performance and eliminated papers that were conceptual, analytical, based on anecdotal evidence or based on a single case study as these are not fit for meta-analysis. We found 290 relevant articles. We did not have access to the full text of 12 of these articles. We contacted the authors to ask for the full text and we received six.

In the next step, we examined each paper carefully and eliminated papers that did not fit the previously mentioned criteria. We also eliminated comparative case studies that only report qualitative data. If there was more than one publication based on the same data set or the same sample, we included only the one with more complete results to maintain the assumption of independence. The application of these criteria reduced the number of articles in our sample to 172.

Lastly, we investigated each of these 172 papers to identify if it contained adequate information required for the meta-analysis. We extracted information about the sample size, reliabilities of dependent and independent variables, and the relationship between

¹ The TQM Journal (The TQM Magazine), The International Journal of Quality & Reliability Management, Total Quality Management and Business Excellence (Total Quality Management), Managing Service Quality, Managerial Auditing Journal, International Journal of Production Economics, International Journal of Productivity and Performance Management, Business Process Management Journal, Accreditation and Quality Assurance, International Journal of Production Research

² Academy of Management, Academy of Management Annals, Academy of Management Review, Administrative Science Quarterly, Decision Sciences, Information & Management, International Journal of Management Reviews, Journal of International Business Studies, Journal of Management, Journal of Management Information Systems, Journal of Management Studies, Journal of Operations Management, Journal of Supply Chain Management, Management Information Systems Quarterly, Management Science, Omega-International Journal of Management Science, Organization Science, Project Management Journal, Research Policy, Strategic Management Journal

independent and dependent variables. Some studies reported partial information. We sent an e-mail request and a reminder to the authors to obtain the missing information. Specifically, there were 101 studies with missing information and we were able to contact the authors of 99 of them. We received six mail delivery error messages. Additional information was obtained for eight studies. If a study missed the reliability information and could not be obtained from the author, it was substituted by average reliabilities reported across all studies, as previous studies have done (Mackelprang and Nair, 2010). Overall, we obtained relevant information for 92 articles that formed the sample for this meta-analysis study. This sample size is comparable with other meta-analysis studies (Mackelprang and Nair, 2010; Nair, 2006). Appendix A lists the articles included in our analysis.

2.3.3. Coding

2.3.3.1. Variables

The literature shows a diversity of research methods and even within one method the exact measures used to represent the constructs are somewhat different across studies. However, it is still reasonable to include these operationalizations in a meta-analysis if they are in line with the specific hypotheses, theories and research synthesis objective (Cooper, 1998). Glass (1977) states that there is nothing wrong with mixing apples and oranges if the interest of the study is fruit. Using such different operationalizations within a single meta-analysis is called multiple operationism and can be defined as the use of many measures that share a conceptual definition “but have different patterns of irrelevant components” (Webb et al., 1981, p. 35). It is important to use multiple operationism, because narrow concepts do not provide enough information about generalizability or robustness of the results. Hence, “the greater the conceptual breadth of the definitions used in a synthesis, the greater its potential to produce conclusions that are more general than synthesis using narrow definitions” (Cooper, 1998, p. 37). In line with these recommendations, we have included different operationalizations of ISO 9001 certification and financial performance within the scope of this study.

First of all, the studies differ in terms of their designs. Some studies compare the financial status of companies after being certified and their status before the certification. Other studies compare the financials of certified firms with those of non-certified firms. In

this meta-analysis, we address both types of study designs, and present the results separately. Second, some studies use binary variables to indicate if a firm acquired certification or not, whereas other studies use interval variables and determine the years passed after registration. In the second case, the variable is zero until first certification, and then takes successive values of 1, 2, 3, etc., for following years. In this meta-analysis, we take both measures into account.

Both direct and indirect indicators are included to represent the depend variables. Overall financial performance is conceptualized in terms of: profitability (e.g., return on assets, return on investments, return on equity, profit margin, earnings per share), profit (e.g., operating income, economic value added, earning before taxes), vulnerability to risks (e.g., debt to equity), productivity (e.g., sales per employee) and efficiency (e.g., total assets turnover, assets per employee, fixed asset ratio). Stock market value is measured separately from overall financial performance as it reflects investors' perception of the value of companies.

The costs construct is conceptualized in terms of: production costs (e.g., production efficiency, waste reduction), quality costs (e.g., inspection costs, warranty costs, rework costs, prevention costs), inventory costs (e.g., inventory turns, inventory levels), delivery costs (e.g., delivery speed), and overall costs (e.g., management costs, operation costs, personnel costs, documentation costs).

The revenues construct is conceptualized in terms of: market share (e.g., domestic market share, international market share), sales (e.g., domestic sales, international sales, customer satisfaction, company image) and revenue (e.g., cash flow, earning growth, revenue).

Studies also differ in terms of how they measure the moderating variables. The short-term effect of certification is coded as up to one year after certification for stock returns and up to two years after certification for other dependent variable measurements. We chose a one year period for stock market value, since stakeholders are expected to react to certification information in a short time period. The long-term effect of certification is coded as one or more years after certification for stock returns, and two or more years after certification for other dependent variable measurements.

Studies are coded under three categories, based on the version of the standard used for certification. These categories are: companies certified with new versions of the standard (2000 or 2008), companies certified with old versions of the standard (1987 or 1994) and companies certified with mixed versions (1994 or 2000). In the last case, if a study reported the effects of different versions of the standard separately, we coded them separately. It is important to distinguish the latest two versions from the oldest two versions, since the old versions focus more on control, whereas the new versions pay more attention to continuous improvement, customer satisfaction and management involvement.

In terms of geographic regions, North America includes studies conducted in Canada and the US, South America includes studies conducted in Brazil, Asia includes China, India, Japan, Korea, Malaysia, Pakistan, Singapore, Taiwan and Thailand, Central/East Europe includes Lithuania and Slovenia, North/West Europe includes Ireland, the Netherlands, Sweden and the UK, South Europe includes Greece, Italy, Portugal, Spain and Turkey, and finally the Middle East includes Egypt, Jordan, Lebanon, Saudi Arabia, the Sultanate of Oman, and the United Arab Emirates.

In terms of sectors, manufacturing, agribusiness, food and textile companies are coded as manufacturing sector. Service, consultancy, design, education, hospitality and sport companies are coded as service sector. The size of the company is coded as either large, or small and medium. We did not look at the actual size of the companies, but we took the information as it was reported in the studies.

We code the data collection method as database or survey. Finally, the role of the respondent in the company is coded as quality managers, middle managers or senior managers. Unfortunately, the effects of other potential moderators such as motivation, certification maturity and the effects of potential mediators such as learning and internalization cannot be examined, as there were fewer than five studies that address these constructs.

2.3.3.2. Effect sizes

Studies also differed in terms of the type of the effect size they used to represent the relationship between ISO 9001 certification and financial performance. When studies use different types of statistics, it is not possible to analyze them together quantitatively. Additionally, the type of effect size statistics chosen for the meta-analysis should be

suitable to the nature of the relationship described in the given study (Lipsey and Wilson, 2001). For these reasons, we coded different types of effect size statistics according to the study designs, and we analyzed the different effect size statistics separately.

The first effect size is standardized mean gain values measured in terms of standardized Cohen's *d*. Cohen's *d* represents the observed effect size measure divided by the standard deviation. In this case, we compare business performance values before and after certification. A value above 0 represents that average business performance is better after certification than before certification, whereas a value below 0 represents that average business performance is better before certification than after certification. Additionally, Cohen's *d* values of .20, .50 and .80 respectively correspond to small, medium, and large positive effect sizes (Cohen, 1992). Cohen (1992, p. 156) explained that a small effect is "noticeably smaller than medium but not so small as to be trivial," a medium effect is "an effect likely to be visible to the naked eye of a careful observer," and a large effect is "the same distance above medium as small was below it."

The second effect size is proportions. For example, what percentage of the respondents in a study indicated that their market share increased after certification? In the case of proportion statistics, we examined whether the majority of the companies benefit from certification. In other words, if the mean effect size value is above 0.5, we conclude that the effect is positive and vice versa. The effect size values of .55, .65 and .75 respectively correspond to small, medium, and large positive effect sizes (Cohen, 1992). Additionally, if the confidence intervals do not include the value 0.5, we conclude that the effect is statistically significant.

The third effect size is the arithmetic mean values. Many studies report an average mean value on a Likert scale. We converted these values to a scale from 1 to 5 where 1 represents a performance much worse than before, 3 represents a performance that did not change and 5 represents a performance much better than before. Therefore, an effect size value between 3.0 and 4.0 can be seen as a small positive effect, whereas an effect size between 4.0 and 5.0 corresponds to a large positive effect. We examined whether the average value is below or above the value 3. If the confidence intervals do not include the value 3, we conclude that the effect is statistically significant.

The fourth effect size is standardized mean difference values again measured in terms of standardized Cohen's *d*. This effect size is used to compare the business performance of certified companies and non-certified companies. A value above 0 represents that certified companies, on average, have a higher business performance than non-certified companies.

2.3.4. Meta-analysis procedure

The meta-analytic procedures that are used in this study are based on Lipsey and Wilson (2001) and can be found in Appendix B. The meta-analysis was conducted in three stages: main effects testing, moderator existence testing, and moderating effects testing. First, we calculated the fixed effect size statistics, standard errors and inverse variance values by using the formulas F1-F4 (See Appendix B). Second, we calculated the mean effect sizes across studies weighted by sample sizes using F5. Third, we calculated the standard errors of the mean effect sizes using F6. Fourth, we computed the 95% credibility intervals around mean effect sizes using F7 to test the precision of the mean effect sizes. Finally, we applied the random effects model using F8. The random effects model assumes that different studies estimate different population effect sizes. Therefore, using random effects model in every case is recommended (Cumming, 2011). In the second stage, we conducted homogeneity tests based on Q statistics and 75% rule using F9. Q statistics allows us to examine if the dispersion around the effect size can be explained by the sampling errors alone or whether there are some moderators that affect the relationship. The 75% rule states that if the percentage of total variability is greater than 25%, some moderator variables may affect the relationship. In the third stage, we tested the existence of moderating variables. The data was divided into groups according to the moderating variable, and the statistics given above were applied again. F10 was used to check if the difference between the groups was statistically significant. In the case that different effect sizes led to different results, we focused only on standardized mean difference values and standardized mean gain values as these values are mostly based on objective data collected from databases.

2.4. Results

The cumulative evidence of meta-analyses is given in Table 2.1 and we discuss the implications in detail in the following section. See the supplementary results for more specific analyses.

The first goal of this study is to identify to which extent ISO 9001 certification impacts firms' financial performance. The analysis provides several new insights to this question. First of all, the results indicate that 40% (CI=0.286/0.586) of the companies increase their financial performance with certification. The average effect size for all companies including the other 60% who reported that they did not gain the benefits they had expected from certification is small but significant (AM=3.449, CI=3.251/3.646). However, the results are small and not statistically significant according to standardized mean gain statistics (SG=0.194, CI=-0.140/0.528). The difference between certified and non-certified firms in terms of financial performance is medium and statistically significant (SD=0.375, CI=0.161/0.590). As the results are not consistent, Hypothesis 1 is not fully supported. Second, the results indicate that certification helps almost 60% (CI=0.491/0.671) of the companies to reduce costs. The average effect size for all companies is small and statistically significant (AM=3.635, CI=3.485/3.784). However, the difference between certified and non-certified firms in terms of costs is small and statistically not significant (SD=0.080, CI=-0.014/0.174). Therefore, Hypothesis 2 is not fully supported. Third, the results show that around 60% (CI=0.477/0.666) of the companies increase their revenues. The average effect size is small and statistically significant (AM=3.687, CI=3.560/3.813). Additionally, the difference between certified and non-certified firms in terms of revenues is small but statistically significant (SD=0.105, CI=0.035/0.176). This reaffirms the role of ISO 9001 certification in improving companies' revenues, and therefore Hypothesis 3 is accepted. Fourth, the results show that there is a positive small difference in the stock market value variable between before and after certification, but the difference is not statistically significant (SG=0.043, CI=-0.148/0.233). For this reason, Hypothesis 4 is not supported. Finally, in some cases, Q statistics and the 75% rule show that the relationships are not homogenous. We therefore continued with the moderator analyses.

Table 2.1. Results ^{ab}

| | Lower costs | | | Higher revenues | | | Higher financial performance | | | Higher stock market value | | | | |
|--|---------------------------|-------------------------|--------------------|---------------------------|----------------|--------|------------------------------|----------------|--------|---------------------------|---------|--------|--------|---------|
| | Certified – non-certified | Before – after | | Certified – non-certified | Before – after | | Certified – non-certified | Before – after | | | | | | |
| | | SD | AM | | P | SD | | AM | P | | SD | AM | P | |
| | | | | | | | | | | | | | | |
| | Effect time | | Main effect | | | | | | | | | | | |
| | | | | 0.080 | 3.635* | 0.581 | 0.105* | 3.687* | 0.572 | 0.375* | 0.194 | 3.449* | 0.436 | 0.043 |
| | | Short | | | 3.073 | 0.571 | | 3.020 | | 0.030 | 0.003 | | | 0.073 |
| | | Long | | | 2.883 | | | 2.867 | | 0.120 | 0.108 | | | 0.015 |
| | Standard version | | | | 3.535* | 0.561 | | 3.684* | 0.570 | 0.593* | 0.540 | 3.598* | 0.421 | 0.185* |
| | | Mixed | | | 3.450 | 0.630* | | 3.250 | 0.567 | 0.130 | -0.356* | 2.917 | 0.350* | -0.153* |
| | | 9001:2000/2008 | | | 3.798* | 0.611 | | 3.851* | 0.568 | 0.328* | 0.223 | 3.524* | 0.455 | 0.145 |
| | Region | | | | | 0.784* | | | 0.685* | | | | 0.690* | |
| | | Africa | | | 3.016 | 0.380* | | 3.428 | 0.344* | 0.377 | 0.015 | 3.601* | 0.337* | 0.068 |
| | | America North | | | | | | | | 0.188 | | | | |
| | | America South | | | | | | | | | | | | |
| | | Asia | | | 3.647* | 0.645 | | 3.685* | 0.680 | 1.044* | 2.239* | 3.375 | 0.750 | |
| | | Australia / New Zealand | | | 3.389 | 0.180* | | 3.259 | 0.207* | | | | 0.040* | -0.141 |
| | | Europe Central / East | | | | 0.633 | | | 0.401* | | | | | |
| | | Europe North / West | | | 3.518* | 0.565 | | 3.648* | 0.555 | | | | 0.432 | |
| | | Europe South | | | 3.825* | 0.559 | | 3.824* | 0.611* | 0.031 | -0.187 | 3.347 | 0.461 | 0.159 |
| | | Middle East | | | 3.905* | | | 3.849* | | 0.464 | | 3.672* | | |
| | Size | | | | 3.395* | 0.502 | | 3.479 | 0.554 | | | 3.401* | 0.475 | -0.172 |
| | | Small, medium | | | 3.685* | | | 3.625* | | | | 3.309* | | 0.106 |
| | Sector | | | | 3.695* | 0.522 | | 3.693* | 0.549 | 0.260 | -0.200 | 3.302* | 0.351 | 0.188* |
| | | Manufacturing | | | | | | | | | | | | |
| | | Service | | | 3.550 | 0.573 | | 3.507* | 0.470 | 0.601* | | | 0.060* | |
| | Data collection | | | | | | | | | 0.524* | | | | |
| | | Survey | | | | | | | | | | | | |
| | | Database | | | | | | | | 0.358* | | | | |
| | Respondent | | | | 3.600* | 0.511 | | 3.641* | 0.533 | 0.200 | | 3.966* | 0.276* | |
| | | Quality managers | | | | | | | | | | | | |
| | | Mid-level managers | | | | | | | | | | | | |
| | | Senior managers | | | 3.384 | 0.720 | | 3.556* | 0.250* | | | 3.820* | 0.300 | |

^a SD = standardized mean difference, SG = standardized mean gain, AM = arithmetic mean, P = proportion

^b The grey figures represent results derived from only one study.

*The effect size is significant at the .05 level.

The second purpose of this meta-analysis is to examine if there any moderating factors that influence the relationship between ISO 9001 certification and financial performance. The analyses provide an overwhelming support for the presence of moderators (Table 2.1). First of all, most of the effect sizes are still positive. This indicates that the influences of moderators on the relationship between ISO 9001 and financial performance are mainly in the strength and not in the direction of the relationships. The results highlight the importance of the length of the period since certification. The long-term effect of certification on financial performance is higher than its short-term effect. In the case of stock market values, the results are the other way around. The standard version also appears to be an important moderator. Old versions of the standard have more effect on financial performance and stock market value than new versions, whereas new versions have more effect on costs and revenues. Almost in all analyses, the effect is lowest in the subgroup where both old and new versions of the standard were studied. The effect of certification also differs per region. Overall, companies in the Middle East and Asia benefit the most from certification whereas the benefits are the lowest in North America and Australia / New Zealand regions. The results also highlight the importance of company size. While large companies benefit the most in terms of decreased costs, increased revenues and stock market values, small and medium sized companies benefit more in terms of financial performance. In most of the cases, companies in the manufacturing sector benefit more than those in the service sector. Data collection method is another important moderator. The effect size derived from survey data is higher than the effect size found in studies that collected data from databases. Finally, the results show that the perceptions of quality managers and senior managers differ in terms of the benefits of certification. In most of the cases, quality managers perceive higher benefits than senior managers. Therefore, we conclude that Hypothesis 5 is supported.

2.5. Discussion

2.5.1. Main effects

The results show that the benefits of the certification in terms of costs are not always significant. A possible explanation is decoupling (Aravind and Christmann, 2011). This means that the act of the certification and how the standards are implemented, in other words internalization, are two separate activities. Some studies (Boiral, 2003; Yeung and

Mok, 2005) confirm that firms may obtain certification without using the standard requirements in their daily activities even though they were audited by a third party (!). Most of the existing studies define certification without considering internalization (Aravind and Christmann, 2011). However, certification and internalization of standards should be considered separately to understand the effects of ISO 9001.

Inconsistent impacts of certification on decreasing costs can be explained by different internalization levels caused by company motivations. Previous studies including qualitative literature reviews discuss that the benefits gained from ISO 9001 certification are related to company motivations (Jang and Lin, 2008; Kaynak, 2003; Psomas and Fotopoulos, 2009; Rusjan and Alič, 2010; Sampaio et al., 2009; Singels et al., 2001; Terziovski et al., 2003). Companies that are internally motivated strive to develop an effective quality system instead of just getting a certificate, and therefore are more likely to correctly implement and understand the standard, including continuous improvement and quality management principles (Rusjan and Alič, 2010). As a consequence, these companies are more likely to comply with the requirements, accomplish documentation and customer-related processes, and improve their productivity and efficiency (Psomas and Fotopoulos, 2009). Furthermore, companies that are internally motivated are also more likely to have high management commitment and support, which makes it easy to link a company's quality policy with the principles of the standard. Having the company's vision, mission and strategic goals associated with its quality policy has a positive impact on the effect of certification (Dimara et al., 2004; Rusjan and Alič, 2010; Sharma and Gadenne, 2001; van der Wiele et al., 2005).

Moreover, the results on the impact of certification on decreasing costs and improving overall financial performance show that the cost of the certification itself needs to be considered separately. ISO 9001 registration cost has three components. First, companies have to build a quality management system. Especially if the company does not have a quality management system in place, building a system according to ISO 9000 standards is expected to cost time and money. Second, companies have to hire consultants if they require outside help. Third, companies have to pay certification audit costs. Gunnlaugsdóttir (2002) found that, on average, 5000 man-hours were needed to obtain certification. In total, certification costs approximately US\$133,000. This includes 53.8%

for internal costs, 38.5% for consultants, and 7.7% for registration fees. According to Casadesús and Karapetrovic (2005b), companies need a minimum of US\$7,500 annually to maintain the quality system. Our results show that the long-term effect of certification on financial performance is higher than its short-term effect. Long-term effects represent a company's financial performance two or more years after certification. Thus, despite the fact that these costs decrease over time (Leung et al., 1999), it may take at least two years for companies to compensate the costs of certification, especially if they have to build a quality management system and hire consultants.

Last, the results show that the effect of certification on stock market value is not significant. First, investors may have learned about a company's certification efforts before the announcement (Aarts and Vos, 2001; McGuire and Dilts, 2008). In this case, we would not expect to find the positive effect of certification on the stock market value on the day of the certification, because the information would already have been embedded in the price (Aarts and Vos, 2001). Second, market and stakeholders may perceive certification as just conforming to a requirement instead of a source of competitive advantage (Martínez-Costa and Martínez-Lorente, 2003; McGuire and Dilts, 2008). Third, the market may not be efficient and may not properly value the announcement of certification (McGuire and Dilts, 2008). However, the results show that the effect is higher in the short-term than in the long-term. In other words, the market does value the certification, but the value decreases over time as certification news becomes old. This decrease may depend on whether companies implement the standards properly. If the situation of the company does not improve, stakeholders are not expected to value certification in the medium and long-term.

To sum up, unlike the existing literature review (Psomas and Fotopoulos, 2009; Rusjan and Alič, 2010; Sampaio et al., 2009) which do not go beyond listing the possible benefits of certification, we congregated effect sizes given in the existing studies quantitatively and concluded that firms can benefit from certification through increased revenues even though the effect size is small. However, the results also show that the effect of certification on costs, overall financial performance and stock market value are not consistent. A probable explanation is that moderation effects apply and this is indeed what current literature and our analyses suggest.

2.5.2. Moderation effects

Meta-analysis requires availability of data from different studies and therefore we could not investigate all moderators mentioned in the literature. Nevertheless, we have some interesting findings. First of all, our moderator analysis shows that the effect of certification differs per region. A possible explanation is the economic development of the countries. The country of origin is an important factor in consumers' buying decision, and consumers have a tendency to associate high quality with a country's income per capita (Hong and Wyer, 1989; Hudson and Jones, 2003). Thus, firms from developing countries and countries in transition face particular problems in signaling their quality to customers. As many companies from economically developed countries supply their products from economically less developed countries, certification may help companies in developing countries and countries in transition to increase their export opportunities (Clougherty and Grajek, 2008). A second explanation is the geographic location. Spatial barriers in international trade lead to difficulties for buyers to identify product quality (Potoski and Prakash, 2009). When a North European company receives a product from a South European supplier, they can physically go to the factory to check operations and product quality. However, this is not that easy when the supplier is located in the Middle East, Asia or Africa. Therefore, certification has more value in ensuring quality for companies located in Africa, Middle East or Asia. Last, the existing quality culture in Asia may have led to more positive results. Especially in Japan, companies are familiar with quality management approaches like Kanban, just in time and lean manufacturing. Additionally, teamwork and trust are key factors in many Asian countries and this helps companies in these countries to easily achieve continuous improvements by co-operating with their employees, customers and suppliers (Adam et al., 1994; Dahlggaard et al., 1998). In the North American region, the results derived from studies that collected data from databases are positive, but the proportion statistics indicate negative results. This may be explained by the negative image caused by the 'not invented here' syndrome. ISO 9001 is perceived to be a European approach, whereas the popular Six Sigma is American. In Australia and New Zealand, the results derived either from surveys or stock market values are also negative. These countries were relatively early in implementing ISO 9001 standards due to pressure from governments and customers. For this reason, ISO 9001 systems became a

commodity without competitive advantage. This may explain why these countries feel that they no longer benefit from implementation, and why the total number of certificates in these countries has shrunk, whereas most other countries it has increased.

Second, the results show that the effect of old versions of the standard on financial performance is higher than the effect of new versions. In the subgroup of new certification, there may be companies who already had certification based on the 1994 version of the standard, but then upgraded it to meet the 2000 version's requirements. This would mean that they already had a quality management system in place when they were recertified. In this case, the financial benefits from the modified quality management system are expected to be less than the benefits for those companies implementing a completely new system. Conversely, most results based on the perception of the respondents indicate that the effect of certification based on the 2000 or 2008 versions of the standard is higher on increasing revenues and decreasing costs. A possible explanation is that the new version of the standard focuses more on continuous improvement and customer satisfaction, whereas the older one prescribed a system of control via many procedures. Therefore, respondents may have had a negative impression of the first version of the standard, as it led to increased bureaucracy. The difference between the impact of old and new versions of the standard can also be explained by the impact of the length of the period since initial certification. Market perception of certification might have been more positive in the beginning. When certified companies produce low quality products, the confidence in certification and the overall signaling effect of certification decreases (Terlaak and King, 2006). Additionally, at the end of the 1990s, research confirmed rumors in the market about low performing companies obtaining certification and the benefits of ISO 9001 certification were questioned (Seddon, 2000; Seddon, 1997). Another possible explanation is that early adopters may benefit more from certification than late adopters, as there were fewer certified competitors in the beginning. In other words, in the 1980s, it was more a competitive advantage to obtain the certificate, later it was a necessity for survival. Finally, the effect of old versions of the standard on stock market value is also higher than the effect of new versions. This can be explained by the decrease in the perceived value of certification.

Third, we also saw that the results are the lowest and sometimes even negative in studies using both versions of the standards. This can be related to the costs and difficulties associated with the conversion from 9000:1994 to 9001:2000 during the transition period from 2000 to 2003. According to van der Wiele et al. (2005), companies perceived this conversion as costly and difficult. To acquire ISO 9000:1994 certification, organizations did not need major changes in their structure or system. However, companies had to make major changes and considerable investments to acquire the 9001:2000 version because of the new requirements for business processes, continuous improvement and involvement of people. This may explain why companies benefit the least during the period of conversion

Fourth, the results reveal that manufacturing companies benefit more than service companies. There can be two explanations for this. First, signaling works when it is difficult to assess the quality of an organization. Graffin and Ward (2010) state that the more uncertain customers are about the company's capabilities, the more likely the company's reputation will benefit from third-party quality signals like certification. In the service sector, customers are mostly involved in the process of production which gives them with the opportunity to experience the quality of the whole system. However, in the manufacturing sector, customers only see the end product and not how it is made. The distance between a manufacturing company and its clients is bigger. This makes it more difficult for the client to visit the company, and consequently the client is more likely to rely on the certificate. Therefore, signaling benefits the manufacturing sector more. Second, the perception of the manufacturing and service companies in terms of the benefit of certification may be different. As products of the service sector are more intangible, it can be difficult for companies to identify the direct benefits. Therefore they may be negatively biased. On the other hand, in the manufacturing sector, companies are better able to measure the effect of the quality management system on their operations or on the end product.

Fifth, the results also show that large companies benefit the most in terms of increased revenues, stock market value and decreased cost, whereas small and medium sized companies benefit more in terms of financial performance. Our research framework helps to interpret this paradox: apparently large companies benefit more from internalization and signaling. However, a large company's market position depends on

more assets than just certification. This may be the reason why they benefit more from increased revenues and decreased costs, but these are not directly reflected in their financial performance. Another explanation is the response bias in the answers of the large firms. They mostly employ a quality manager and as it is explained later, quality managers can be positively biased especially when they answer questions about costs.

Last, the results reveal that research methodology impact the results. Large effect sizes derived from survey studies indicate the existence of a positive response bias. Response bias is a distorted response driven by social desirability or strategic answering behavior (Furnham, 1986). Since companies have been certified driven by the expectation to receive certain benefits, it is likely that they will report that they have indeed benefited from certification. In this sense, data derived from the database is much more reliable and can be seen as more objective effects of certification. Large effect sizes reported by quality managers show a further strengthening of the positive response bias. They apparently want their system to have positive impacts. This is understandable because they are the ones who implement and maintain the system and thus may feel more responsible for its outcomes.

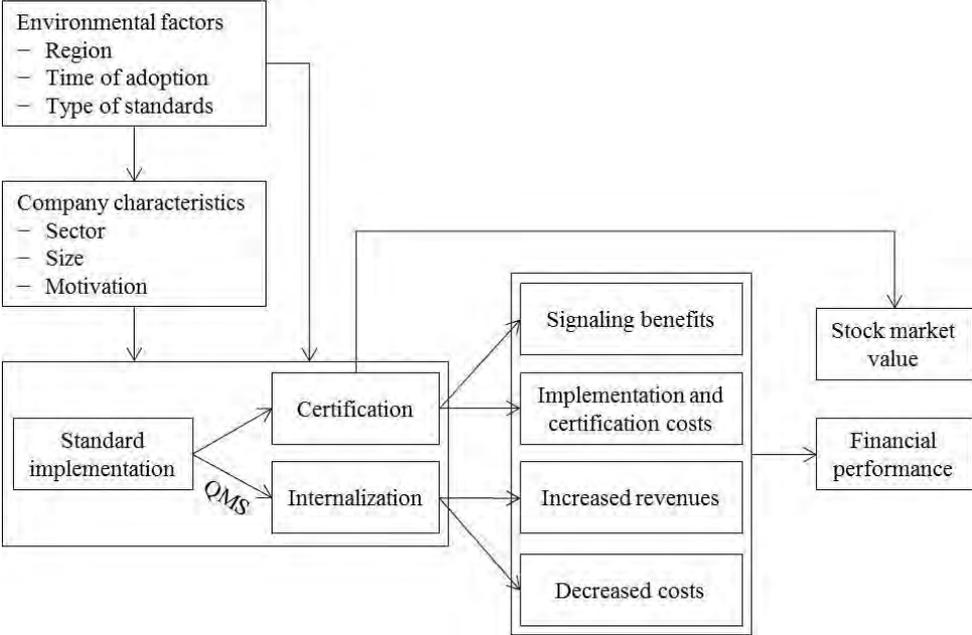
To sum up, first of all this study confirms previous findings that the long-term effect of certification on financial performance is higher than its short-term effect (Corbett and Kirsch, 2005; Lima et al., 2000). We also analyzed both short and long-term effects of certification on stock market value and found that the effect is highest in the short term. Second, the results are consistent with those of other studies (Karapetrovic et al., 2010; Mezher et al., 2004; van der Wiele et al., 2005) who suggest that new versions of the standard have more impact on costs and revenues, whereas old versions have more impact on financial performance. Unlike previous studies, we also analyzed the effects of different versions of the standard on stock market value and found that the effects are the highest when companies are certified based on the old version. In addition, we analyzed studies that examine a combination of old and new versions of the standard and found that the effect is the lowest in this case. Third, in contrast to earlier findings (Huang, 1998; Padma et al., 2008), we found that large companies benefit more than small and medium-sized companies in terms of decreased costs, increased revenues and stock market values. Fourth, our results confirm that the companies in the manufacturing sector benefit more

than the companies in the service sector (Lee, 1998). Our method also enabled us to distinguish differences per region. We found that the companies in the Middle East and Asia benefit the most from certification, whereas the companies in North America and Australia / New Zealand benefit the least.

Additionally, in contrast to previous studies, we analyzed the effects of the data collection method and the role of the respondent in the company. We found out that impacts on financial performance derived from surveys are higher than impacts derived from databases, and that impacts based on the responses of quality managers are higher than those by the senior managers.

To conclude, existing studies insufficiently explain how ISO 9001 certification may impact financial performance. Our analysis provides a better understanding. Figure 2.1 shows our research framework for the financial impacts of ISO 9001 certification. This framework may be used to structure future research.

Figure 2.1. Research framework for financial impacts of ISO 9001 certification



2.6. Conclusions

We investigated the financial impacts of ISO 9001 certification using meta-analysis. Our findings provide quantitative evidence that, in most of the cases, the companies that implement these standards increase their revenues. However, this effect may be a result of the signaling effect of certification. This effect may differ per region and business sector, and may depend on the length of the period since obtaining the initial certificate. Second, we could not prove that ISO 9001 certification decreases costs. However, we discussed that companies can decrease their costs if they are motivated to implement a well-functioning quality system and if there is a high management commitment. Strategic company goals should also be aligned with the quality policy. Third, the findings suggest that not all companies are able to gain financial benefits from certification, but overall companies are expected to benefit in the long-term. However, the cost of the certification seems to be a setback for achieving short-term benefits.

2.6.1. Managerial implications

For business managers considering to implement ISO 9001, our research gives empirical evidence that implementation leads to benefits in the majority of cases. These benefits stem from the signal the certificate provides in the market and/or from benefits generated by the quality management system itself: lower cost and/or increased sales. The benefits depend on the market situation as well as on company performance, and have to be balanced against the cost of implementation. Here, the time dimension is important – initially the balance can be negative but most companies manage to reap benefits over the medium to long-term. The impact on stock value is limited so this should not be the reason for implementation. Benefits from the system itself depend on the motivation to implement it, and on management commitment. Managers may also want to rely on ISO 9001 certificates of suppliers. Here our findings suggest caution, because it is possible to get certificates for systems that have a low level of internalization and thus little impact on the supplier's real performance.

The latter finding also has implications that reach beyond individual companies. Apparently the standard as such is fine – it can lead to substantial benefits. However, our findings suggest that the global certification system is not reliable. It should provide assurance that the requirements in the standard are met but apparently this is not always

the case. In this sense, it is also remarkable that new versions of the standard (2000 and 2008) show lower impacts than old versions (1987 and 1994). The old versions focused on control. The new ones focus on control and the continuous improvement of the quality management system. As a result, improvement in overall performance could also be expected. This raises the question whether companies have real systems according to the requirements and principals of the standard, more rigid systems (focusing on control but less on improvement) or systems that hardly function in practice ('window-dressing'), with all kinds of options in-between these three extremes. Current research does not make a clear distinction and, in fact, we do not know what the actual situation is. In this situation of lack of knowledge, it might be premature that a new version of ISO 9001 is already being prepared. Our findings show that the conversion from the 1994 to the 2000 version caused substantial costs and did not lead to more benefits. Why then 'improve' the standard once again, knowing that this will cause substantial conversion costs for companies, without any indication that these costs will be compensated by benefits. The only ones that really profit are consultants and certification firms who are overrepresented in the committees that work on the revision of ISO 9001 (Hallström, 2004; Russian Research Institute for Certification, 2012), thereby creating their own business.

2.6.2. Limitations, theoretical implications and future research

Every effort was undertaken to extensively analyze the literature and to obtain reliable and valid conclusions. However, the study still has several limitations that should be considered when interpreting the findings. First, the direction of the causality may be an issue when certified companies are compared with non-certified ones. In this meta-analysis, we found that certified companies have higher revenues than non-certified companies. But it can be also the other way around. Companies might decide to apply for certification because they are already performing well in financial terms. On the other hand, the comparison of companies before and after certification does not raise an issue of causality, and therefore our results are robust. Second, we could not include all studies of ISO 9001 and business benefit for several reasons. Some of the studies did not report effect sizes or any other statistics that can be converted into effect sizes. When we tried to collect the necessary information, some authors did not want to cooperate, or did not respond. We also had to exclude some studies because the study designs were not fit for comparison.

For example, in Zeng et al. (2002), respondents had to choose one of the following benefits for internal operations: increase efficiency, define responsibility, better teamwork, standardization of internal management or other. Then the results cannot be compared with those from the commonly used Likert scale studies. We also had to exclude studies that used a Likert scale where the lowest score represents no or very few benefits, and where the highest score represents very substantial benefits (Gotzamani, 2010; Mady, 2011; Prajogo, 2009), because these studies do not give respondents an option to report a negative result. Third, when we could not gather reliability of the dependent variable measurements, we had to substitute it with the averages reported across other studies. However, the substituted average reliabilities may not exactly reflect the real reliability of the dependent variables. Fourth, some results (especially in the moderator analysis) have a low statistical power because of the limited number of studies. Therefore, these results should be interpreted carefully. Fifth, as noted before, we could not study the role of some of the moderators and mediating factors.

This study also helps to identify directions for future research that can increase our understanding of the relationship between ISO 9001 certification and financial performance. We discussed that the lack of internal motivation of the company may affect the benefits gained from certification. Therefore, future studies are needed to examine this relationship. Future research should also distinguish between certification and internalization. Instead of using a binary variable to represent ISO 9001 certification, researchers should examine how the standards are used in a company. More specifically, researchers should distinguish between companies that use standards properly in their daily operations and companies that use certification merely as window dressing. Furthermore, our findings show the need for further examination of the signaling effect of certification separate from the effect of implementation as such. This can be done by comparing firms that implemented the standard without applying for certification with those that implemented the standard and obtained a certificate. Moreover, future research needs to further explore the effects of implementation costs on financial performance. Researchers should investigate how high these costs are, how much time it takes for companies to reach a break even, how certification costs can be decreased, etc. Last, we found that the effect of certification on stock market value is really small and not significant. The lack of

relationship is intriguing. A recent study on the impacts of a similar standard for environmental management systems ISO 14001, also reported a negative effect, whereas all other studies reported positive impacts of ISO 14001 (de Vries et al., 2012). Here, future studies could collect and analyze longitudinal stock exchange data of larger samples of certified companies (before and after certification) enriched with empirical data about investors' perceptions.

The results also showed that different versions of the standards have different impacts. Here, the argument was that the standard has other implications in an early stage compared to a later stage, when most competitors have adapted the standard. However, most of the existing studies use cross-sectional data and do not examine the benefits of certification over time. Future research needs to establish longitudinal data to test the direction of causality and help determine the true effects. Additionally, only a limited number of studies examine the latest version of the standard, suggesting that future research should fill this gap. Moreover, future studies are needed to test the performance difference between newly certified firms and recertified firms and to examine whether old and new versions of the standard really lead to different benefits. This is informative for the intended substantial revision of ISO 9001 scheduled for 2015 (Croft, 2012). Changes will probably include a new structure for the standard, and changes in the contents such as the introduction of risk management. This is expected to cause major transition problems for the more than a million companies that have implemented the standard (Liebesman, 2012) – another topic for research.

The analysis of regionally focused studies revealed that some regions were understudied. More studies are necessary in Africa, South America and Central and Eastern Europe to fill this gap. We also found surprisingly high impacts in the Middle East and Asia. More in-depth studies should be conducted to understand why these regions benefit the most from certification. On the other hand, we found that the companies in North America and Australia / New Zealand regions have a negative image of certification. Decreasing numbers of certification in Australia / New Zealand also point towards this conclusion (ISO, 2013a). Therefore, more in-depth studies should be conducted to understand the reasoning behind their perception. We also found that the existing studies mostly focus on the manufacturing sector. Since certification has diffused into the service

sector and since the service sector has been growing rapidly, future research should also focus on this sector.

Our findings revealed that most studies employ data from surveys and that survey studies may produce an upward bias of the impacts. Therefore, new research projects should consider the data source as an important factor and should focus more on objective data. For example, information such as financial results and company features can be obtained from commercial databases or companies' annual reports. If objective data is not available, for example, about a company's motivation, researchers may try to triangulate their data by surveying different parties such as employees, suppliers and customers. Respondent analysis showed that quality managers are positively biased about the impact of certification. Therefore, researchers should try to collect data from other sources than quality managers. If this is not possible, they should be aware of the possible bias existing in their data. Multiple case studies directed at finding quantitative evidence within companies could provide additional data. Finally, descriptive statistics and the correlation matrices should be reported in the future to contribute to the accumulation of research findings.

Appendix A. Summary of articles used for meta-analysis

| Study | Sample size | Statistics type | Moderators | Dependent variables |
|------------------------------------|-------------|-----------------|------------------------|---------------------|
| Aarts and Vos (2001) | 120 | SG | ET, CT, RG, SZ | SMV |
| Abdi et al. (2008) | 85 | AM | CT, RG, SC | C, R, FP |
| Abraham et al. (2000) | 12 | AM | CT, RG | C, R |
| Acharya and Ray (2000) | 1200 | P | CT, RG | C, R |
| Al-Refaie et al. (2012) | 130 | AM | CT, RG | C, R, FP |
| Arauz and Suzuki (2004) | 287 | AM | CT, RG | C, R, FP |
| Ashrafi and Bashir (2011) | 57 | SD | CT, RG, DC, RS | C, R, FP |
| Beattie and Sohail (1999) | 48 | P | CT, RG, SC | C, R, FP |
| Beirão and Cabral (2002) | 22 | SG | ET, CT, RG | FP |
| Bhuiyan and Alam (2005) | 30 | AM | CT, RG | R |
| Boiral (2007) | 872 | AM | CT, RG, RS | C |
| Briscoe et al. (2005) | 275 | AM | CT, RG, SC, SZ, RS | C, R |
| Buttle (1997) | 1220 | P | CT, RG | C, R, FP |
| Calisir (2007) | 86 | AM | CT, RG, SC, RS | C, R |
| Calisir et al. (2001) | 73 | AM | CT, RG, SZ, RS | C, R |
| Calisir et al. (2005) | 43 | AM | CT, RG, SC, RS | C, R |
| Capmany et al. (2000) | 186 | AM | CT, RG, SC | C, R, FP |
| Casadesús and Gimenez (2000) | 288 | P | CT, RG | C, FP |
| Casadesús and Karapetrovic (2005a) | 399 | P | CT, RG, RS | C, R, FP |
| Casadesús et al. (2001) | 502 | P | CT, RG | C, R, FP |
| Casadesús et al. (2011) | 176 | P | CT, RG | C, R, FP |
| Chittenden et al. (1998) | 240 | P | CT, RG, SZ | C, R |
| Chow-Chua et al. (2003) | 146 | SD, SG | CT, RG, DC | FP |
| Corbett and Kirsch (2005) | 701 | SG | ET, CT, RG, SC | FP, SMV |
| Dick et al. (2008) | 634 | SD | ET, CT, RG, DC | R, FP |
| Dimara et al. (2004) | 188 | SG | ET, CT, RG | FP |
| Dissanayaka et al. (2001) | 33 | P | CT, RG, SC | C, R |
| Douglas et al. (2003) | 104 | P | CT, RG, RS | C |
| Drew and Healy (2006) | 427 | P | CT, RG | C, R |
| Dreyfus et al. (2004) | 243 | SD | CT, RG, SC, DC, RS | C, R |
| Dunu and Ayokanmbi (2008) | 92 | SD, SG | ET, CT, RG, DC | R, FP |
| Ferreira et al. (2008) | 1174 | SG | ET, CT, RG | SMV |
| Fotopoulos et al. (2010) | 97 | AM | CT, RG, SC | C, R, FP |
| Gustafsson et al. (2001) | 406 | P | CT, RG, SZ, RS | C |
| Huang (1998) | 370 | AM | CT, RG, SZ | C, R, FP |
| Idris et al. (1996) | 247 | P | CT, RG, SC | C, R |
| Jones et al. (1997) | 272 | AM | ET, CT, RG, RS | C, R |
| Kam and Tang (1998) | 35 | AM | CT, RG, SC, RS | C, R |
| Karapetrovic et al. (2010) | 754 | P | CT, RG, RS | C, R, FP |
| Koc (2007) | 106 | SD | CT, RG, SC, SZ, DC, RS | C |
| Krasachol et al. (1998) | 88 | P | CT, RG | C |
| Lafuente et al. (2010) | 163 | SD | CT, RG, SC, SZ, DC | FP |
| Lee (1998) | 235 | P | CT, RG, SC | C, R |
| Lima et al. (2000) | 138 | SD | ET, CT, RG, DC | FP |
| Lin and Jang (2008) | 441 | AM | CT, RG | C, R, FP |
| Lo and Chang (2007) | 160 | AM | CT, RG | C, R, FP |
| Lundmark and Westelius (2006) | 66 | AM | CT, RG, SZ, RS | C, R |

| | | | | |
|--|------|-----------|------------------------|----------|
| Magd (2006) | 105 | AM | CT, RG, SC | C, R, FP |
| Magd (2008) | 21 | AM | CT, RG, SC, RS | C, R, FP |
| Magd and Curry (2003) | 38 | AM | CT, RG, RS | C, R |
| Martínez-Costa and Martínez-Lorente (2003) | 60 | SG | ET, CT, RG, SZ | SMV |
| Martínez Costa and Martínez-Lorente (2007) | 713 | SD, SG, P | CT, RG, SC, DC, RS | C, R, FP |
| Martínez-Costa et al. (2009) | 577 | SD | ET, CT, RG, SC, DC, RS | C, R |
| Martinsons (1996) | 6 | P | CT, RG | C, R, FP |
| Masakure et al. (2009) | 102 | SD | CT, RG, SC, SZ, DC | R |
| McAdam and Canning (2001) | 20 | P | CT, RG, SC, SZ, RS | C, FP |
| McAdam and McKeown (1999) | 108 | P | CT, RG, SZ | C, R |
| McGuire and Dilts (2008) | 408 | SG | ET, CT, RG, SZ | SMV |
| Mezher et al. (2004) | 60 | AM | CT, RG, RS | C, R, FP |
| Mokhtar and Muda (2012) | 122 | SD | CT, RG, DC | R, FP |
| Najmi and Kehoe (2001) | 221 | AM | CT, RG, SC | C |
| Naveh and Marcus (2005) | 534 | SD | CT, RG, DC, RS | FP |
| Nield and Kozak (1999) | 34 | P | CT, RG, SC | C, R |
| Okay and Semiz (2010) | 108 | AM | CT, RG, SC, SZ | C, FP |
| Padma et al. (2008) | 37 | AM | CT, RG, SC, SZ | C, R, FP |
| Piskar and Dolinsek (2006) | 212 | P | CT, RG | C, R |
| Prabhu et al. (2000) | 217 | SD | CT, RG, SC, DC | C, R |
| Psomas et al. (2011) | 196 | AM | CT, RG, SC | C |
| Romano (2000) | 100 | P | ET, CT, RG, SC, RS | C |
| Ruzevicius et al. (2004) | 31 | P | CT, RG, RS | C, R |
| Sampaio et al. (2011) | 207 | SD | CT, RG, SZ, DC | C |
| Santos et al. (2011) | 46 | P | CT, RG, SZ | C, R, FP |
| Sharma (2005) | 70 | SD | CT, RG, DC | R, FP |
| Simmons and White (1999) | 126 | SD | CT, RG, SC, DC | R, FP |
| Singh et al. (2011) | 416 | AM | CT, RG, SC, RS | C |
| Skrabec Jr. et al. (1997) | 300 | P | CT, RG | C, R, FP |
| Tan and Sia (2001) | 100 | P | CT, RG | C, R |
| Tang and Kam (1999) | 19 | AM | CT, RG, SC, RS | C, R |
| Tari and Molina (2002) | 106 | AM | CT, RG, RS | R, FP |
| Terziovski et al. (1997) | 855 | SD | CT, RG, DC, RS | C, R |
| To et al. (2012) | 148 | AM | CT, RG, RS | C, R, FP |
| Torre et al. (2001) | 119 | AM | CT, RG | C, R, FP |
| Tsekouras et al. (2002) | 143 | SD | CT, RG, DC | C, FP |
| Turner et al. (2000) | 32 | P | CT, RG, SC | C, R, FP |
| Tzelepis et al. (2006) | 1572 | SD | CT, RG, SC, DC | FP |
| van der Wiele et al. (2005) | 790 | AM | CT, RG | C, R |
| Wilcock et al. (2006) | 20 | P | CT, RG, RS | R, FP |
| Withers (2001) | 10 | P | CT, RG | C, R |
| Wu and Chen (2012) | 120 | SD | CT, RG, SC, DC, RS | C, R, FP |
| Yahya and Goh (2001) | 221 | AM | CT, RG | C, R |
| Yeung et al. (2011) | 356 | SG | ET, CT, RG, SC | FP |
| Zaramdini (2007) | 209 | AM | CT, RG | C, R, FP |

SD = standardized mean difference, SG = standardized mean gain, AM = arithmetic mean, P = proportion, ET = effect time, CT = certification type, RG = region, SZ = size, SC = sector, DC = data collection, RS = respondent, C = costs, R = revenues, FP = financial performance, SMV = stock market value

Appendix B. Meta-analysis computational formula

| Formulas | Input variables | Formulas |
|----------------------------------|---|---|
| F1. Proportion | k : Number of subjects in the category of interest n : Sample size | $ES = \frac{k}{n}$ $SE = \sqrt{\frac{p(1-p)}{n}}$ $w = \frac{1}{SE^2}$ |
| F2. Arithmetic mean | x_i : Individual score for subject i n : Sample size s : Standard deviation of x | $ES = \bar{X} = \frac{\sum x_i}{n}$ $SE = \frac{s}{\sqrt{n}}$ $w = \frac{1}{SE^2}$ |
| F3. Standardized mean gain | \bar{X}_{T1} : Mean at Time 1 \bar{X}_{T2} : Mean at Time 2 n : Common sample size at Time 1 and 2 r : Correlation between Time 1 and 2 scores s_p : Pooled standard deviation of the Time 1 and 2 scores | $SE = \sqrt{\frac{2(1-r)}{n} \frac{ES^2}{2n} + \frac{ES^2}{2n}}$ $s_p = \sqrt{\frac{s_{T1}^2 + s_{T2}^2}{2}}$ $w = \frac{1}{SE^2}$ |
| F4. Standardized mean difference | \bar{X}_{G1} : Mean of Group 1 \bar{X}_{G2} : Mean of Group 2 n_{G1} : Size of Group 1 n_{G2} : Size of Group 2 s_{G1} : Standard deviation of Group 1 s_{G2} : Standard deviation of Group 2 | $SE = \sqrt{\frac{n_{G1} + n_{G2}}{n_{G1}n_{G2}} + \frac{(ES')^2}{2(n_{G1} + n_{G2})}}$ $s_p = \sqrt{\frac{(n_{G1} - 1)s_{G1}^2 + (n_{G2} - 1)s_{G2}^2}{(n_{G1} - 1) + (n_{G2} - 1)}}$ $w = \frac{1}{SE^2}$ |
| F5. Weighted mean effect size | ES_i : Effect size values w_i : Inverse variance weight for effect size i | $\bar{ES} = \frac{\sum (w_i ES_i)}{\sum w_i}$ |
| F6. Standard error of the mean | w_i : Inverse variance weight for effect size i | $SE_{\bar{ES}} = \sqrt{\frac{1}{\sum w_i}}$ |
| F7. Confidence interval | z : Desired confidence level | $\bar{ES}_L = \bar{ES} - z_{(1-\alpha)}(SE_{\bar{ES}})$ $\bar{ES}_U = \bar{ES} + z_{(1-\alpha)}(SE_{\bar{ES}})$ |
| F8. Random effects | v_i : Estimate of the variance associated with subject-level sampling error k : Number of effect sizes | $v_i^* = v_\theta + v_i$ $v_\theta = \frac{Q - (k - 1)}{\sum w_i - (\sum w_i^2 / \sum w_i)}$ |
| F9. Homogeneity | df : Degrees of freedom | $Q = \sum w_i ES_i^2 - \frac{(\sum w_i ES_i)^2}{\sum w_i}$ $I^2 = \frac{Q - df}{Q} \times 100\%$ |
| F10. Testing moderators | j : Categories of between-groups variable | $Q_j = \sum w_j ES_j^2 - \frac{(\sum w_j ES_j)^2}{\sum w_j}$ $Q_W = \sum Q_j$ $Q_B = Q - Q_W$ |

Appendix C. Supplementary results

Comparison of certified and non-certified firms

The cumulative evidence of meta-analyses comparing the certified and non-certified firms measured in terms of standardized Cohen's *d* value is given in Table 2.2. It shows that there is a statistically significant difference between the certified and non-certified firms in terms of revenues and financial performance as the confidence intervals do not include the value zero. However, there is no difference between them in terms of costs.

The 75% rule and Chi-square homogeneity test suggest that the relationship between ISO 9001 certification and costs is homogenous (Table 2.2). In other words, the dispersion of the effect sizes around the mean is no greater than that expected from sampling error alone. The same holds for the relationship between ISO 9001 and revenues. However, for the ISO 9001 - financial performance association, the tests differ. Both the 75% rule and the significant result of the *Q* tests suggest that the relationship between ISO 9001 and financial performance is not consistent and there is a potential moderating effect. In sum, these tests motivate an investigation of the potential sources for the reported differences.

We conducted moderator analyses when there was at least one study in a subgroup. Table 2.3 summarizes the results of moderator analyses and the *Q* tests of differences between mean effect sizes of moderators' subgroups. In all subgroups where the mean effect size is statistically significant, the direction of the relationship is still positive. Therefore, the findings suggest that the moderators influence the strength of the relationship between ISO 9001 and financial performance, but not the direction. A brief discussion for each moderator is provided below.

The analysis shows that the mean effect size in the subgroup where the short-term effect of the certification was reported is smaller than the long-term effect subgroup. However the difference between the results of two subgroups is not significant. Results suggest that the version of the standard is also an important moderator. The subgroups differ significantly in financial performance. The effect of the ISO 9000:1987 and ISO 9000:1994 certificate on financial performance is stronger than the effect of ISO 9001:2000 and ISO 9001:2008 certificates. However, in the subgroup where both old and new versions of the standard were studied the effect is the lowest and not significant.

| Small, medium Large | Company size | | Insufficient data for analysis | | Insufficient data for analysis | |
|------------------------|-------------------|-------------|--------------------------------|--------------------|--------------------------------|----------------|
| | Number of studies | Sample size | Fixed effect mean | Random effect mean | 95% CI | Standard error |
| Manufacturing | 5 | 2331 | 0.136 | 0.260 | -0.073/0.593 | 0.170 |
| | 1 | 60 | 0.601 | 0.601* | 0.083/1.118 | 0.264 |
| Service | 2 | 177 | 0.524 | 0.524* | 0.190/0.857 | 0.170 |
| | 12 | 4011 | 0.188 | 0.358* | 0.125/0.590 | 0.119 |
| Survey | 4 | 1071 | 0.096 | 0.200 | -0.166/0.566 | 0.187 |
| | 12 | 4011 | 0.188 | 0.358* | 0.125/0.590 | 0.119 |
| Database | 2 | 177 | 0.524 | 0.524* | 0.190/0.857 | 0.170 |
| | 12 | 4011 | 0.188 | 0.358* | 0.125/0.590 | 0.119 |
| Quality managers | 4 | 1071 | 0.096 | 0.200 | -0.166/0.566 | 0.187 |
| | 12 | 4011 | 0.188 | 0.358* | 0.125/0.590 | 0.119 |
| Mid-level managers | 4 | 1071 | 0.096 | 0.200 | -0.166/0.566 | 0.187 |
| | 12 | 4011 | 0.188 | 0.358* | 0.125/0.590 | 0.119 |
| Senior managers | 4 | 1071 | 0.096 | 0.200 | -0.166/0.566 | 0.187 |
| | 12 | 4011 | 0.188 | 0.358* | 0.125/0.590 | 0.119 |

a(*)The effect size is significant at the .05 level.

b(*)The homogeneity test is significant at the .05 level.

Table 2.4. Main effects of meta-analysis measured in standardized mean gain values

| Dependent variable | Number of studies | Sample size | Fixed effect mean | Random effect mean | 95% CI | Standard error | Q (p) | I ² |
|------------------------------|-------------------|-------------|-------------------|--------------------|--------------|----------------|----------------|----------------|
| Lower cost | | | | | | | | |
| Higher revenues | | | | | | | | |
| Higher financial performance | 7 | 893 | -0.049 | 0.194 | -0.140/0.528 | 0.170 | 116.16 (0.00)* | 0.95 |
| Higher stock market value | 5 | 1173 | -0.002 | 0.043 | -0.148/0.233 | 0.097 | 32.37 (0.00)* | 0.88 |

Subgroup analysis of regions shows that the difference between the subgroups is significant. Moreover, the mean effect size is significant only in Asia region. The magnitude of the effect size is also highest in the Asia. Middle East and North America follow Asia in terms of the magnitude of the effect size. The effect sizes in South America and South Europe are the lowest. However, the findings about the South America and Middle East regions should be regarded with caution, because they each are based on the data from only one study.

Subgroup analysis of firm sectors suggests that the service sector has a higher and significant mean effect size value than the manufacturing sector. On the other hand, the mean effect size for the manufacturing sector is not significant. However, the results about the service sector should be interpreted with caution again, as there is only one study in this subgroup and the difference between two subgroups is not significant.

Lastly, the analysis of data collection method reveals some interesting results. The mean effect size values are significant for both subgroups. The difference between the studies which collected data by using survey and database are almost significant. Additionally, the average effect size of the survey subgroup is much higher than the database subgroup.

Comparison of certified firms before and after the certification

The cumulative evidence of meta-analyses comparing the certified firms before and after the certification are given in terms of three different kind of statistics: standardized mean gain scores, proportion of the firms that reported a positive performance change, and average mean values on a Likert scale from 1 to 5 where 5 represents the highest improvement. The results are given in Table 2.4, 2.7 and 2.11.

The analysis of main effect sizes shows that there is a positive difference between before and after the certification values for the financial performance and stock market value dependent variables, but these differences are not statistically significant. Moreover, further analyses suggest that the relationships are not homogenous (Table 2.4); therefore we investigated the existence of moderators.

The results of moderator analyses for the financial performance are given In Table 2.5. The results indicate that the differences between the subgroups are significant for all the moderators. Moreover, according to effect time subgroup analysis, the mean effect

sizes of both subgroups are positive but not significant. The long-term effect of the certificate is significantly higher than its short-term effect. Subgroup analysis of certification versions also reveals some interesting results. The effect of the old versions of the certificate on financial performance is stronger than the new versions' effect. However, in both subgroups the effects are not significant. Interestingly, in the subgroup where both old and new versions of the standard were included, the effect is negative and significant. The difference between the subgroups is also statistically significant. From the subgroup analysis of regions, it is apparent that the mean effect size is significant only in the Asia region. However, this result is based only on one study. In contrast, the effect size in South Europe is negative, but not significant. Lastly, subgroup analysis of sectors shows that the effect of certification on financial performance is negative but not significant in the manufacturing sector.

Table 2.6 provides the results of moderator analyses for stock market value. The analysis of different effect times shows that both short and long-term effects of the certification are positive but not significant. The short-term effect is greater than the long-term effect and the difference between these two subgroups is significant. According to the subgroup analysis of standard versions, the effect of the old versions of the standard is significant and positive, but the effect of the mixed versions of the certificate is negative and significant. In the case of the new version the effect is positive but not significant. Also in this case, the difference between the subgroups is significant according to Q statistics. The subgroup analysis of regions shows that South European companies benefit the most from the certification followed by North American companies. On the other hand, the effect of the certification is negative in Australia / New Zealand. However, the mean effects sizes in the subgroups are not significant and the difference between the subgroups is also not significant. From the analysis of company sizes, it is apparent that the mean effect size of large companies is positive and the mean effect size of small and medium companies are negative. Yet the difference is not significant in both cases. Moreover, the difference between these two subgroups is also not significant. Lastly, sector analysis reveals that in the manufacturing sector the effect of certification on stock market values is positive and significant. Unfortunately, these results are based on only one study.

Table 2.5. Results of subgroup analysis for financial performance measured in standardized mean gain values

| Dependent variable | Number of studies | Sample size | Fixed effect mean | Random effect mean | 95% CI | Standard error | Q (p) | I ² | Qb (p) |
|-------------------------|-------------------|-------------|-------------------|--------------------|--------------------------------|----------------|---------------|----------------|---------|
| Short Long | 3 | 778 | 0.001 | 0.003 | -0.236/0.241 | 0.122 | 13.98 (0.00)* | 0.86 | 11.06 |
| | 4 | 296 | 0.108 | 0.108 | -0.006/0.223 | 0.058 | 1.46 (0.69) | 0.00 | (0.00)* |
| 9000:1987/1994 | 4 | 491 | 0.143 | 0.540 | -0.038/1.117 | 0.295 | 59.9 (0.00)* | 0.95 | 51.20 |
| Mixed | 2 | 358 | -0.353 | -0.356* | -0.598/-0.115 | 0.123 | 5.06 (0.02)* | 0.80 | (0.00)* |
| 9001:2000/2008 | 1 | 45 | 0.223 | 0.223 | -0.073/0.519 | 0.151 | | | |
| Region | | | | | | | | | |
| Africa | | | | | Insufficient data for analysis | | | | |
| America North | 3 | 574 | 0.009 | 0.015 | -0.249/0.278 | 0.134 | 15.25 (0.00)* | 0.87 | |
| America South | | | | | Insufficient data for analysis | | | | |
| Asia | 1 | 35 | 2.239 | 2.239* | 1.698/2.781 | 0.276 | | | 85.30 |
| Australia / New Zealand | | | | | Insufficient data for analysis | | | | (0.00)* |
| Europe Central / East | | | | | Insufficient data for analysis | | | | |
| Europe North / West | | | | | Insufficient data for analysis | | | | |
| Europe South | 3 | 285 | -0.285 | -0.187 | -0.592/0.219 | 0.207 | 15.6 (0.00)* | 0.87 | |
| Middle East | | | | | Insufficient data for analysis | | | | |
| Size | | | | | | | | | |
| Small, medium | | | | | Insufficient data for analysis | | | | |
| Large | | | | | Insufficient data for analysis | | | | |
| Sector | | | | | | | | | |
| Manufacturing | 3 | 708 | -0.120 | -0.200 | -0.550/0.149 | 0.178 | 40.33 (0.00)* | 0.95 | |
| Service | | | | | Insufficient data for analysis | | | | |

Table 2.6. Results of subgroup analysis for stock market value measured in standardized mean gain values

| Dependent variable | Number of studies | Sample size | Fixed effect mean | Random effect mean | 95% CI | Standard error | Q (p) | I ² | Qb (p) |
|--------------------|-------------------|-------------|-------------------|--------------------|--------------------------------|----------------|---------------|----------------|--------|
| Manufacturing | 3 | 708 | -0.120 | -0.200 | -0.550/0.149 | 0.178 | 40.33 (0.00)* | 0.95 | |
| Service | | | | | Insufficient data for analysis | | | | |

| studies | | mean | mean | Effect time | | | | |
|-------------------------|---|------|-------------------------|-------------|--------------------------------|-------|---------------|--------------|
| Short | 3 | 294 | 0.112 | 0.073 | -0.141/0.287 | 0.109 | 4.81 (0.09) | 0.58 5.03 |
| Long | 2 | 879 | -0.040 | 0.015 | -0.321/0.350 | 0.171 | 22.53 (0.00)* | 0.96 (0.03)* |
| | | | Standard version | | | | | |
| 9000:1987/1994 | 3 | 478 | 0.149 | 0.185* | 0.063/0.307 | 0.062 | 2.16 (0.34) | 0.08 30.20 |
| Mixed | 2 | 647 | -0.153 | -0.153* | -0.230/-0.075 | 0.040 | 0.08 (0.93) | 0.00 (0.00)* |
| 9001:2000/2008 | 1 | 50 | 0.145 | 0.145 | -0.134/0.424 | 0.142 | | |
| | | | Region | | | | | |
| Africa | | | | | Insufficient data for analysis | | | 1.94 |
| America North | 3 | 1083 | 0.001 | 0.068 | -0.180/0.315 | 0.126 | 30.44 (0.00)* | 0.93 (0.38) |
| America South | | | | | Insufficient data for analysis | | | |
| Asia | | | | | Insufficient data for analysis | | | |
| Australia / New Zealand | 1 | 60 | -0.141 | -0.141 | -0.396/0.113 | 0.13 | | |
| Europe Central / East | | | | | Insufficient data for analysis | | | |
| Europe North / West | | | | | Insufficient data for analysis | | | |
| Europe South | 1 | 30 | 0.159 | 0.159 | -0.201/0.519 | 0.184 | | |
| Middle East | | | | | Insufficient data for analysis | | | |
| | | | Size | | | | | |
| Small, medium | 2 | 132 | -0.240 | -0.172 | -0.480/0.137 | 0.157 | 6.19 (0.05) | 0.68 2.50 |
| Large | 3 | 162 | 0.114 | 0.106 | -0.086/0.298 | 0.098 | 1.14 (0.29) | 0.12 (0.29) |
| | | | Sector | | | | | |
| Manufacturing | 1 | 292 | 0.188 | 0.188* | 0.073/0.304 | 0.059 | | |
| Service | | | | | Insufficient data for analysis | | | |

Table 2.7. Main effects of meta-analysis measured in proportion values

| Dependent variable | Number of studies | Sample size | Fixed effect mean | Random effect mean | 95% CI | Standard error | Q (p) | I ² |
|------------------------------|-------------------|-------------|-------------------|--------------------|--------------------------------|----------------|-----------------|----------------|
| Lower cost | 29 | 7490 | 0.705 | 0.581 | 0.491/0.671 | 0.046 | 2089.71 (0.00)* | 0.99 |
| Higher revenues | 24 | 6499 | 0.707 | 0.572 | 0.477/0.666 | 0.048 | 1523.38 (0.00)* | 0.98 |
| Higher financial performance | 14 | 3963 | 0.526 | 0.436 | 0.286/0.586 | 0.077 | 1378.99 (0.00)* | 0.99 |
| Higher stock market value | | | | | Insufficient data for analysis | | | |

The results of main effect analyses in terms of proportion values are presented in Table 2.7. In this case, we looked if most of the companies benefit from the certification. In other words, if the mean effect size value is above 0.5, we conclude that the effect is positive and vice versa. Additionally, if the confidence intervals do not include the value 0.5, we conclude that the effect is significant. As can be seen from Table 2.7, the effect of the certification is positive but not significant on costs and revenues. In contrast, the effect of the certification on financial performance is negative and not significant. Furthermore, according to Q statistics and the 75% rule, all three relationships are heterogeneous. Therefore we continued with the subgroups analyses.

Table 2.8 shows subgroup outcomes for costs. First of all the results suggest that the short-term effect of the certification is also positive and not significant, but it is only based on one study. Similarly, the effects of the old versions and new versions of the standard are positive and not significant. However, a higher proportion of the companies benefited from the new versions of the standard than from the old version. Interestingly, in studies where both old and new versions of the certification were included, the result is positive and significant. Q statistics show that the difference between these three subgroups is significant. Subgroup analysis of regions also reveals surprising results. In North America and Australia / New Zealand, the effect of the certification is negative and significant. On the other hand, only in Africa the effect is positive and significant. However the results should be interpreted carefully, because all three are based on only one study. In other regions, the results are positive but not significant. In Asia and Central / East Europe a higher proportion of companies benefited from the certification than in North / West Europe and the Middle East. Additionally, the difference between the subgroups appears to be significant. In the case of company size subgroup analysis, the results are not different from the main results. Most of the small and medium companies benefit from the certification, but the effect is not significant. Subgroup analysis for sectors shows similar results, the results are positive but not significant. However, in the service sector a higher proportion of the companies benefit from the certification than in the manufacturing sector. Additionally, the difference between these two subgroups is significant. Lastly, analysis of respondents reveals some interesting results. When senior managers respond to the questionnaires the results are positive, significant and greater than when quality managers

respond. Moreover, the difference between the two subgroups is also statistically significant.

Moderator analyses for revenues measured in proportion values are shown in Table 2.9. First of all, the moderator analyses of the versions of the standard are not different from the main effect. In all three subgroups the effect is positive but not significant. Moreover, even though the difference between the subgroups is significant according to the Q test, the magnitudes of the mean effect sizes are almost similar. Subgroup analysis of regions shows that the effect is positive and significant in the Africa and South Europe regions. Moreover, most of the Asian and North European companies benefit from the certification in terms of cost, but the results are not statistically significant in these two regions. In contrast, in the North America, Australia / New Zealand and Central / East Europe regions most of the companies do not benefit from the certification and these results are also significant. Additionally, the difference between different regions is significant. In terms of company size, the results are similar to the main results. Most of the small and medium sized companies report that they benefited from the certification but the results are not statistically significant. The results are the same also for the manufacturing sector. However, more than half of the companies in the service sector reported that they do not benefit. Both for the manufacturing and service sectors the results are not significant, but the difference between these subgroups is significant. Lastly, the analysis of respondents reveals some interesting results. When senior managers answer the questionnaire the results are significant and negative. On the other hand, when the respondents are quality managers the results are positive and not significant. Q test shows that the difference between these two subgroups is significant.

Table 2.10 presents the results of subgroup analysis for financial performance measured in proportion values. In terms of different versions of the standard, both old and new versions reveal similar results as the main analysis. In other words, more than half of the companies do not benefit from the certification, but these results are not significant. In one study where both versions of the standards are studied, the results are significantly negative. Analysis of region subgroups shows that in North / West Europe and South Europe the results are the same as the main results. However, in North America and Australia / New Zealand most of the companies do not benefit from the certification and

Table 2.9. Results of subgroup analysis for revenues measured in proportion values

| Dependent variable | Number of studies | Sample size | Fixed effect mean | Random effect mean | 95% CI | Standard error | Q (p) | I ² | Qb (p) |
|--------------------------------|-------------------|-------------|-------------------|--------------------|-------------|----------------|-----------------|----------------|----------------|
| Effect time | | | | | | | | | |
| Insufficient data for analysis | | | | | | | | | |
| Insufficient data for analysis | | | | | | | | | |
| Standard version | | | | | | | | | |
| 9000:1987/1994 | 18 | 4949 | 0.728 | 0.570 | 0.452/0.688 | 0.060 | 1276.13 (0.00)* | 0.987 | 44.75 (0.00)* |
| Mixed | 3 | 765 | 0.659 | 0.567 | 0.306/0.828 | 0.133 | 106.56 (0.00)* | 0.981 | (0.00)* |
| 9001:2000/2008 | 5 | 785 | 0.618 | 0.568 | 0.384/0.751 | 0.093 | 95.94 (0.00)* | 0.958 | |
| Region | | | | | | | | | |
| Africa | 1 | 32 | 0.685 | 0.685* | 0.524/0.846 | 0.082 | | | |
| America North | 2 | 320 | 0.352 | 0.344* | 0.268/0.420 | 0.039 | 1.19 (0.27) | 0.162 | |
| America South | | | | | | | | | |
| Insufficient data for analysis | | | | | | | | | |
| Asia | 6 | 1821 | 0.889 | 0.680 | 0.442/0.917 | 0.121 | 367.14 (0.00)* | 0.986 | 825.82 (0.00)* |
| Australia / New Zealand | 1 | 48 | 0.207 | 0.207* | 0.092/0.321 | 0.058 | | | |
| Europe Central / East | 2 | 243 | 0.401 | 0.401* | 0.339/0.462 | 0.031 | 0.07 (0.80) | 0.000 | |
| Europe North / West | 5 | 2229 | 0.729 | 0.555 | 0.382/0.728 | 0.088 | 229.25 (0.00)* | 0.983 | |
| Europe South | 6 | 1996 | 0.579 | 0.611* | 0.511/0.710 | 0.051 | 99.92 (0.00)* | 0.950 | |
| Middle East | | | | | | | | | |
| Insufficient data for analysis | | | | | | | | | |
| Size | | | | | | | | | |
| Small, medium | 3 | 394 | 0.551 | 0.554 | 0.189/0.918 | 0.186 | 144.08 (0.00)* | 0.986 | |
| Large | | | | | | | | | |
| Insufficient data for analysis | | | | | | | | | |
| Sector | | | | | | | | | |
| Manufacturing | 6 | 572 | 0.578 | 0.549 | 0.408/0.690 | 0.072 | 56.4 (0.00)* | 0.911 | 91.12 (0.00)* |
| Service | 2 | 91 | 0.470 | 0.470 | 0.367/0.572 | 0.052 | 0.18 (0.67) | 0.000 | |
| Respondent | | | | | | | | | |
| Quality managers | 4 | 1306 | 0.545 | 0.533 | 0.488/0.579 | 0.023 | 5.83 (0.12) | 0.485 | 191.30 (0.00)* |
| Mid-level managers | | | | | | | | | |
| Senior managers | 1 | 20 | 0.250 | 0.250* | 0.060/0.440 | 0.097 | | | |
| Insufficient data for analysis | | | | | | | | | |

these results are significant. Lastly, in Africa the results are significantly positive. Subgroup analysis of company size reveals similar results to the main analysis. The same holds for the subgroup analysis in the manufacturing sector. Whereas, in the service sector the results are significantly negative. The difference between the manufacturing and the service sectors is statistically significant. Lastly, analysis of respondents shows that when senior managers are the respondents, the results are the same as the main results. However, in the case of quality managers, the effect of the certification on financial performance is significantly negative. In other words, most of the quality managers reported that they do not benefit from the certification. Q test indicates that the difference between these two respondent groups is significant.

The results of main effect analyses in terms of arithmetic means are provided in Table 2.11. In this case, we looked at the average score reported by companies on a Likert scale from 1 to 5 where the value 5 means highest benefits. Specifically, we look at if the average value is below or above the value 3. Additionally, if the confidence intervals do not include the value 3, we conclude that the effect is significant. It can be seen from the data below that the effect of the certification is significantly positive on costs, revenues and financial performance. However, 75% rule and Q statistics show that there may be some moderating factors. Thus, moderator analyses had to be conducted for all three dependent variables.

Table 2.12 presents the results of subgroup analysis for costs measured in arithmetic mean values. Analysis of effect times shows that the long-term effect is negative and the short-term effect is positive. Both results are statistically not significant, but the difference between them is significant. However, the results should be interpreted carefully, because in this case there is only one study that looks at the short and long-term effect of the certification separately. According to the analysis of different versions of the standard, both in old and new versions the results are similar to the main results. However, the average effect size of the studies which used the new standard is higher than the average effect size of the studies with the old standard. On the other hand, in the case where both old and new versions of the standard was studied, the results are positive and lower than the other two subgroups, but not significant. Moreover the difference between the three groups is significant. Subgroup analysis of region shows that in Asia, North / West Europe,

South Europe and Middle East, the results are consistent with the main results. On the other hand in North America and Australia / New Zealand regions, the results are positive and lower than in the other regions, but not significant. Again, the difference between the regions appears to be statistically significant. Both for small and large companies the effect is significantly positive. However, large companies reported higher benefits than smaller companies and this difference is significant. The benefits gained by manufacturing companies are similar to the main effect. Even though the effect size is positive, the companies in the service sector gained less benefit than the companies in the manufacturing sector. The effect size in the service sector is not significant, but the difference between the subgroups is significant. Lastly, the analysis of respondents reveals that when quality managers respond, the results are significantly positive. However, when the senior managers respond, the results are positive but lower than the results of the quality managers and not significant. Similar to the previous cases, the difference between the subgroups is significant.

The results for revenues measured in arithmetic mean values are illustrated in Table 2.13. The difference between the subgroups is significant for each moderator. The moderator analyses of effect time, standard version and region reveal similar results to the ones described above for costs. Subgroup analysis of company sizes shows that the average effect size of the large companies is significantly positive. On the other hand, the effect size of the small and medium companies is still positive, but lower and not significant. Subgroup analysis of firm sector indicates similar results to the main results. However, manufacturing companies report higher benefits than the service companies. Lastly, both subgroups in respondent analysis reveal positive and significant results, but the quality managers report higher benefits than the senior managers.

Table 2.10. Results of subgroup analysis for financial performance measured in proportion values

| Dependent variable | Number of studies | Sample size | Fixed effect mean | Random effect mean | 95% CI | Standard error | Q (p) | I ² | Qb (p) |
|--------------------------------|-------------------|-------------|-------------------|--------------------|-------------|----------------|-----------------|----------------|----------------|
| Effect time | | | | | | | | | |
| Insufficient data for analysis | | | | | | | | | |
| Insufficient data for analysis | | | | | | | | | |
| Standard version | | | | | | | | | |
| 9000:1987/1994 | 10 | 3002 | 0.558 | 0.421 | 0.228/0.614 | 0.098 | 1173.51 (0.00)* | 0.992 | 83.79 (0.00)* |
| Mixed | 1 | 180 | 0.350 | 0.350* | 0.280/0.420 | 0.036 | | | |
| 9001:2000/2008 | 5 | 781 | 0.417 | 0.455 | 0.241/0.669 | 0.109 | 121.69 (0.00)* | 0.967 | |
| Region | | | | | | | | | |
| Africa | 1 | 32 | 0.690 | 0.690* | 0.530/0.850 | 0.082 | | | |
| America North | 2 | 320 | 0.337 | 0.337* | 0.286/0.389 | 0.026 | 0.14 (0.71) | 0.000 | |
| America South | | | | | | | | | |
| Insufficient data for analysis | | | | | | | | | |
| Asia | 1 | 4 | 0.750 | 0.750 | 0.326/1.00 | 0.217 | | | 924.63 (0.00)* |
| Australia / New Zealand | 1 | 48 | 0.040 | 0.040* | 0.000/0.095 | 0.028 | | | |
| Insufficient data for analysis | | | | | | | | | |
| Europe Central / East | 2 | 1240 | 0.767 | 0.432 | 0.000/1.000 | 0.370 | 185.55 (0.00)* | 0.995 | |
| Europe North / West | 7 | 2319 | 0.424 | 0.461 | 0.329/0.593 | 0.067 | 268.67 (0.00)* | 0.978 | |
| Europe South | | | | | | | | | |
| Middle East | | | | | | | | | |
| Insufficient data for analysis | | | | | | | | | |
| Size | | | | | | | | | |
| Small, medium | 2 | 66 | 0.533 | 0.475 | 0.000/1.000 | 0.415 | 139.22 (0.00)* | 0.993 | |
| Large | | | | | | | | | |
| Insufficient data for analysis | | | | | | | | | |
| Sector | | | | | | | | | |
| Manufacturing | 3 | 260 | 0.196 | 0.351 | 0.044/0.659 | 0.157 | 85.69 (0.00)* | 0.977 | 356.72 (0.00)* |
| Service | 1 | 20 | 0.060 | 0.060* | 0.000/0.164 | 0.053 | | | |
| Insufficient data for analysis | | | | | | | | | |
| Respondent | | | | | | | | | |
| Quality managers | 4 | 1327 | 0.317 | 0.276* | 0.189/0.363 | 0.044 | 29.24 (0.00)* | 0.897 | 393.68 (0.00)* |
| Mid-level managers | | | | | | | | | |
| Senior managers | 1 | 20 | 0.300 | 0.300 | 0.099/0.501 | 0.102 | | | |

| | | | | | | | | | |
|--------------------|---|-----|-------|--------------------------------|-------------|-------|----------------|------|---------------|
| Quality managers | 9 | 762 | 3.487 | 3.641* | 3.266/4.016 | 0.191 | 392.01 (0.00)* | 0.98 | 65.02 (0.00)* |
| Mid-level managers | | | | Insufficient data for analysis | | | | | |
| Senior managers | 4 | 479 | 3.702 | 3.556* | 3.066/4.045 | 0.25 | 183.71 (0.00)* | 0.98 | |

Table 2.14. Results of subgroup analysis for financial performance measured in arithmetic mean values

| Dependent variable | Number of studies | Sample size | Fixed effect mean | Random effect mean | 95% CI | Standard error | Q (p) | I ² | Qb (p) |
|-------------------------|-------------------|-------------|-------------------|--------------------|--------------------------------|----------------|----------------|----------------|----------------|
| Effect time | | | | | | | | | |
| Short | | | | | Insufficient data for analysis | | | | |
| Long | | | | | Insufficient data for analysis | | | | |
| Standard version | | | | | | | | | |
| 9000:1987/1994 | 5 | 811 | 3.573 | 3.598* | 3.309/3.886 | 0.147 | 107.75 (0.00)* | 0.96 | 446.70 (0.00)* |
| Mixed | 2 | 385 | 2.840 | 2.917 | 2.646/3.188 | 0.138 | 4.37 (0.04)* | 0.77 | |
| 9001:2000/2008 | 11 | 1466 | 3.786 | 3.524* | 3.282/3.766 | 0.123 | 572.47 (0.00)* | 0.98 | |
| Region | | | | | | | | | |
| Africa | | | | | Insufficient data for analysis | | | | 319.43 (0.00)* |
| America North | 1 | 186 | 3.601 | 3.601* | 3.488/3.714 | 0.057 | | | |
| America South | | | | | Insufficient data for analysis | | | | |
| Asia | 7 | 1080 | 3.787 | 3.375 | 2.977/3.774 | 0.204 | 609.63 (0.00)* | 0.99 | |
| Australia / New Zealand | | | | | Insufficient data for analysis | | | | |
| Europe Central / East | | | | | Insufficient data for analysis | | | | |
| Europe North / West | 4 | 430 | 3.523 | 3.347 | 2.904/3.79 | 0.226 | 113.51 (0.00)* | 0.97 | |
| Europe South | | | | | Insufficient data for analysis | | | | |
| Middle East | 5 | 525 | 3.636 | 3.672* | 3.299/4.044 | 0.190 | 88.72 (0.00)* | 0.95 | |
| Size | | | | | | | | | |
| Small, medium | 3 | 193 | 3.349 | 3.401* | 3.168/3.634 | 0.119 | 6.52 (0.04)* | 0.69 | 125.66 (0.00)* |
| Large | 2 | 322 | 3.309 | 3.309* | 3.209/3.408 | 0.051 | 0.07 (0.79) | 0.00 | |
| Sector | | | | | | | | | |
| Manufacturing | 7 | 464 | 3.205 | 3.302* | 3.117/3.488 | 0.094 | 28.46 (0.00)* | 0.79 | |
| Service | | | | | Insufficient data for analysis | | | | |
| Respondent | | | | | | | | | |
| Quality managers | 2 | 166 | 3.945 | 3.966* | 3.819/4.112 | 0.075 | 2.5 (0.11) | 0.60 | 857.93 (0.00)* |
| Mid-level managers | | | | | Insufficient data for analysis | | | | |
| Senior managers | 2 | 169 | 3.820 | 3.820* | 3.807/3.833 | 0.006 | 0.01 (0.92) | 0.00 | |

Table 2.14 provides the results of subgroup analysis for financial performance measured in arithmetic mean values. Also in this case, the difference between the subgroups is significant for each moderator. The analysis of the subgroups with old and the new versions of the standard reveal similar results to the main analysis. In the case where both old and new versions of the standard were studied, the results are negative but not significant. Subgroups analysis of regions shows that in North America and the Middle East the effect is significantly positive. However in Asia and South Europe, the effect is still positive, but lower than the other two regions and not significant. In the case of company sizes, subgroup analysis reveals comparable results with the main analysis. Additionally, it can be seen that small and medium companies report slightly higher benefits than the large companies. Analysis of the manufacturing sector subgroup shows significantly positive results. Finally, the results of respondent subgroup analysis are consistent with the main results, but like in the previous two cases the average effect size is higher when the quality managers respond than when the senior managers respond.

Chapter 3.

The global influence of ISO 9001 and the role of national context: A meta-analysis

Abstract

With growing globalization, organizations increasingly implement various management standards. To date more than one million organizations have implemented the ISO 9001 standard worldwide. The ISO 9001 certificate signals that organizations can meet customers' quality expectations. In addition, firms can potentially improve operational and market performance. Nevertheless, research on the performance benefits of ISO 9001 has led to mixed results. In addition, research has not fully investigated how national differences affect ISO 9001. This study conducts a meta-analysis to investigate the global benefits of ISO 9001 and the role of national culture and economic development. The analysis examines more than 1000 studies on ISO 9001 and uses 53 studies from 24 different countries involving over 11,000 firms. The results indicate that ISO 9001 positively affects operational and market performance globally. The analysis also shows that national culture and economic development of a country affect the relative benefits of ISO 9001. This is the first study to investigate the global impact of ISO 9001 and to show how the performance benefits differ across national boundaries. The findings show that managers should consider national conditions when implementing ISO 9001 or when evaluating suppliers. In general, this study contributes to the global operations literature on implementing management standards and notes the importance of understanding national differences.

Keywords: ISO 9001; Quality management; Global operations; Divergence; National Culture; Economic development; Meta-analysis

3.1. Introduction

Over the past few decades, globalization has created many opportunities and challenges for managers. Lower trade barriers have increased the opportunities for sourcing products and services from different parts of the world. However, managers also face the challenge of

making sure that processes seamlessly execute across borders to ensure high quality products and services. Assessing suppliers' capabilities becomes more difficult when they are located in other parts of the world. In particular, firms in developing countries may not have the same level of managerial expertise as firms in developed countries. In order to assure high quality products and services, ISO 9001 has become an important global management standard for conducting business worldwide. Cao and Prakash (2007) note that ISO 9001 "standards have both instrumental and normative functions. They regulate by creating incentives for actors to comply with them and they educate actors by providing logic of appropriate behavior. (p. 5)." Organizations can also obtain a certification when they properly implement the ISO 9001 standard. Kiggundu (2002) said, "one of the most important findings for the benefit of newly globalizing developing countries is the use of ISO 9001 certification" (p. 133). ISO 9001 certification has been growing at a rate of 50,000 to 60,000 per year worldwide (Corbett and Kirsch, 2001). In addition, over 560,000 organizations from 159 countries have obtained ISO 9001 certification by the year 2002 (Corbett, 2006). This number now exceeds more than one million certificates in 187 countries (ISO, 2013a).

Despite ISO 9001's wide acceptance, research shows mixed results about the performance benefits. Even though some studies show positive benefits of ISO 9001 (Benner and Veloso, 2008; Corbett and Kirsch, 2005; Levine and Toffel, 2010; Naveh and Marcus, 2005), other studies do not find that ISO 9001 leads to higher performance (Martínez-Costa et al., 2009; Singh et al., 2011; Terziowski et al., 1997). Most of these studies are conducted in a single country. National differences can potentially explain some of the mixed results. In general, scholars have also questioned the global applicability of management theories. Zhao et al. (2006) notes, "although most management theory was developed in the Western hemisphere, it is often assumed to be universally applicable (p. 466)." In the management literature, the convergence/divergence hypotheses offer two competing views of the universal applicability of management practices (Naor et al., 2010; Ralston et al., 1995). The convergence hypothesis argues that as nations develop they embrace behaviors similar to industrialized countries. Consequently, they become more like industrialized countries and adopt universal practices about work and corporate culture, which ultimately undermines the effect of

national culture (Child and Keiser, 1979; Shenkar and Ronen, 1987). In contrast, the divergence hypotheses argues that “national culture, not industrialized practice, drives values, and that, even if the country becomes industrialized, the values systems in the work force remain will largely unchanged” (Ralston et al., 1997, p. 183).

The convergence/divergence hypotheses become important to understand the performance implications of ISO 9001, since these standards “are based on global expert opinion ... [and] ... developed through a multi-stakeholder process” (ISO, 2014b). The International Organization for Standardization (ISO) develops these standards through a consensus process that intends to promote global applicability (ISO, 2014b). Studies have looked at the global diffusion of ISO 9001 (Cao and Prakash, 2011; Corbett, 2006; Guler et al., 2002). However, research has not fully investigated the global performance benefits of ISO 9001 since these studies typically take place in a single country. This research investigates the following questions: 1. What are the global performance benefits of ISO 9001? That is, do organizations in different countries benefit differently from ISO 9001 implementation? 2. How do national differences affect ISO 9001 performance? Specifically, do national culture and economic development of a country affect the performance of ISO 9001?

To investigate these questions, this study employs meta-analysis on 53 studies covering 24 different countries and involving more than 11,000 firms. Meta-analysis critically examines and integrates research findings across different studies, and it has won widespread recognition in management research over the last few decades (Capon et al., 1990; Carney et al., 2011; Chen et al., 2010; Crook et al., 2008; Gooding and Wagner III, 1985; Stahl and Voigt, 2008). Meta-analysis enables theory-testing since it allows researchers to examine a set of factors not fully investigated in any single primary study (Eden, 2002). As a result, meta-analysis is a promising technique to examine the global performance benefits of ISO 9001. Because previous research is mostly country-specific, meta-analysis also allows us to examine the effect of national differences.

The analysis draws on literature from quality management (Boiral, 2012b; Casadesús and Karapetrovic, 2005b; Naveh and Marcus, 2005; Sroufe and Curkovic, 2008), institutional theory (DiMaggio and Powell, 1983; Meyer and Rowan, 1977), signaling theory (Akdeniz and Talay, 2013; Erdem et al., 2006), international management (Adler,

1983; Child and Keiser, 1979) and international operations (Flynn and Saladin, 2006; Kull and Wacker, 2010; Naor et al., 2010; Rungtusanatham et al., 2005). The results show that ISO 9001 leads to operational and market performance benefits globally. However, organizations in some countries benefit more from ISO 9001 than others. The level of economic development and national culture affect ISO 9001 performance. More broadly, this paper offers new insights into the benefits derived from ISO 9001 and under what national conditions companies benefit the most from ISO 9001.

In the era of a “flattening world” (Friedman, 2006), it is important for practitioners to understand the impact of national differences on operations. This paper demonstrates that even though ISO 9001 positively influences performance globally, the national differences affect the relative performance benefits of ISO 9001. This can help practitioners in several ways. First, they can consider the cultural conditions in their company to assess ISO 9001 implementation. Second, they can predict which countries benefit more from ISO 9001 when selecting suppliers. Third, they can better determine the performance benefits from ISO 9001 when making global sourcing decisions. To summarize, managers benefit from understanding national differences when assessing the benefits from ISO 9001.

The remainder of the paper is organized as follows. The next section extensively reviews the relevant literature and theoretically develops the hypotheses. Section 3 describes the meta-analysis research methodology. Section 4 presents the results of the meta-analysis. Section 5, discusses the findings and presents the conclusions, managerial and theoretical implications.

3.2. Theoretical background and hypotheses

Figure 3.1. Research framework

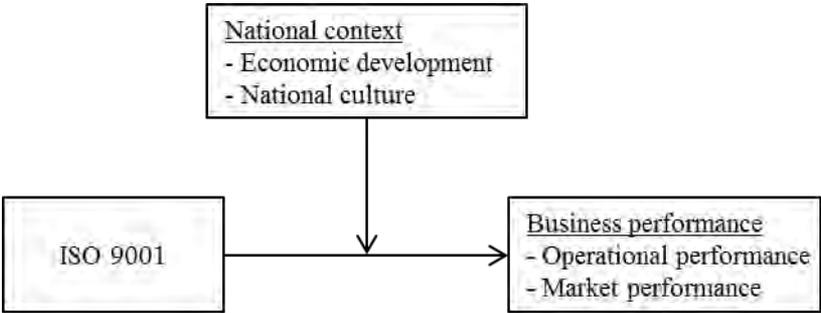


Figure 3.1 gives the overall research framework for this study. The first section develops hypotheses about the overall effect of ISO 9001 on performance. Since research shows mixed results between ISO 9001 and performance, this section develops hypotheses both for and against the impact of ISO 9001 on performance. Other meta-analytic approaches have used this general approach to hypotheses development when confronted with mixed results (Carney et al., 2011; Heugens and Lander, 2009). The second section develops hypotheses for the effect of national differences on ISO 9001 performance.

3.2.1. Performance effects of ISO 9001

Research shows conflicting results about the performance benefits of ISO 9001. A large body of literature reports positive effects of ISO 9001 on different performance measures (Benner and Veloso, 2008; Corbett and Kirsch, 2005; Levine and Toffel, 2010; Naveh and Marcus, 2005). However, some studies report that ISO 9001 has no significant impact on performance (Martínez-Costa et al., 2009; Singh et al., 2011; Terziovski et al., 1997). In addition, some studies report a negative relationship between ISO 9001 and performance (Yeung et al., 2011). ISO 9001 can potentially affect both the operational and market performance of an organization. The next section develops hypotheses both for and against these performance variables.

3.2.1.1. Operational performance

Scholars have argued that ISO 9001 increases operational performance. ISO 9001 requires organizations to focus on and continuously improve their processes, so they can better meet the requirements of their customers (ISO, 2012b). Specifically, ISO 9001 helps organizations standardize workflows and improve coordination between different functions (Sharma and Gadenne, 2001; Singels et al., 2001). It promotes documentation that clearly defines work instructions and job responsibilities (Casadesús and Karapetrovic, 2005a; Chow-Chua et al., 2003; Thawesaengskulthai and Tannock, 2008). ISO 9001 helps set clear quality objectives and encourages fact based data driven decision-making (Casadesús and Karapetrovic, 2005b; Claver et al., 2002; Leung et al., 1999; van der Wiele et al., 2005). In addition, ISO 9001 also promotes employee learning and development. It increases the dissemination of knowledge among employees and their commitment to quality (Chow-Chua et al., 2003; Douglas et al., 2003; Magd and Curry, 2003; Magd,

2008). Consequently, ISO 9001 decreases process variation, scrap, rework and improves response time (Lee, 1998; Sun, 1999), which enhances operational performance. This suggests the following hypothesis.

***H1a.** ISO 9001 certification leads to an increase in operational performance.*

In contrast, some scholars argue that ISO 9001 does not increase operational performance. Scholars have noted that ISO 9001 can become bureaucratic and overly focused on documentation (Sroufe and Curkovic, 2008). Organizations often fail to understand and adopt the process-driven philosophy of the standard (Sroufe and Curkovic, 2008). In addition, ISO 9001 may cause an organization to get locked into their current practices because certification itself makes managers satisfied about quality (Terziovski et al., 1997). Institutional theory offers another explanation why ISO 9001 may not affect performance. Institutional theory argues that organizations act to enhance their legitimacy rather than improving their efficiency (DiMaggio and Powell, 1983; Meyer and Rowan, 1977; Scott, 1995). Organizations may get ISO 9001 certified because of the market and industry expectations (Anderson et al., 1999; Boiral, 2012b). As a result, they make minimum effort to change their processes (Singh et al., 2011). In other words, the implementation of the standard becomes superficial and ceremonial (Boiral, 2012b). As a result, ISO 9001 does not lead to operational performance, which suggests the following alternative hypothesis.

***H1b.** ISO 9001 certification does not lead to an increase in operational performance.*

3.2.1.2. Market performance

Scholars have argued that ISO 9001 increases market performance for a number of reasons. First, ISO 9001 improves customer satisfaction, which increases market performance (Naveh and Marcus, 2005). Second, signaling theory offers another explanation why ISO 9001 increases market performance. Spence (1973) gave a classical example of signaling theory where college diplomas help to distinguish high productivity job applicants from low productivity ones, independently of whether students have learnt anything while attending college. From a signaling theory perspective, ISO 9001 certification may work in the same way. Many markets have information asymmetries where customers lack full knowledge about their supplier's products (Blind, 2004; Terlaak and King, 2006). ISO 9001 can help solve this problem. It signals that companies have a

system in place to assure product quality. Consequently, ISO 9001 certified companies may have a competitive advantage over non-certified companies (Terlaak and King, 2006), which suggest the following hypothesis.

***H2a.** ISO 9001 certification leads to an increase in market performance.*

On the other hand, some scholars argue that ISO 9001 may not increase market performance for the following reasons. First, high adoption rates of ISO 9001 worldwide create homogeneity among organizations (Naveh and Marcus, 2005). As a result, ISO 9001 does not differentiate firms anymore and consequently is no longer a source of competitive advantage. Second, when certified companies do not improve their operational performances and produce products that sometimes fail to meet customer requirements, the confidence in ISO 9001 certification and the overall signaling effect of certification decreases (Terlaak and King, 2006). In addition, some scholars have found that low performing companies could obtain ISO 9001 certification which called into question the value of ISO 9001 certification (Seddon, 2000; Seddon, 1997). This suggests the following alternative hypothesis.

***H2b.** ISO 9001 certification does not lead to an increase market performance.*

3.2.2. The role of national culture and economic development

ISO aims to promote global applicability of standards by developing them “through a multi-stakeholder process ... based on global expert opinion” (ISO, 2014b). Consistent with this objective, more than one million organizations in 187 countries have adopted ISO 9001 (ISO, 2013a) and more than 100 countries are involved in the process of its development and revisions (ISO, 2014e). Given the global intent of ISO 9001, the convergence/divergence debate becomes important to understand the performance implications of this standard.

The convergence/divergence debate gives two opposing views on the universal applicability of management practices (Ralston et al., 1995). According to the convergence arguments, as nations develop they become more like industrialized countries. They adopt universal practices about work and corporate culture, which eventually weakens the effect of national culture (Child and Keiser, 1979; Shenkar and Ronen, 1987). However according to the divergence argument, when a country becomes industrialized their value systems in the work force remain largely unchanged (Ralston et al., 1997). The divergence

argument also says that observed differences across nations would hinder the cross-national applicability of managerial practices and theories (Child and Keiser, 1979). These observed differences across nations might arise from differences in cultures, economic, politic, and social and juridical conditions (Adler, 1983; Rungtusanatham et al., 2005). A large body of literature supports the divergence argument and shows that the national differences have an impact on quality management practices (Flynn and Saladin, 2006; Kull and Wacker, 2010; Vecchi and Brennan, 2011). On the other hand, some studies suggest the universalistic perspective and argue that quality management practices can be implemented regardless of national differences (Rungtusanatham et al., 2005).

Few studies have investigated the relationship between national differences and quality management practices. Most of these studies have examined the relationship between national differences and the presence of various quality management practices (Flynn and Saladin, 2006; Vecchi and Brennan, 2011). Some studies have looked at the impact of national differences on quality performance, but they did not consider the impact of implementing quality management systems (Gray and Massimino, 2014; Naor et al., 2010). Kull and Wacker (2010) conducted one of the few studies that examine the effectiveness of quality management practices in relation to the national differences. They studied the relationship between the extent of resources (money, time, and/or people) invested in various quality management practices and product quality performance, together with national differences. However, to our knowledge, no research has investigated how national differences affect the performance ISO 9001, which is important given the global purpose of the standard. Therefore, this paper investigates how national culture and the level of economic development of a country affect the performance of ISO 9001.

3.2.2.1. Economic development

The level of economic development in a country affects a firm's managerial sophistication. More highly developed countries tend to have firms with more experience and sophisticated management systems. Quality standards increase with the level of economic development (Pheng, 1993). Firms in developed countries have more formal approaches towards quality and customer satisfaction (Adam et al., 1997; Prasad and Tata, 2003). They have more experience with different improvement systems like total quality

management, six sigma, lean, etc. As a result, ISO 9001 may not alter their existing practices too much. On the other hand, firms in developing countries may have less sophisticated management systems, little quality management expertise and training (Lakhe and Mohanty, 1994) and lower product quality (Prasad and Babbar, 2000). As a result, they can benefit more from ISO 9001. ISO 9001 can significantly enhance their process improvement capabilities, which leads to higher operational performance. This suggests the following hypothesis.

H3. The effect of ISO 9001 certification on operational performance is higher in developing countries.

The level of economic development should also affect the marketing performance of ISO 9001. ISO 9001 can signal an expected level of quality performance to customers. Signaling works when it is difficult to assess an organization's quality performance. Graffin and Ward (2010) state that the more uncertainty customers have about a company's capabilities, the more likely the company's reputation will benefit from third-party signals like certification. Firms in less developed countries typically have less information about quality available to customers when compared to firms in developed countries. In other words, information asymmetries tend to occur more with firms in developing countries. Therefore, consumers in developing countries look for other signals to infer quality (Erdem et al., 2006), which suggests the following hypothesis.

H4. The effect of ISO 9001 certification on marketing performance is higher in developing countries.

3.2.2.2. National culture

GLOBE (Global Leadership and Organizational Behavior Effectiveness) defines national culture as "shared motives, values, beliefs, identities, and interpretations or meanings of significant events that result from common experiences of members of collectives that are transmitted across generations" (House et al., 2004, p. 15). The GLOBE project collected data in the mid-1990s from more than 17000 middle managers in 951 organizations in 62 societies. This comprehensive study intended to overcome the limitations of other studies on how to assess national culture (Javidan et al., 2006). The GLOBE framework consists of nine cultural dimensions: Uncertainty avoidance, power distance, institutional collectivism, in-group collectivism, assertiveness, gender egalitarianism, future orientation,

performance orientation and humane orientation. Gender egalitarianism (i.e. the degree to which a collective minimizes gender role differences) is not included in this study, because ISO 9001 does not clearly relate to gender roles. Kull and Wacker (2010) excluded gender egalitarianism from their study on quality and national culture for similar reasons.

Uncertainty avoidance

Uncertainty avoidance (UA) is “the extent to which members of an organization or society strive to avoid uncertainty by relying on established social norms, rituals, and bureaucratic practices.” (House et al., 2004, p. 11). National cultures with high UA can positively affect the relationship between ISO 9001 and operational performance for several reasons. First, leaders in high UA cultures do not feel comfortable with instability and prefer clear organizational structures and rules (Blunt, 1988). As a result, they set clear goals for the organization. Similarly, ISO 9001 (ISO, 2012b) states that leaders should establish a clear vision for quality, set challenging quality goals and targets. In addition, employees in high UA cultures tend to accept rules, policies and follow standard procedures to increase predictability (Hofstede, 2001; Perrow, 1972). Moreover, employees in high UA cultures tend to search for information (Ashford, 1986; Morrison, 2002) and seek feedback (Ashford and Cummings, 1983). This should lead to more fact-based decision-making and continuous improvement, which leads to higher operational performance, which suggests the following hypothesis.

H5. The effect of ISO 9001 certification on operational performance is higher in high Uncertainty Avoidance cultures.

High levels of UA should also lead to higher market performance for the following reasons. First, high UA cultures place more value on feedback (Ashford and Cummings, 1983). Consequently, employees will likely listen to customer feedback and make corrective changes. This is consistent with the ISO 9001 standard and should lead to higher customer satisfaction. Furthermore, consumers in high UA cultures also try to reduce uncertainty by searching for and favoring credible and consistent brands (Dawar and Parker, 1994; Roth, 1995). They will gather more information, even at the expense of incurring more search costs. As a result, they value the signal from ISO 9001 more than consumers in low UA cultures do (Akdeniz and Talay, 2013; Erdem et al., 2006). This suggests the following hypothesis.

H6. The effect of ISO 9001 certification on market performance is higher in high Uncertainty Avoidance cultures.

Power distance

Power distance (PD) is “the degree to which members of an organization or society expect and agree that power should be stratified and concentrated at higher levels of an organization or government” (House et al., 2004, p. 12). National cultures with low PD should have higher operational performance for the following reasons. First, leaders in low PD cultures encourage employees to have open and honest discussions. Leaders from low PD cultures allow employees to influence decision-making and have confidence in their decisions (Dansereau Jr et al., 1975). As a result, employees feel empowered to make improvement suggestions (Huselid, 1995; Nadler, 1989). In contrast, leaders from high PD cultures tend to communicate less with lower level employees and do not empower them as much (Dansereau Jr et al., 1975) . In these settings, employees depend on their supervisors to make decisions. Leaders in high PD cultures tend to use coercion which also decreases employee commitment and leads to resistance (Yukl and Heaton, 2002). Furthermore, in high PD cultures teamwork may become more difficult since employees from different levels may not feel as comfortable with face-to-face interactions (Newman and Nollen, 1996). However, continuous improvement activities require employee involvement in critical decisions, since they often have important operational knowledge (Flynn and Saladin, 2006; Kull and Wacker, 2010). Solving quality problems often requires teamwork (Smith and Dowling, 2001) that engages employees with expertise from different areas and levels of the organization. Lastly, continuous improvement requires a culture of learning (Anwar and Jabnoun, 2006). High PD cultures may interfere with employee learning (Haire et al., 1966). Collectively this suggests the following hypothesis.

H7. The effect of ISO 9001 certification on operational performance is higher in low Power Distance cultures.

Low levels of PD should also lead to higher market performance for the following reasons. First, consumers in high PD cultures tend to distrust authority (Dawar et al., 1996). Distrust in authority may decrease the expected signaling effects (Erdem et al., 2006). Second, employees in high PD cultures defer to authority which makes it difficult to discuss customer issues that traverse hierarchies (Flynn and Saladin, 2006). This would

decrease understanding of customer needs and expectations which is incongruent with the customer focus principle of ISO 9001. This suggests the following hypothesis.

***H8.** The effect of ISO 9001 certification on market performance is higher in low Power Distance cultures.*

Institutional collectivism

Institutional collectivism (IC) is “the degree to which organizational and societal institutional practices encourage and reward collective distribution of resources and collective action” (House et al., 2004, p. 12). National cultures with high IC should have higher operational performance for a number of reasons. First, ISO 9001’s process approach requires cooperation between different employees because one person’s output in the process forms another person’s input. High IC cultures emphasize the importance of interdependence of individuals and employees feel motivated to contribute to the group (Kashima and Callan, 1994; Markus and Kitayama, 1991; Yu and Yang, 1994). This promotes teamwork (Erez, 1994). ISO 9001 involves the use of teams to work on process improvement projects. Researchers also found developing a strong team orientation increases the rate of adoption of quality management programs (Young, 1992). Finally, consistent with ISO 9001, high IC cultures give much more importance to training than low IC cultures (Triandis, 2002). This suggests the following hypothesis.

***H9.** The effect of ISO 9001 certification on operational performance is higher in cultures with high Institutional Collectivism.*

IC should also affect market performance. ISO 9001 promotes mutual, long-term relationships with customers. Organizations should collaborate with their customers to improve customer satisfaction. High IC cultures value more long-term intimate interactions. In general, this is consistent ISO 9001’s focus on the customer, which suggest the following hypothesis.

***H10.** The effect of ISO 9001 certification on market performance is higher in cultures with high Institutional Collectivism.*

In-group collectivism

In-group collectivism (GC) is “the degree to which individuals express pride, loyalty, and cohesiveness in their organizations and families” (House et al., 2004, p. 12). GC should

lead to higher operational performance. In high GC cultures, employees feel committed and loyal to the organization. They feel proud of their work and their organization's successes (Deming, 1986). As a result, they will take initiative, share ideas, and get involved in continuous improvement. This suggests the following hypothesis.

H11. *The effect of ISO 9001 certification on operational performance is higher in cultures with high In-group Collectivism.*

High GC should also affect market performance. In collectivist cultures, brand names become import to group identity (Johansson et al., 1994). Consumers choose brands that strengthen group membership and connection (Erdem et al., 2006). Moreover, consumers value consensus and, as a result, they show more loyalty to dominant brands (Robinson, 1996). Similarly, ISO 9001 creates a positive signal like brands. Accordingly, high GC should respond more to ISO 9001, which suggests the following hypothesis.

H12. *The effect of ISO 9001 certification on market performance is higher in cultures with high In-group Collectivism.*

Assertiveness

Assertiveness (AS) is “the degree to which individuals in organizations or societies are assertive, confrontational, and aggressive in social relationships” (House et al., 2004, p. 12). High AS should negatively affect operational performance for the following reasons. First, high AS cultures emphasize individual achievement, competitiveness and aggressiveness. Second, employees in high AS cultures tend to have more conflict and higher resistance, whereas low AS cultures focus on harmony and responsiveness (Trompenaars and Hampden-Turner, 1997). Low AS cultures emphasize communication, negotiation, compromise, and sensitivity in order to solve conflicts (Naor et al., 2010). ISO 9001 emphasizes teamwork, consistent with low AS cultures. In addition, low AS cultures promote employee involvement and encourage employees to share knowledge versus hoarding it (Siemsen et al., 2009). This should enhance both continuous improvement and fact based decision-making. Moreover, high AS cultures tend to act opportunistically. They believe the benefits of opportunistic behavior like visible achievement and making money exceed the costs (Doney et al., 1998). This suggests the following hypothesis.

H13. *The effect of ISO 9001 certification on operational performance is higher in low Assertiveness cultures.*

Lower AS should also positively affect market performance for the following reasons. First, high AS cultures promote self-interest and opportunistic behavior, which can break down the trust-building process. Trust building is mostly based on calculations of intentions of others (Doney et al., 1998). This may harm relationships with customers and other key stakeholders; which is incongruent with customer focus in ISO 9001 standard. In contrast, low AS cultures emphasize solidarity, cooperation and service that leads to building trust (Doney et al., 1998). ISO 9001 signals predictability and trust in the organizations, which suggests the following hypothesis.

***H14.** The effect of ISO 9001 certification on market performance is higher in low Assertiveness cultures.*

Future orientation

Future orientation (FO) is “the degree to which individuals in organizations or societies engage in future-oriented behaviors such as planning, investing in the future, and delaying individual or collective gratification” (House et al., 2004, p. 12). FO should affect operational performance for the following reasons. First, high FO cultures have a strong desire to formulate long-term goals and strategies. Similarly, ISO 9001 involves long-term strategic planning to implement continuous improvement efforts (Das, 1986). Second, high FO cultures have an open-ended view of future, as opposed to a short-term view (Lang and Carstensen, 2002). As a result, they will take time to acquire knowledge that needed for continuous improvement. Moreover, in high FO cultures employees have higher levels of achievement motivation (Raynor et al., 1982), whereas in low FO cultures individuals quickly become impatient and disappointed when working towards their goals (Carstensen, 1993). Implementation of ISO 9001 may take some time for companies to realize benefits from it. As a result, low FO cultures may implement ISO 9001 ceremonially only on meeting the minimum requirements for certification inspection and ignoring the long-term benefits (Kull and Wacker, 2010; Lozeau et al., 2002). This suggests the following hypothesis.

***H15.** The effect of ISO 9001 certification on operational performance is higher in high Future Orientation cultures.*

FO should also affect market performance. For example, ISO 9001 focuses on taking a systematic approach to manage customer relationships. This involves researching

customer needs and requirements, meeting those requirements, and measuring results and taking corrective action. Improving customer satisfaction on an ongoing basis requires implementation of multiple plan-do-check-act cycles. Cultures with high FO will formulate goals and develop strategies to meet those goals. This suggests the following hypothesis.

***H16.** The effect of ISO 9001 certification on market performance is higher in high Future Orientation cultures.*

Performance orientation

Performance orientation (PO) is “the degree to which an organization or society encourages and rewards group members for performance improvement and excellence” (House et al., 2004, p. 13). PO cultures should positively affect operational performance for the following reasons. First, high PO cultures believe that groups can control outcomes (Rotter, 1966) and value taking initiatives. In addition, high PO cultures value knowledge, training and development. They see education as a critical success factor. High PO cultures also seek out feedback, which is necessary for improvement. Consequently, PO is consistent with the ISO 9001 principles of employee involvement and continuous improvement. This suggests the following hypothesis.

***H17.** The effect of ISO 9001 certification on operational performance is higher in high Performance Orientation cultures.*

PO should also positively affect market performance for the following reasons. First, high PO cultures promote self-confidence, ambition and competition. They wish to be better than others. Second, they have a sense of urgency since they see time as a limited and valuable commodity. Additionally, high PO cultures believe in the importance of feedback for improvement. Moreover, they promote explicit, clear and to the point in communications (Hall, 1959). This helps better understand customer needs. Furthermore, high PO cultures value groups that complete assignments and produce results (Parsons and Shils, 1951; Trompenaars and Hampden-Turner, 1998). As a result, customers in high PO cultures value ISO 9001 certification more because it signals that a company can complete assignments and produce results. This suggests the following hypothesis.

***H18.** The effect of ISO 9001 certification on market performance is higher in high Performance Orientation cultures.*

Humane orientation

Humane orientation (HO) is “the degree to which individuals in organizations and societies encourage and reward individuals for being fair, altruistic, friendly, generous, caring, and kind to others” (House et al., 2004, p. 13). HO should positively affect operational performance. People in high HO cultures tend to have more intrinsic motivation. Quality management thought leaders have advocated intrinsic motivation and criticized extrinsic rewards (Anderson et al., 1994). In addition, high HO cultures value cooperation over competition. This should enhance employee involvement in decision making, teamwork and continuous improvement. Moreover, high HO cultures value fairness in their internal relationships with suppliers. Collectively, HO is consistent with ISO 9001, which suggests the following hypothesis.

H19. The effect of ISO 9001 certification on operational performance is higher in high Humane Orientation cultures.

HO should also affect market performance, because high HO cultures also value fairness in relationships with their customers. They also place importance on cooperation with customers. They genuinely care about the customer requirements, opinions and feedback (Kull and Wacker, 2010). As a result, this should increase customer satisfaction. Moreover, high HO cultures value group belongingness and affiliation (Triandis, 1995). Accordingly, ISO 9001 gives a positive signal, and customers will desire to be affiliated with certified organizations. Therefore, this suggests the following hypothesis.

H20. The effect of ISO 9001 certification on market performance is higher in high Humane Orientation cultures.

3.3. Research method

3.3.1. Data Collection

Meta-analysis was founded by Glass (1977) and can be defined as “the quantitative cumulation and analysis of effect sizes and other descriptive statistics across studies” (Hunter and Schmidt, 1990, p. 479). Meta-analysis helps to obtain reliable and valid conclusions, because it not only considers the direction of the relationship, but also the effect sizes, samples sizes and error values.

Figure 3.2 summarizes the steps followed to collect data from empirical studies on the effect ISO 9000 on performance. First, we conducted a detailed search of Business

Source Premier, ABI/INFORM Global and Scopus databases for peer reviewed journal articles. Conference papers and dissertations were not included. The data search period was from 1987 to July 2013. We searched for the terms ((impact OR value OR factor OR benefit OR performance OR affect OR effect) AND ("ISO 9000" OR "ISO 9001")) in the titles, keywords or abstracts of the articles. We also searched the top 10 journals³ that published the highest number of ISO 9001 articles to identify any recent studies not included in the databases. In addition, we searched the top 20 management journals⁴ (ISI Web of Knowledge, 2012) which may have also recently published research on ISO 9001. These efforts resulted in 1401 articles. A meta-analysis should try to avoid publication bias, which is the tendency toward “preparation, submission and publication of research findings based on the nature and direction of the research results” (Rothstein et al., 2005, p. 13). As a result, we did not exclude journals based on quality, some of the papers in our sample were published in journals with a low impact factor (ISI Web of Knowledge, 2012). Low impact journals may publish ISO 9001 studies with small effect sizes and/or small sample sizes and including them will help problems with publication bias. However, we also report failsafe N estimates in the results section to control for potential publication bias. Fail safe N estimate is the number of unpublished studies reporting null results needed to reduce the cumulative effect across studies to the point of nonsignificance ($p \geq .05$) (Rosenthal, 1979).

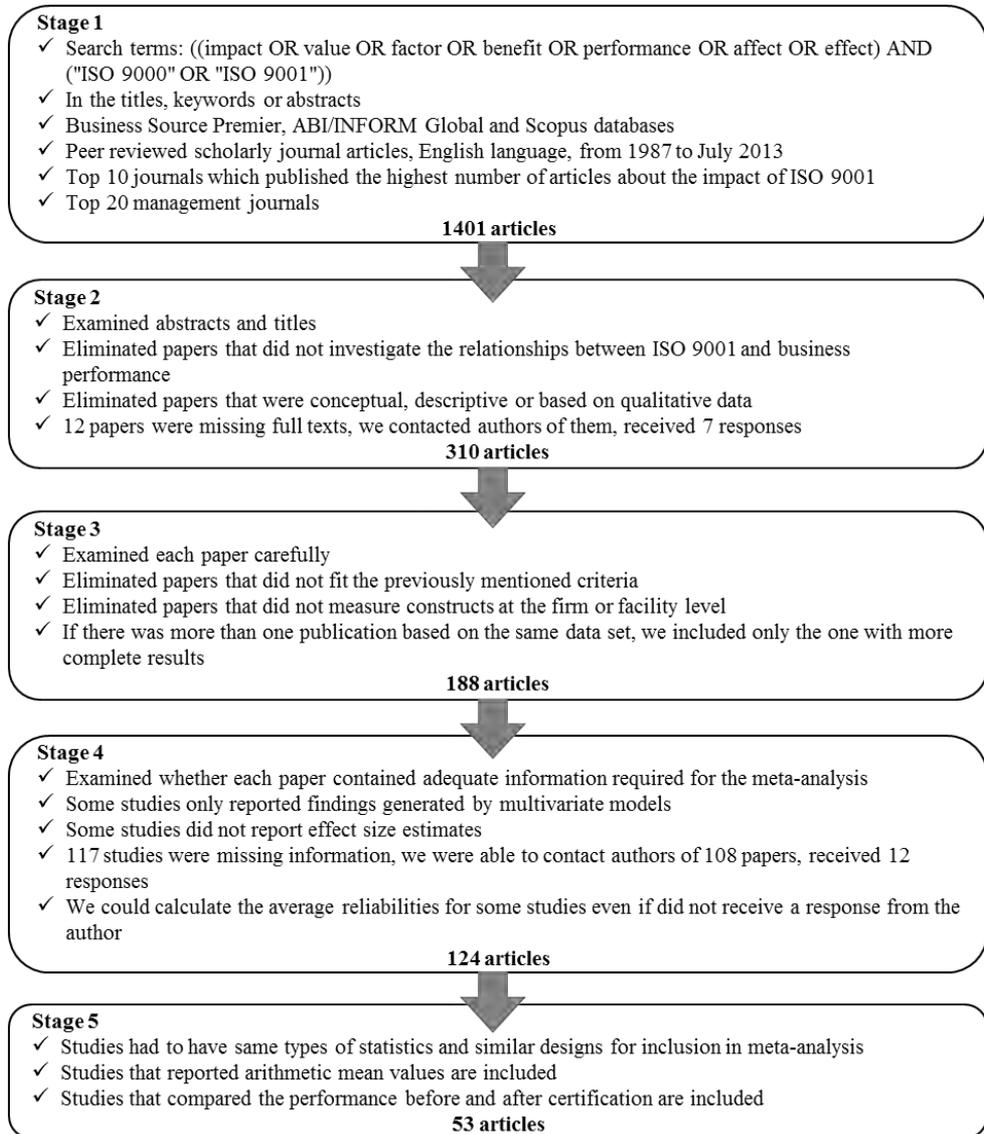
Second, we examined abstracts and titles of the candidate studies to identify the relevant articles. A study had to report a relationship between ISO 9001 and business performance for inclusion. According to Lipsey and Wilson (2001, p. 2), meta-analysis only applies to empirical research studies and cannot be used to summarize theoretical papers, review papers, etc. In addition, it only applies to studies that report quantitative

³ The TQM Journal (The TQM Magazine), The International Journal of Quality & Reliability Management, Total Quality Management and Business Excellence (Total Quality Management), Managing Service Quality, Managerial Auditing Journal, International Journal of Production Economics, International Journal of Productivity and Performance Management, Business Process Management Journal, Accreditation and Quality Assurance, International Journal of Production Research

⁴ Academy of Management, Academy of Management Annals, Academy of Management Review, Administrative Science Quarterly, Decision Sciences, Information & Management, International Journal of Management Reviews, Journal of International Business Studies, Journal of Management, Journal of Management Information Systems, Journal of Management Studies, Journal of Operations Management, Journal of Supply Chain Management, Management Information Systems Quarterly, Management Science, Omega-International Journal of Management Science, Organization Science, Project Management Journal, Research Policy, Strategic Management Journal

findings. As a result, we eliminated studies that were conceptual, descriptive or based on qualitative data. Of the remaining studies, we did not have access to the full text of 12 of the articles. We contacted the authors to get for the full text and received seven of them.

Figure 3.2. Sampling framework



Third, we examined each paper carefully and eliminated papers that did not fit the previously mentioned criteria. Additionally, if there was more than one publication based

on the same data set or the same sample, only the one with more complete results was included to maintain the assumption of independence (Lipsey and Wilson, 2001, p. 105). In addition, only those studies that measured constructs at the business unit level were included. This resulted in a database of 188 studies.

In the next step, we investigated each of these papers to identify if they contained adequate information required for the meta-analysis. Some studies only reported findings generated by multivariate models which cannot be included in the meta-analysis (Lipsey and Wilson, 2001, p. 16). We contacted the authors of these papers to gather descriptive statistics. Some studies reported usable effect sizes, but they did not report effect size estimates. In total, there were 117 studies with missing information and we were able to contact the authors of 108 of them. Additional information was obtained for 12 studies. If a study did not include reliability information and it could not be obtained from the author, it was substituted by average reliabilities reported across all studies (Mackelprang and Nair, 2010).

Finally, Lipsey and Wilson (2001, p. 2) indicate that studies included in the meta-analysis should use similar statistical forms and have similar research designs. Studies in our sample differed in terms of the type of the effect size they used. The most commonly reported effect size was arithmetic mean values, which we use in this study. Some studies differed in their designs. For example, some studies compared the performance of certified firms with those of non-certified firms. Other studies compared the performance of firms before and after getting certification. We chose the second category, because the majority of the studies belonged to that category. Overall, we obtained relevant and comparable information from 53 studies that formed the sample for the meta-analysis study. Other meta-analysis studies have had a similar sample size (Mackelprang and Nair, 2010; Nair, 2006).

3.3.2. Coding

Lipsey and Wilson (2001) recommend using a protocol to code the data to reduce coding error. An initial draft of the coding protocol was developed and then revised after coding 40 papers. A coding form was developed to extract data on dependent variables, study sample sizes, effect size statistics, reliability information and study characteristics. Appendix A lists the articles coded in this study.

The literature shows a diversity of research methods and even within one method the exact measures used to represent the constructs can somewhat differ across studies. However, it is still reasonable to include these operationalizations in a meta-analysis if they are in line with the specific hypotheses, theories and research objectives (Cooper, 1998). Glass (1977) states that there is nothing wrong with mixing apples and oranges if the interest of the study is fruit. Using different operationalizations within a single meta-analysis is called *multiple operationism* (Webb et al., 1981), which is defined as the use of many measures that share a conceptual definition “but have different patterns of irrelevant components” (Webb et al., 1981, p. 35). It is important to use multiple operationism, because narrow concepts do not provide enough information about generalizability or robustness of the results. Hence, “the greater the conceptual breadth of the definitions used in a synthesis, the greater its potential to produce conclusions that are more general than synthesis using narrow definitions” (Cooper, 1998, p. 37).

In line with these recommendations, we include slightly different operationalizations of operational and market performance in this study. Operational performance is conceptualized as the following: delivery performance (e.g. on-time delivery, volume of deliveries), efficiency (e.g. capacity utilization, waste reduction), flexibility/innovation performance (e.g. product volume flexibility, product variety flexibility, number of innovation, speed of innovations), inventory performance (e.g. inventory need, inventory turnover), manufacturing costs (e.g. production costs), manufacturing time (e.g. cycle time, lead time), operating costs (e.g. management costs, personnel costs, documentation costs), productivity (e.g. employee productivity, yield), quality costs (e.g. inspection cost, preventions costs, guarantee costs), and quality performance (e.g. scrap, error, defect, rework rate, warranty claims). Market performance is conceptualized as the following: ability to stay in business (e.g. survival, not excluded from tenders), competitiveness (e.g. competitive advantage, price bargaining position), corporate image (e.g. reputation, quality image), customer loyalty (e.g. loyalty, repeat businesses), customer satisfaction (e.g. meeting customer requirements, reduced complaints), exports (e.g. overseas sales, exports), market share (e.g. gaining new customers, expansion to new markets), and sales (e.g. orders, sales, more contracts).

Finally, we coded arithmetic mean value effect sizes, sample sizes and reliabilities of the dependent and independent variables. All studies in our sample report an average mean value on a Likert scale. We assumed that the scales were interval and converted all values to a scale from 1 to 5.

3.3.3. Meta-analysis procedures

The literature on ISO 9001 mostly reports arithmetic mean effect size statistics. Lipsey and Wilson (2001) develop meta-analytic procedures (See Table 3.1) to test these types of main effect hypotheses.

Table 3.1. Meta-analysis computational formula

| Explanation | Input variables | Formulas |
|---|--|--|
| 1. Effect size, standard error, inverse variance weight | x_i : Individual score for study i n : Sample size s : Standard deviation of x | $ES = \frac{\sum x_i}{n}$ $SE = \frac{s}{\sqrt{n}}$ $w = \frac{1}{SE^2}$ |
| 2. Weighted mean effect size | ES_i : Effect size values w_i : Inverse variance weight for effect size i | $\overline{ES} = \frac{\sum (w_i ES_i)}{\sum w_i}$ |
| 3. Standard error of the mean | w_i : Inverse variance weight for effect size i | $SE_{\overline{ES}} = \sqrt{\frac{1}{\sum w_i}}$ |
| 4. Confidence interval | z : 95% confidence level | $\overline{ES}_L = \overline{ES} - z_{(1-\alpha)}(SE_{\overline{ES}})$ $\overline{ES}_U = \overline{ES} + z_{(1-\alpha)}(SE_{\overline{ES}})$ |
| 5. Homogeneity test | df : Degrees of freedom | $Q = \sum w_i ES_i^2 - \frac{(\sum w_i ES_i)^2}{\sum w_i}$ $I^2 = \frac{Q-df}{Q} \times 100\%$ |
| 6. Random effects | v_i : Estimate of the variance associated with subject-level sampling error (SE^2) k : Number of effect sizes | $v_\theta = \frac{Q - (k - 1)}{\sum w_i - (\sum w_i^2 / \sum w_i)}$ $v_i^* = v_\theta + v_i$ $w = \frac{1}{v_i^*}$ |

First, fixed effect size statistics, standard errors and inverse variance values are calculated. If a study reported multiple effect sizes, they are averaged to a single effect size to assure statistical independence (Lipsey and Wilson, 2001, p. 113). Then, the mean effect sizes are computed by weighting each effect size by the inverse of its variance. Third, standard errors are computed. After that, 95% confidence intervals around the mean effect sizes are calculated to test the precision of the mean effect sizes. Homogeneity tests are conducted based on Q statistics and 75% rule. Q statistics allow us to examine if the

dispersion around the effect size can be explained by the sampling errors alone or whether there are some moderators that affect the relationship. According to the 75% rule, if the percentage of total variability is greater than 25%, some moderator variables may affect the relationship. Finally, the random effects model is applied. The random effects model assumes that each observed effect size differs from population mean by subject-level sampling error plus a value caused by random variability. Application of random effects model is recommended because of its generality (Cumming, 2011). To apply the random effects model, a variance component is calculated. A new inverse variance weight is calculated by using the new variance component and then steps two to five are repeated by using the new inverse variance weight.

To test the hypotheses related to national culture and economic development, we use Meta-Analytic Regression Analysis (MARA), which is a special type of Weighted Least Squares (WLS) regression analysis designed to evaluate the relationship between effect size and moderator variables (Lipsey and Wilson, 2001). Recent meta-analysis studies have also used the MARA procedure for moderation analysis (Heugens and Lander, 2009; van Essen et al., 2012). In MARA, effect sizes are weighted by the inverse of their variances. WLS functions of statistical software programs interpret the weights as “representing multiple effect sizes rather than weightings of single effect sizes” (Lipsey and Wilson, 2001, p. 122). To overcome this problem, we use the extended macro published by Lipsey and Wilson (2001). Moreover, we use mixed effect model which attributes variability to systematic between-study differences, subject-level sampling error an additional random component (Lipsey and Wilson, 2001). Additional data is collected to test the effects of national culture and economic development. The GLOBE study gives national cultural “values” to test the effect of national culture (House et al., 2004). Culture values of Kuwait are substituted for Saudi Arabia and values of Qatar are substituted for United Arab Emirates, since they are culturally similar (House et al., 2004, p. 155). We had to exclude one paper from the national differences analysis since the sample included companies from both the United States and Canada and no separate statistics were reported (Briscoe et al., 2005). We also had to exclude papers studying Jordan, Lebanon, Pakistan and Serbia, because there were are no GLOBE scores for these countries or equivalent countries with GLOBE scores. IMF’s classification of “advanced economies” and

“emerging market and developing economies” is used to code whether a country is economically developing or developed (IMF, 2013).

We also use three control variables to ensure robustness of our hypotheses tests. First, the “impact factor” of the journal is coded based on the ISI Social Science Citation Index to control for the journal quality (ISI Web of Knowledge, 2012). Value zero is assigned to a journal that is not listed in ISI (Carney et al., 2011). Second, the year of data collection is coded to control for potential time effect (Carney et al., 2011). If a data collection year was not reported, two years before the publication year is taken as the data collection year. Third, we use a dummy variable to control for the methodological differences. Most of the studies use both negative and positive labels in their scales where 1 represents a performance much worse than before, 3 represents a performance that did not change and 5 represents a performance much better than before. However, some studies used biased scales with only positive labels. For example, 1 represents no change in performance and 5 represents performance much better than before. We code the dummy variable as (1) for studies with the biased scale and (0) for the unbiased scale. However, in the main effect analysis we only use studies with unbiased scales to make sure that the results are not biased and interpretable.

3.4. Results

3.4.1. Performance effects of ISO 9001

The analysis begins by examining the overall global benefits of ISO 9001. To interpret the results we look at the average effect size and confidence intervals. We examine whether the average effect is below or above the value 3 on a five point scale. An effect size value above 3 represents a positive effect.

Table 3.2 shows that overall ISO 9001 has a positive effect on operational performance (Mean = 3.67, $p \leq 0.01$). This supports H1a and rejects H1b. More specifically, the results show that ISO 9001 positively affects delivery performance, efficiency, flexibility/innovation, inventory performance, operating costs, productivity, quality costs and quality performance. The effect on manufacturing costs and manufacturing time is not significant. The failsafe N numbers suggest that we should be cautious about the results on flexibility/innovation performance and quality costs, because these results could lose their significance easily.

Table 3.2. Main effects of ISO 9001 certification on operational performance

| | # of studies | Sample size | Mean (<i>p</i>) | SE | 95% CI | <i>Q</i> (<i>p</i>) | <i>I</i> ² | Failsafe <i>N</i> |
|-------------------------------|--------------|-------------|-------------------|------|-----------|-----------------------|-----------------------|-------------------|
| Aggregate performance | 36 | 6085 | 3.67 (0.00)** | 0.07 | 3.54/3.80 | 1384.06 (0.00) | 97% | 864 |
| <i>Delivery performance</i> | 9 | 2439 | 3.52 (0.00)** | 0.17 | 3.18/3.86 | 732.07 (0.00) | 99% | 72 |
| <i>Efficiency</i> | 9 | 1700 | 3.28 (0.02)* | 0.12 | 3.05/3.52 | 169.00 (0.00) | 95% | 40 |
| <i>Flexibility/innovation</i> | 2 | 637 | 3.53 (0.00)** | 0.13 | 3.28/3.79 | 13.02 (0.00) | 92% | 2 |
| <i>Inventory performance</i> | 5 | 1123 | 3.61 (0.02)* | 0.24 | 3.14/4.07 | 316.00 (0.00) | 99% | 11 |
| <i>Manufacturing costs</i> | 5 | 782 | 3.26 (0.39) | 0.30 | 2.67/3.85 | 294.39 (0.00) | 99% | |
| <i>Manufacturing time</i> | 13 | 1084 | 3.04 (0.86) | 0.20 | 2.64/3.43 | 345.99 (0.00) | 97% | |
| <i>Operating costs</i> | 21 | 2105 | 3.66 (0.00)** | 0.14 | 3.39/3.93 | 1016.27 (0.00) | 98% | 28 |
| <i>Productivity</i> | 11 | 1548 | 3.55 (0.00)** | 0.12 | 3.32/3.78 | 267.82 (0.00) | 96% | 89 |
| <i>Quality costs</i> | 7 | 1244 | 3.33 (0.04)* | 0.15 | 3.02/3.63 | 191.02 (0.00) | 97% | 2 |
| <i>Quality performance</i> | 29 | 5171 | 3.91 (0.00)** | 0.07 | 3.78/4.04 | 991.14 (0.00) | 97% | 812 |

Q = Homogeneity test statistic (probability of *Q*); *I*² = Percentage of total variation across studies due to heterogeneity; Failsafe *N* = The number of unpublished studies reporting null results needed to reduce the cumulative effect across studies to the point of nonsignificance ($p \geq .05$) and is only reported for statistically significant results ($p < .05$); * $p < .05$; ** $p < .01$

Table 3.3. Main effects of ISO 9001 certification on market performance

| | # of studies | Sample size | Mean (<i>p</i>) | SE | 95% CI | <i>Q</i> (<i>p</i>) | <i>I</i> ² | Failsafe <i>N</i> |
|------------------------------------|--------------|-------------|-------------------|------|-----------|-----------------------|-----------------------|-------------------|
| Aggregate performance | 30 | 4783 | 3.70 (0.00)** | 0.06 | 3.58/3.81 | 1166.64 (0.00) | 98% | 811 |
| <i>Ability to stay in business</i> | 1 | 30 | 3.65 | | | | | |
| <i>Competitiveness</i> | 11 | 1821 | 3.62 (0.00)** | 0.13 | 3.37/3.87 | 728.53 (0.00) | 99% | 110 |
| <i>Corporate image</i> | 19 | 3190 | 3.91 (0.00)** | 0.08 | 3.76/4.06 | 1029.52 (0.00) | 98% | 305 |
| <i>Customer loyalty</i> | 1 | 790 | 3.57 | | | | | |
| <i>Customer satisfaction</i> | 23 | 4026 | 3.92 (0.00)** | 0.07 | 3.79/4.05 | 1163.94 (0.00) | 98% | 506 |
| <i>Exports</i> | 12 | 1509 | 3.52 (0.03)* | 0.24 | 3.06/3.99 | 987.59 (0.00) | 99% | 88 |
| <i>Market share</i> | 20 | 3484 | 3.57 (0.00)* | 0.06 | 3.46/3.68 | 426.94 (0.00) | 96% | 380 |
| <i>Sales</i> | 12 | 2019 | 3.37 (0.06) | 0.19 | 2.99/3.75 | 992.51 (0.00) | 99% | |

Q = Homogeneity test statistic (probability of *Q*); *I*² = Percentage of total variation across studies due to heterogeneity; Failsafe *N* = The number of unpublished studies reporting null results needed to reduce the cumulative effect across studies to the point of nonsignificance ($p \geq .05$) and is only reported for statistically significant results ($p < .05$); * $p < .05$; ** $p < .01$

On the other hand, the rest of the results are resistant to unpublished null effects, since a large number of studies are needed to overturn the significant findings reported about the overall effect of ISO 9001 on operational performance.

Table 3.3 shows that ISO 9001 has a positive effect on market performance (Mean = 3.70, $p \leq 0.01$). This supports H2a and rejects H2b. Results show a positive and significant effect on competitiveness, corporate image, customer satisfaction, exports and market share. The effect on sales is not significant. Finally, the effect on ability to stay in business and customer loyalty are positive, but since the results come from a single study there are no statistical significance values. The failsafe N numbers suggest that the results are resistant, since a large number of studies are needed to overturn the significant findings reported. Finally, the Q statistics and the 75% rule show that the relationships are not homogenous, which indicates the sampling error alone is not enough to explain the variance (Lipsey and Wilson, 2001). This indicates some other factors influence the relationship between ISO 9001 and performance, to explain this variation we now investigate national differences.

3.4.2. The effect of national culture and economic development

Table 3.4 reports the meta-analytic regression analysis that considers national differences. Model 1 shows results for the control variables. Model 2 reports results for the hypotheses on national culture and economic development and fits the data well both for operational performance ($R^2 = 0.74$, $Q_{\text{model}} p = 0.00$) and market performance ($R^2 = 0.51$, $Q_{\text{model}} p = 0.01$).

Table 3.4 shows that economic developing countries have higher operational performance, which supports H3. National cultures with low PD, high IC and high PO cultures have higher operational performance, which supports H7, H9 and H17. However, the results do not show a significant relationship between operational performance and UA, GC, AS and HO national cultures, which does not support H5, H11, H13 and H19. Finally, contrary to H15, FO has a significantly negative effect on operational performance. Table 3.4 also reports control variable results. Data collection year has a positive effect, suggesting that operational performance benefits increase over time. The significant, positive effect for journal impact factor suggests a publication bias among more highly cited journals. Finally, the dummy scale variable for the biased studies has a

significant, negative impact. Thus, studies with biased scales report lower effect sizes than the studies with unbiased scales.

Table 3.4. Mixed-effects WLS regression results for operational and market performances^a

| Variable | Operational performance | | Market performance | |
|----------------------------|-------------------------|----------------------------|------------------------------|--------------------------|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| Constant | 0.00 (18.38)** | 0.00 (15.80) ⁺ | 0.00 (26.08) ⁺ | 0.00 (33.56) |
| Economic development | | - 0.48 (0.11)** | | - 0.01 (0.21) |
| Uncertainty avoidance | | 0.06 (0.11) | | 0.27 (0.19) |
| Power distance | | - 0.23 (0.15) ⁺ | | - 0.16 (0.27) |
| Institutional collectivism | | 0.36 (0.15) ⁺ | | - 0.02 (0.28) |
| In-group collectivism | | - 0.22 (0.25) | | - 0.28 (0.51) |
| Assertiveness | | - 0.11 (0.07) | | - 0.18 (0.13) |
| Future orientation | | - 0.25 (0.14) [*] | | 0.07 (0.26) |
| Performance orientation | | 0.22 (0.19) [*] | | 0.38 (0.35) ⁺ |
| Humane orientation | | 0.25 (0.31) | | 0.27 (0.62) |
| Controls | | | | |
| Data collection year | 0.35 (0.01)** | 0.20 (0.01) [*] | 0.22 (0.01) ⁺ | 0.18 (0.02) |
| Journal impact factor | 0.02 (0.05) | 0.27 (0.04)** | 0.09 (0.06) | 0.26 (0.07) ⁺ |
| Biased scale dummy | - 0.38 (0.10)** | - 0.32 (0.07)** | - 0.42 (0.11)** | - 0.47 (0.12)** |
| R^2 | 0.36 | 0.74 | 0.27 | 0.51 |
| k | 50 | 50 | 47 | 43 |
| $Q_{\text{model}} (p)$ | 37.31 (0.00) | 111.38 (0.00) | 21.72 (0.00) | 25.54 (0.01) |
| $Q_{\text{residual}} (p)$ | 67.48 (0.06) | 39.09 (0.38) | 58.07 (0.06) | 24.54 (0.75) |
| ν | 0.092 | 0.039 | 0.107 | 0.123 |

^a Unstandardized regression coefficients are presented for national culture, economic development and control variables, with standard errors in parentheses; k is the total number of effect sizes; Q is the homogeneity statistics, with its probability in parentheses; ν is the random-effects variance component.

⁺ $p < .10$

^{*} $p < .05$

^{**} $p < .01$

Table 3.4 also shows no significant effect of economic development on market performance, which does not support H4. On the other hand, PO has a positive and marginally significant effect on market performance, which supports H18. The analysis does not find a significant effect of the UA, PD, IC, GC, AS, FO and HO national cultures on market performance. In addition, Table 3.4 reports control variable results. Data collection year does not have an impact on market performance. In other words, the market benefits do not change over time. A marginally significant and positive effect on journal

impact factor suggests a publication bias among journals with high impact factors. Finally, significant, negative effect of the dummy scale variable suggests that studies with biased scales report lower effect sizes.

3.5. Discussion and conclusion

Increasingly operations managers implement various international management system standards such as ISO 9001, ISO 14001, and ISO 28000 with the aim to improve performance. These standards share a common template and many features and aim to be globally applicable. ISO 9001 is the most implemented standard of all ISO standards. Although several studies have investigated the performance benefits of ISO 9001, to our knowledge none have investigated the benefits of the standard at a global level. The convergence/divergence debate becomes central to understanding the global applicability of ISO 9001. This research investigates the global benefits of ISO 9001 and how national culture and economic development affect the relevant benefits of this standard. A meta-analysis ISO 9001 reveals some of the following key results.

First, the results show that ISO 9001 benefits both operational and market performance across various countries. However, the analysis also reveals that companies in some countries benefit more from ISO 9001. This provides support for the idea that national differences affect the performance benefits of ISO 9001, specifically the level of economic development and national culture affect the performance benefits of ISO 9001.

Second, the analysis shows that level of economic development has a significantly negative effect on operational performance and no effect on market performance. This confirms that implementing ISO 9001 leads to more operational improvements in companies located in developing countries. As a result, they experience higher operational benefits.

The analysis also shows that national culture affects the relationship between ISO 9001 and operational performance. First, Power Distance (PD) has a significant negative influence on operational performance. With lower levels of PD, employees feel more empowered, feel free to make suggestions, and are more satisfied and they have more opportunities to develop themselves. Organizations situated in national cultures with low PD get more operational benefits from ISO 9001. Second, Institutional Collectivism (IC) has a significantly positive effect on ISO 9001. With higher levels of IC, employees value

working in groups, feel motivated to contribute to the group and value training. As a result, organizations in national cultures with high IC benefit more from ISO 9001. Third, Performance Orientation (PO) culture also has a positive effect on operational performance. This suggests that when the national culture emphasizes taking initiatives, achieving results, knowledge, development and feedback, companies gain more operational benefits. Finally, contrary to our expectations, Future Orientation (FO) has a significant negative affect on operational performance. This suggests that when individuals participate in future-oriented behaviors like planning and investing in the future, organizations gain less operational benefits. House et al. (2004) notes that a characteristic of low FO national cultures is focusing on routines and repetitions. ISO 9001 promotes the adoption of standardized processes and this might explain the inconsistent results.

The results show that some dimensions of national culture do not affect operational performance. First, Uncertainty Avoidance (UA) culture does not affect operational performance significantly. A characteristic of high UA national cultures is resisting changes to avoid uncertainty (DiMaggio and Powell, 1983). However, some risk taking behavior is necessary to generate and implement innovative ideas for continuous improvement (Dean and Bowen, 1994; Naor et al., 2008). This could explain the insignificant results. Second, there is no significant relationship between In-group Collectivism (GC) and operational performance. Even if high GC culture leads to employee involvement and commitment, the emphasis on harmony and tradition can make employees resistant to changes (Kull and Wacker, 2010) and therefore resistant to continuous improvement. This might explain why GC culture does not influence operational performance. Third, contrary to our expectations Assertiveness (AS) culture does not impact operational performance. This can be explained by the existence of assertive, dominant and tough leaders in high AS cultures. An assertive leader can establish a clear vision of the organization's future, set challenging goals and targets. Having an assertive leader can also be good when an organization have to make fast decisions about quality management. Finally, Humane Orientation (HO) doesn't affect the relationship between ISO 9001 and operational performance. This suggests that individuals being fair, altruistic, friendly, generous, caring, and kind to others are unrelated to ISO 9001 performance.

Contrary to our expectations, the analysis shows that only a PO culture has a significant positive impact on marketing performance. This confirms that organizations in high PO cultures can communicate better with customers, take immediate actions to meet customer needs and improve themselves based on customer feedback. This also indicates that customers in high PO cultures value ISO 9001 certification more than the customers in low PO cultures. On the other hand UA, PD, IC, GC, AS, FO and HO cultures do not have a significant impact on marketing performance. This suggests that national culture plays a smaller role when it comes to market performance.

Finally, the results show the importance of some control variables to understand the performance benefits of ISO 9001. First, data collection time has a significantly positive impact on operational performance. Companies gain more knowledge and experience on how to implement ISO 9001 and how they gain the most benefits out of it as time passes. Additionally, later versions of ISO 9001 focus more on continuous improvement. These may explain why later studies report higher operational benefits. Second, journals with higher impact factors report higher benefits. This indicates a publication bias, where high impact journals tend not to publish weak results. Finally, results reveal that the scales can bias the results.

3.5.1. Theoretical and Practical Implications

This study contributes to the literature in several ways. First, it contributes to the ongoing convergence/divergence debate in the operations management literature (Rungtusanatham et al., 2005). The results suggest that ISO 9001 positively affects operational and market performance regardless of national conditions (convergence argument). However, the relative benefits of ISO 9001 depend on national conditions (divergence). As a result, the analysis offers a more nuanced understanding of the convergence/divergence debate when it comes to implementing international standards like ISO 9001. Although ISO 9001 implementation should lead to higher performance, the return on investment may depend, in part, on national conditions.

More broadly, this study responds to scholars' calls for more international operations management research (Naor et al., 2010; Prasad and Babbar, 2000) by studying more than 11,000 firms in 24 different countries. According to the latest statistics (ISO, 2013a), over one million companies in 187 countries have ISO 9001 certification. In the past five years

alone the number of certified firms worldwide increased by almost 25%. Growth of the ISO 9001 certification suggests that it will continue to have global influence in the years to come. In addition, over the years ISO issued many other global standards like ISO 14001 (environmental), ISO 28000 (supply chain resilience) and ISO 13053 (Six Sigma). We believe that insights from this study can help inform the potential benefits of other standards.

This study also contributes to research on international quality management (Flynn and Saladin, 2006; Gray and Massimino, 2014; Kull and Wacker, 2010; Naor et al., 2010; Vecchi and Brennan, 2011). With respect to ISO 9001, the analysis shows that low economic development has a significant impact on operational performance. Kull and Wacker (2010) showed that quality management practices did not differ between developing and developed countries. However, this study specifically examines ISO 9001 rather than quality management practices in general. ISO 9001 involves third party auditing to ensure that organizations have implement specific components of a comprehensive quality system. The auditing function of ISO 9001 may account for the differences in the results. Ensuring that developing countries have implemented all the components of a quality system may account for the differences.

Figure 3.3. Summary of the results

| | Operational performance | Market performance |
|----------------------------|--------------------------------|---------------------------|
| Economic development | Negative | Not significant |
| Power distance | Negative | Not significant |
| Institutional collectivism | Positive | Not significant |
| Future orientation | Negative | Not significant |
| Performance orientation | Positive | Positive |

In general, the analyses show that managers can expect to see performance benefits from ISO 9001 regardless of country. But national differences affect the relative benefits. Figure 3.3 summarizes the results of the study. In general, operational performance is more sensitive to national differences than market performance. Developing countries tend to have higher operational performance improvements from ISO 9001. Countries with lower economic development tend to have less sophisticated management systems, training, and skills. Implementing ISO 9001 helps firms in these settings develop more sophisticated

approaches to quality management, this in turn affects operational metrics. ISO 9001 offers a way to transfer important knowledge about quality systems in developing countries. However, the same does not hold for market performance.

In terms of national culture, PO has a positive effect on both operational and market performance. Societies that embrace rewards based on performance improvement and excellence works well with ISO 9001. However, the other dimensions of national culture do not affect market performance. Consistent with our expectations, low PD and high IC affect operational performance. A high society with high levels of power stratification likely disrupts quality improvement efforts, while societies that value collective action support the improvement efforts in ISO 9001. Surprisingly, societies with low FO positively affect operational performance. Although ISO 9001 implementation may focus on the future, House et al. (2004) notes that low future oriented cultures tend to focus on repetition and routines. The notion of process control and document control may work well in these societies.

3.5.2. Limitations and future research

Although this study made every effort to obtain reliable and valid conclusions, there are still some limitations. First, we could not include all studies of ISO 9001 and business performance for several reasons. Some of the studies did not report effect sizes or any other statistics that can be converted into effect sizes. When we tried to collect the necessary information, some authors did not want to cooperate, or did not respond. When we could not gather reliability of the dependent variable measurements, we had to substitute it with the averages reported across other studies. However, the substituted average reliabilities may not exactly reflect the real reliability of the dependent variables. Second, like most of the other cross-cultural studies relying on GLOBE we assumed that national culture in each country is unified. We were unable to study different subcultures, since GLOBE dataset only includes country specific culture values. Third, because of secondary data usage, we could not investigate the impact of the organizational culture (Naor et al., 2010). However, we believe that our findings are robust since country culture has a strong influence on organizational culture (House et al., 2004). Fourth, the signaling impact of the certification may be more visible when an organization exports products. However, we did not have company specific information to control for the trade

relationships. Therefore, hypotheses related to the signaling consider the signaling effect only in the local country.

This study also helps to identify directions for future research that can increase our understanding of ISO 9001's impact. First, we recommend operation management researchers to report descriptive statistics and the correlation matrices in the future to contribute to the accumulation of research findings. Second, our study reveals that some studies use biased measurement scales to measure impact of ISO 9001. In those studies respondents were not given options to report negative effects. We recommend operation management researchers to be careful with their measurement scales. Third, our study reveals that the impact of ISO 9001 was understudied in some regions. More studies are necessary in Africa, South America and Central and Eastern Europe to fill this gap. Future research can extend our study by adding the missing regions into the analysis. Including more countries/regions would also enhance the generalizability of the findings.

Appendix A. Studies included in the meta-analysis

| Articles (Total: 53) | Sample size (Total: 11080) | Performance variable | Region (Total: 24) |
|--|-------------------------------|------------------------|---------------------------------------|
| Abdi et al. (2008) | 85 | Operational and market | Pakistan |
| Abraham et al. (2000) | 12 | Operational and market | Australia |
| Al-Refaie et al. (2012) | 130 | Operational and market | Jordan |
| Arauz and Suzuki (2004) | 287 | Operational and market | Japan |
| Bhuiyan and Alam (2005) | 30 | Market | Canada |
| Briscoe et al. (2005) | 275 | Operational | United States and Canada |
| Brown et al. (1998) | 160 | Market | Australia |
| Calisir et al. (2001) | 73 | Operational and market | Turkey |
| Calisir et al. (2005) | 43 | Operational and market | Turkey |
| Calisir (2007) | 86 | Operational and market | Turkey |
| Capmany et al. (2000) | 186 | Operational and market | United States |
| Carlson and Carlson (1996) | 96 | Market | Sweden |
| Chow-Chua et al. (2003) | 103 | Market | Singapore |
| Delic et al. (2013) | 160 | Operational | Serbia |
| Escanciano et al. (2001) | 749 | Market | Spain |
| Fotopoulos et al. (2010) | 97 | Operational and market | Greece |
| Gotzamani and Tsiotras (2002) | 84 | Market | Greece |
| Gotzamani (2010) | 87 | Market | Greece |
| Huang (1998) | 370 | Operational and market | Taiwan |
| Jones et al. (1997) | 272 | Operational and market | Australia |
| Kafetzopoulos et al. (2013) | 169 | Operational | Greece |
| Kam and Tang (1998) | 35 | Operational and market | Hong Kong |
| Lertpachin et al. (2013) | 168 | Operational | Thailand |
| Lin and Jang (2008) | 441 | Operational and market | Taiwan |
| Lo and Chang (2007) | 160 | Operational and market | Taiwan |
| Lundmark and Westelius (2006) | 66 | Operational and market | Sweden |
| Mady (2011) | 50 | Operational | Egypt |
| Magd and Curry (2003) | 38 | Operational and market | Egypt |
| Magd et al. (2003) | 83 | Market | Saudi Arabia |
| Magd (2006) | 105 | Operational and market | Saudi Arabia |
| Magd (2008) | 21 | Operational and market | Egypt |
| Martínez-Costa and Martínez-Lorente (2004) | 13 | Market | Spain |
| Mezher and Ramadan (1998) | 32 | Market | Saudi Arabia |
| Mezher et al. (2004) | 30 | Operational and market | Lebanon |
| Najmi and Kehoe (2001) | 221 | Market | United Kingdom |
| Ofori et al. (2002) | 30 | Market | Singapore |
| Okay and Semiz (2010) | 108 | Operational | Turkey |
| Padma et al. (2008) | 37 | Operational and market | India |
| Pan (2003) | 2907 | Market | Hong Kong, Japan, Korea and Taiwan |
| Poksinka and Antoni (2002) | 135 | Market | Sweden |
| Prajogo (2009) | 326 | Market | Australia |
| Psomas et al. (2011) | 196 | Operational | Greece |
| Psomas et al. (2013) | 100 | Operational | Greece |
| Shih and Huarng (1996) | 89 | Market | Taiwan |
| Singh and Sareen (2006) | 21 | Operational | India |

| | | | |
|-----------------------------|-----|------------------------|-------------------------|
| Singh et al. (2011) | 416 | Operational | Australia |
| Tang and Kam (1999) | 19 | Operational and market | Hong Kong |
| Tari and Molina (2002) | 106 | Operational and market | Spain |
| To et al. (2012) | 148 | Operational and market | China |
| Torre et al. (2001) | 119 | Operational and market | Spain |
| van der Wiele et al. (2005) | 790 | Operational and market | Netherlands |
| Yahya and Goh (2001) | 307 | Operational and market | Malaysia |
| Zaramdini (2007) | 209 | Operational and market | United Arab Emirates |

Chapter 4.

Antecedents of employee involvement in ISO 9001

Abstract

ISO 9001 has been implemented by more than one million organizations worldwide and it became the most widespread quality management system (QMS) standard. ISO 9001 requires employees to be involved in the QMS. Both practitioner and the academic studies recognize the importance of employee commitment and participation for ISO 9001 implementation. However, managers in real life are having difficulties involving employees. Yet, no study exists that systematically analyzes the antecedents of employee involvement in ISO 9001. This paper fills this gap by examining the questions under what conditions employees get involved in standardized work practices and continuous improvement practices related to ISO 9001. We adopt an exploratory case approach. Our unit of data collection and analysis are individuals in an ISO-9001-certified organization. The results show that four important factors differentiate employees who participate in ISO 9001 standardized work practices versus those who do not: having a positive attitude towards ISO 9001, being aware of ISO 9001 requirements and the ISO 9001 QMS, perceiving ISO 9001 as useful, and perceiving ISO 9001 as easy to use. One factor differentiates employees who participate in ISO 9001 continuous improvement practices versus those who do not: feeling responsible for the ISO 9001 QMS. More broadly, this research sheds light on employee involvement in ISO 9001 and gives guidelines to managers on how to enhance employee participation.

Keywords: ISO 9001; Quality management; Employee involvement; Standardized work practices; Continuous improvement practices; Explorative case study

4.1. Introduction

Quality management gurus have long noted the importance of people in accomplishing quality management objectives (Connor, 1997). Following are the typical claims of different quality gurus: “Improve communications ... to understand better how things look to the workers” (Juran and Gryna, 1980, p. 147), “Institute a vigorous program of education and training” (Deming, 1982, p. 47), “Give full rein to human capabilities and to

draw out each individual's infinite potential" (Ishikawa, 1984, p. 4), "Generate a culture built on respect for the individual, display consistency in policy and purpose, provide and encourage education for all, and lay out a clear opportunity for growth" (Crosby, 1992, p. 34).

Victor et al.'s (2000, p. 111) study about the role of employees on TQM implementation at Toyota plants proves the importance of people in achieving quality management objectives. Supervisors studied complained about the non-involvement of their employees and produced such statements as: "We're having trouble getting them involved.", "[m]any of the employees are not involved in the TQM activities and we [the managers] have to do it.", "Our participation rates are very low, I [a manager] find that I have to do it." On the other hand employees produced such statements as, "It's not my job to do total quality," and "I don't get paid to think."

The International Organization for Standardization published the ISO 9000 series of quality management standards in 1987. The purpose of the current version of the standards is to "provide guidance and tools for companies and organizations who want to ensure that their products and services consistently meet customer's requirements, and that quality is consistently improved" (ISO, 2014c). ISO 9001 is the core standard in this series. Since its introduction ISO 9001 has been implemented by over one million organizations in 187 countries (ISO, 2013a) and it became the most widespread quality management system (QMS).

ISO 9001 has eight quality management principles and one of these principles is involvement of people. Moreover, the standard also specifically requires an organization to "ensure that its personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives" (ISO, 2008b, p. 6). Some studies indeed pointed out the importance of employee devotion and participation in ISO 9001 adoption (Heras-Saizarbitoria et al., 2013; Mantura, 2008; Prado et al., 2004). Yet there is no study actually studying the antecedents of employee involvement in an ISO-9001-based QMS.

A theoretical framework is needed to guide both practitioners and academics on employee participation in an ISO 9001 QMS. This paper fills this gap by examining under what conditions employees get involved in ISO 9001. More specifically we investigate

under what conditions employees get involved in standardized work practices and continuous improvement practices related to ISO 9001.

The emergent theory from our case analysis draws on the theory of planned behavior, technology acceptance model, innovation diffusion model and job characteristics theory to understand how employees are involved in ISO 9001. The comparative case analysis identifies four important factors that differentiate employees who participate in ISO-9001-related standardized work practices versus those who do not: (1) having a positive attitude towards ISO 9001, (2) being aware of ISO 9001 requirements and the ISO 9001 QMS, (3) perceiving ISO 9001 as useful, and (4) perceiving ISO 9001 as easy to use. Moreover, case analysis identifies one important factor that differentiates employees who participate in ISO-9001-related continuous improvement practices versus those who do not: feeling responsible for the ISO 9001 QMS.

Our study makes several contributions to the quality management and specifically ISO 9001 literature. First, even though researchers agree on the importance of people's involvement in implementing quality management practices, most of the studies are still at company level and do not consider employees' perceptions (Heras-Saizarbitoria et al., 2013). We fill in this gap by conducting a study at employee level. Second, different from the previous studies we analyze ISO 9001 adoption under two different categories: adoption of standardized work practices and adoption of continuous improvement practices. We show that adoption of standardized work practices and continuous improvement practices have different antecedents. Adoption of standardized work practices has more antecedents. As a result, it is more complex. It is based on the attitudes of employees which are harder to change. However, adoption of continuous improvement practices has fewer antecedents. It is based on the responsibility feeling of employees which is easier to influence by giving accountability to people. As a conclusion, our results give guidelines to managers on how to increase employees' involvement in the ISO-9001-based QMS.

The remainder of the paper has the following organization. Section 2 gives an overview of the relevant literature. Section 3 describes our research site and case study methodology. Section 4 presents the findings and propositions. Section 5 summarizes the findings, and provides the implications and conclusions.

4.2. Literature review

4.2.1. ISO 9001 at employee level

Even though adoption of ISO 9001 standard is not the same as having a certificate, the majority of the empirical studies only consider whether or not a company has obtained certification. In this sense, they assume homogeneous adoption. However, a firm might have an ISO 9001 certificate while the standard is not actually adopted and used actively in firm's daily operations. This phenomenon is called decoupling (Aravind and Christmann, 2011; Meyer and Rowan, 1977). Firms have motivation and apparently also opportunity to decouple standards implementation from certification to gain legitimacy and signaling benefits without investing too much money (Aravind and Christmann, 2011). Some researchers indeed found that companies adopt the ISO 9001 standard at different levels (Beck and Walgenbach, 2005; Boiral, 2003; Boiral, 2007; Boiral and Amara, 2009; Boiral, 2011; Christmann and Taylor, 2006; Heras-Saizarbitoria, 2011; Nair and Prajogo, 2009; Naveh and Marcus, 2004; Sandholtz, 2012). For example, Sandholtz (2012) studied adoption of ISO 9001 in two divisions of a company. In one division, standard requirements were followed voluntarily, whereas the other division was dominated by chaotic work practices and a culture of cynicism.

This is an important step in ISO 9001 literature, nevertheless the literature on ISO 9001 adoption still suffers from several limitations that are relevant to the present study. First, the literature still assumes that implementation in a company is either symbolic or substantive (Sandholtz, 2012). However, even if a company implements the standard substantially, there may be some employees who are not actually using the standard in their daily activities.

Second, ISO 9001 states that employees should be aware of the ISO 9001 QMS and should understand how their job relates to the QMS (ISO, 2008b). Moreover, they should contribute to the customer satisfaction and continuous improvement. Both practitioner (Hoyle, 2009) and the academic studies (Heras-Saizarbitoria et al., 2013; Mantura, 2008; Prado et al., 2004) recognize the importance of employee commitment and participation for ISO 9001 implementation. As stated by Prado et al. (2004, p. 221) "personnel participation becomes the key for quality system survival and improvement in the long term". To our knowledge, Boiral (2003) is the only study that shows different levels of

employee participation in ISO-9001-related practices. It looks at the attitudes of employees and identifies three types of respondents: “ceremonial integrators” who believed the implementation of ISO 9001 was a response to external business pressures, “quality enthusiasts” who believed ISO 9001 was more than a marketing tool and “dissidents” who clearly disagreed with the implementation of ISO 9001.

Third, current studies about the adoption of ISO 9001 are mostly at a company level, and based on surveys and the perception of quality managers or top manager (Heras-Saizarbitoria et al., 2013; Heras-Saizarbitoria and Boiral, 2013). There are several studies that look at the perception of employees. However, they focus on effectiveness of ISO 9001 implementations (Kuo et al., 2009), impact of ISO 9001 on employees’ working conditions (Poksinska, 2007), adoption of ISO 9001 from the perspective of the shop-floor workers (Heras-Saizarbitoria et al., 2013) rather than different participations levels of employees in the QMS. This paper fills these gaps by systematically analyzing the antecedents of employee involvement in an ISO-9001-based QMS.

4.2.2. Standardized work practices versus continuous improvement practices

The three most important principles of ISO 9001 are customer focus, process approach and continual improvement. Customer focus requires organizations to understand current and future customer needs and meet customer requirements. Process approach requires activities and resources to be managed as a process to increase efficiency. The third principle requires continuous improvement of the organization’s overall performance to be the main objective of the organization. Implementation of these principles requires on the one hand adoption of control, which is often accomplished by standardization of processes, and on the other hand adoption of continuous improvement. We derive these dimensions from literature on rules, routines and flexibility (Adler et al., 1999; March and Simon, 1958; Nelson and Winter, 1982).

March and Simon (1958) identified two types of work: programmed and non-programmed work. Works are programmed to the extent that they are repetitive and routine. Works are non-programmed to the extent that they are novel and unstructured. Managers must choose between organization designs based on repetitive tasks, routines and innovative tasks, non-routines (Adler et al., 1999; Nelson and Winter, 1982). The challenge of engaging in both routine and non-routine tasks has been explored in several

organizational studies (see Daft (1998) for an overview). However, quality management literature has not paid enough attention yet to this challenge.

Adopting ISO 9001 in this sense is also dual. It combines two distinct types of tasks: its purpose to ensure that “products and services consistently meet customers’ requirements” may lead to standardized work practices, whereas the second purpose that “quality is consistently improved” requires continuous improvement (ISO, 2014c). On the one hand, working with structured processes that comply with ISO 9001 should be every employee’s daily routine. Employees should acknowledge that processes are necessary and they should comply with them in their daily activities. On the other hand, ISO 9001 requires the quality management system to be continually improved. Thus, employees should recognize and acknowledge improvements (ISO, 2012b). We believe that this duality has to be taken into consideration when analyzing employee participation in practices related to an ISO-9001-based QMS.

There are some studies that distinguish standardized work practices and continuous improvement practices related to ISO 9001 (Naveh et al., 2004; Naveh and Marcus, 2005; Prajogo et al., 2012). However, these studies focus on the impact of usage of ISO 9001 on business performance. To our knowledge, Victor et al. (2000) is the only study that looks specifically at the adoption of standardized work practices and continuous improvement practices at employee level. However, they focus on the implementation of TQM, whereas we study the implementation of ISO 9001. Moreover, different from their study, we try to identify antecedents of employee involvement and provide clear guidelines for managers on how to stimulate employee participation. To sum up, this paper fills a gap in literature by examining the questions under what conditions employees get involved in standardized work practices and continuous improvement practices related to ISO 9001.

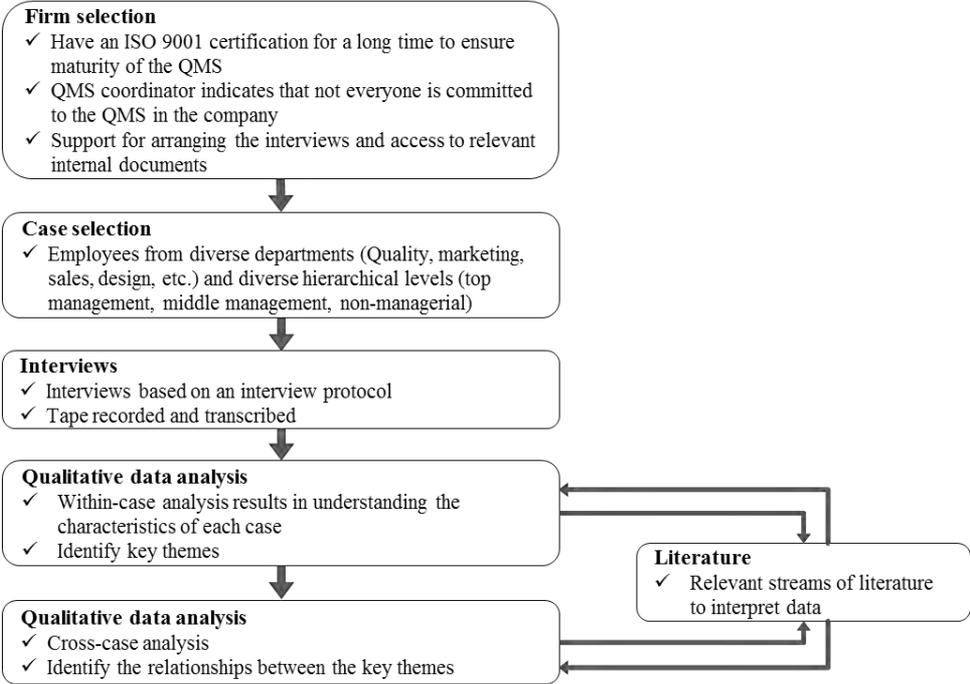
4.3. Methods

4.3.1. Data collection and research methods

The objective of this study is to find out under what conditions employees get involved in ISO-9001-related practices. There is no framework yet in quality management literature that helps to answer this research question. For this reason, we adopt an exploratory case study approach to identify the relevant themes and relationships (Eisenhardt, 1989; Yin, 2003). We then use different streams of literature which contain similar constructs to the

themes that emerge from our data. In a cases study, a “case” may be an individual, an event, an entity, etc. The definition of unit of analysis which is the same as the definition of “case” should be based on the research question (Yin, 2003). Since we are trying to answer a question about employees’ behavior, our unit of data collection and unit of analysis both are individuals. The qualitative data come from a single manufacturing firm. Figure 4.1 gives the overview of the research method. In the following sub-sections we describe how we carried out the different steps.

Figure 4.1. Overview of the research method



4.3.2. Firm selection

Our research is conducted at the Dutch site of a global company named Dimestra (the firm’s real name had to be disguised). Dimestra produces parts mainly for the automotive industry. They also sell products to military, appliance and aircraft industries. They operate worldwide. The Dutch site operates as a European Business Center. They also have business centers in North America and Asia. Their production centers are located in South

America, North America, Asia and Eastern Europe. They have 200,000 different product configurations and they ship more than one billion devices per year throughout the world.

Our initial contact with Dimestra was through the QMS coordinator. Dimestra was a suitably representative case for a single case study for three reasons (Yin, 2003). First, the Dutch site has an ISO 9001 certification since 1995, so the QMS should be mature enough to study employees' perceptions and usage. Second, the management recognized the importance of having a QMS. The QMS coordinator believed that the system is working good enough to justify its certification. However, it could be much better. He also thought that not everyone was committed to the system. Lastly, Dimestra recognized that our research objective is extremely relevant to them and they wanted to use the results to improve their QMS. Therefore, they provided us support for arranging the interviews and they provided access to relevant internal documents.

4.3.3. Case selection

In line with the aim of the study, we interviewed people from diverse departments and diverse hierarchical levels. We had access to all the informants we requested. In total, we interviewed 24 employees. Our list of interviewees included people from Quality Management (Six Sigma deployment leader, QMS coordinator, Quality Support, Quality Director, Customer Quality Engineer, Supplier Quality Manager), Marketing & Sales (three Marketing Segment Managers, Marketing & Sales support), Purchasing (Purchasing Manager, Purchase Program Manager), Design Engineering (Design Engineering Manager, Design Engineering Director, Design Engineering Groups leader, two Design Engineers), Product Management Team - PMT- (PMT Manager, PMT Groups Leader, PM Change Management), Program Manager, Groups leader Laboratory, Process Engineer and Field Application Engineer & Quality. Four of these people were top level managers, three of them were middle level managers and the rest had non-managerial positions.

4.3.4. Interviews

For establishing reliability (Yin, 2003), we have developed an explicit interview protocol before we conducted the interviews (see Appendix A). Since the nature of the research was exploratory, the interviews were semi-structured. The interviewees were not required to stay within the prepared questions. Furthermore, the interview protocol was updated based

on the themes emerged in the interviews and some new questions were added. The aim of the interviews was to understand interviewees' ISO 9001 involvement levels and the behavioral reasons behind their actions.

The interviews lasted from 30 to 90 minutes. We assured that the interviews and the results would stay anonymous in order to facilitate open communication. The QMS coordinator has been interviewed more than once. All the interviews have been conducted in English, face to face at the company location. The interviews were recorded and transcribed (except for one case⁵, the interviewee did not want to be recorded, we took notes).

4.3.5. Within-case analysis

Because of the exploratory nature of the research question, a general inductive approach was used during the data analysis phase (Miles and Huberman, 1994). The voice recordings were transcribed after the completion of each interview. The transcripts were sent back to the interviewees and verified. This resulted into 240 single-spaced pages of transcribed interviews. Then the interview data together with the researcher's notes were imported into the "QSR NVivo 9.0" software for qualitative analysis. Next, the text was carefully read by the first author to get familiar with the content and to gain an understanding of the emerging themes. Third, themes were identified and coded from the text through multiple readings and they were categorized as upper level and lower level themes. In this step, categories were created from the actual phrases used in the text segments. The last step was to read the text again and iteratively revise the coding. This iterative process resulted in some key themes that emerged from the case study data. See Table 4.1 for details.

The relevant literature was incorporated at this stage to conceptually understand the emerging themes. This also increased the validation of our findings (Eisenhardt, 1989). Theory of planned behavior, technology acceptance model, innovation diffusion theory and organizational commitment literatures streams provided a useful conceptual lens to interpret the qualitative data.

⁵ At the end, we removed this case from the analysis for several reasons. First, because we could only take notes the information we obtained about the interviewee was very limited. Second, because the interviewee was agitated that we wanted to record the interview, he/she was not cooperative. The interviewee gave short answers to the questions and the interview took very short.

Table 4.1. Key themes' definitions and dimensions

| Themes | Definition in the literature | Dimensions derived from the data |
|-------------------------------|---|--|
| Attitude towards usage | The extent of an employee's positive or negative feelings about using ISO 9001 (Fishbein and Ajzen, 1975) | <ul style="list-style-type: none"> – Dislike using ISO 9001 (negative) – See ISO 9001 as a burden (negative) – Annoyed by ISO 90001 (negative) – Like using ISO 9001 (positive) – Want to have even more procedures, checklists (positive) – Appreciate having ISO 9001 (positive) |
| Awareness | The extent to which an employee is familiar with the ISO 9001 QMS in the organization and the requirements, and responsibilities associated with it (Rogers, 2010) | <ul style="list-style-type: none"> – Know what ISO 9001 is – Know the requirements of ISO 9001 – Know the procedures, checklists that needs to be used – Know where to find those procedures, checklists |
| Perceived usefulness | The extent to which an employee believes that using ISO 9001 QMS would enhance his or her job performance (Davis, 1989; Davis et al., 1989) | <ul style="list-style-type: none"> – ISO 9001 gives guidelines to do their work better (high) – ISO 9001 is necessary for producing high quality products (high) – ISO 9001 procedures are inefficient (low) – ISO 9001 is a waste of time (low) – ISO 9001 does not bring any benefits (low) |
| Perceived ease of use | The extent to which an employee believes that using ISO 9001 would be free of effort (Davis, 1989) | <ul style="list-style-type: none"> – Not transparent and accessible system (low) – Documents are hard to find (low) – Documents are too long (low) – Documents are hard to read (low) – Documents are hard to follow (low) |
| Feeling responsible | The extent an employee feels personally accountable and responsible for the organization's ISO-9001-relevant goals, and results of the work he or she does (Hackman and Oldham, 1976) | <ul style="list-style-type: none"> – Feel moral obligation to use ISO 9001 – Feel intrinsic motivation to fulfill the minimum requirements of ISO 9001 – Feel willingness to achieve ISO-9001-related goals of the organization |

After all the interviews were completed, we classified the level of involvement in standardized work practices and continuous improvement practices under three different categories: Low, medium and high. Selecting cases with variation in the constructs across cases helps to assess construct viability (Singleton and Straits, 1999). Table 4.2 and Table 4.3 provide indicators of these three different categories identified from the interviews. Moreover, we classified the level of attitude towards usage, awareness, perceived usefulness, perceived ease of use, and responsibility feeling also under three different categories: Low, medium and high. These data are used during the cross-case analysis.

Table 4.2. Level of involvement in standardized work practices

| Level | Dimensions derived from the data | Example quotes from the data |
|--------|---|---|
| High | <ul style="list-style-type: none"> • Working almost 100% according to ISO 9001 in daily life • Knowing relevant ISO 9001 documents like procedures, checklists, etc. • Following standardized way of working, processes, procedures when required | <p>“Everything goes by the book. Not to be stupid. ‘Owww. The procedure says this, so I will just do it’, then bang my head against the wall. But we are the department that is closest to ‘Hey this is how it should be done’. It has been written down this way for a reason. Reasons may change. Okay. Then we change the procedure. Right? But if there is no reason to change, then we go by the procedure.”⁶</p> <p>“For me it's (ISO 9001) a basic principle. It's like the bible let's say for doing business.”</p> |
| Medium | <ul style="list-style-type: none"> • Knowing relevancy of ISO 9001 to their work • Being committed to work according to ISO 9001 • Not being able to follow processes time to time | <p>“I'm committed to use the tools and again also I made the mistake that we move faster forward [rather] than following the procedures ... So that's a challenge for our company. That we are moving faster than the procedures sometimes allow us to do.”</p> |
| Low | <ul style="list-style-type: none"> • Not knowing relevancy of ISO 9001 to their work • Not knowing and/or following relevant documents • Skipping some steps of the processes, work too quick, take some loopholes knowingly • Not documenting, reporting work as required • Doing the assessment later than what is required by the QMS • Working on documents as soon as audit is coming up | <p>“I have a positive sense in terms of the fact that it describes the things that you should do if you want to do everything right. I also know from practice that the day-to-day business drives you to do things different than [what] is described in the document. ... If we get audited on this then you will very quickly find situations where we [are] driven by business time pressure. We deviated, knowingly or unknowingly from the process.”</p> <p>“Probably there are some documents related to how we do things, but I'm not consciously using them. What would happen, may[be] if something changes, a procedure is changed, and then you get confronted with it, because somebody introduced it and, ‘Okay. We are going to do something different’. And then you get to that point ... I would not know by heart a direct connection in that area.”</p> |

⁶ All the interviews were conducted in English, but the interviewees were non-native English speakers. Therefore, throughout the paper we corrected minor grammatical errors of the quotes to make them more readable.

Table 4.3. Level of involvement in continuous improvement practices

| Level | Dimensions derived from the data | Example quotes from the data |
|--------|---|---|
| High | <ul style="list-style-type: none"> • Thinking about how to continually improve • Thinking about efficiency and effectiveness • Updating procedures • Monitoring improvements of processes • Following up on ‘Opportunities for improvements’ (OFIs) that are found during internal and external audit • Writing new procedures if necessary | <p>“I try to dedicate some time per month to actually on topics like continuous improvement. I usually maintain a list of opportunities for improvement for myself and that list comes partly out of internal audits where we have formal OFIs identified. But that is definitely not all. My list of opportunities for improvement also contains discussions with my employees, since I have every two weeks work discussions. There you sometimes come up with things you say ‘Okay. Well. I am facing these and these obstacles’. It is more [or] less my job to remove obstacles as a manager. So what can we do to improve those? I usually ask them: ‘What would be your proposal?’ and write that down as another opportunity for improvement. Then I dedicate some time in the month to work on opportunities. That is more or less the continuous improvement part of the job.”</p> |
| Medium | <ul style="list-style-type: none"> • Working on continuous improvement reactively and believing that it needs to be more proactive • Not driving continuous improvement | <p>“When you look [at] a score ... and you see, then you take action. That is a reaction. So what we need to do and do it now and we do that for many years already and I think most companies do it. We have to be more pro-active. That’s always a struggle. You have a problem, you have to solve it.”</p> <p>“We are very open between, amongst each other. So we have a lot of discussions and we do not hesitate to say, to announce an improvement or to point out an improvement to the other ones: ‘Hey. We could improve this and that’. But it’s all on the level of a side talk, at the coffee machine or during lunch or one or two small emails and then, when it’s not my responsibility, then it stops. So I’m trying to say [that] we do not hide, we do not run away, we do not... If we see opportunities we will note, we will say this. But, we will not drive, or I will not drive, to have this change when it is not really hitting me or hurting me at that moment.”</p> |
| Low | <ul style="list-style-type: none"> • Not thinking about how to continually improve knowingly • Not updating procedures • Not following up OFIs | <p>“We are a lean organization. And then updating procedures or being SMART or continuous improvement. Yeah, that’s due to the time pressure I think a little bit put to the background. ... [We] do the minimum and keep on working like that. But yeah. That’s basic how life works.”</p> <p>“Like I said, if you have limited time, then procedures naturally tend [to] get to the back of your mind. Since you already work like that, you are keeping working like that. Otherwise, you don’t change. If [you] want to change, of course, change is always difficult. Because then you need to analyze and look, and then see the improvement, and then do it. Yeah, that’s a hurdle. Right? And if you’re already busy enough, yeah, then there is no time to do that.”</p> |

4.3.6. Cross-case analysis

The data were analyzed using cross-case analysis (See Table 4.4). The literature was brought in again at this stage to better understand the results. As a result, the final model was derived by interviews and refined by the existing literature on theory of planned behavior, technology acceptance model, innovation diffusion theory and job characteristics theory. The proposed theoretical framework therefore combined arguments from existing literature with evidence from the cases. The final model is discussed in the next section. The findings were shared with the key informant, the QMS coordinator, and he found our findings to be valid. Finally, findings were discussed with the other academic peers.

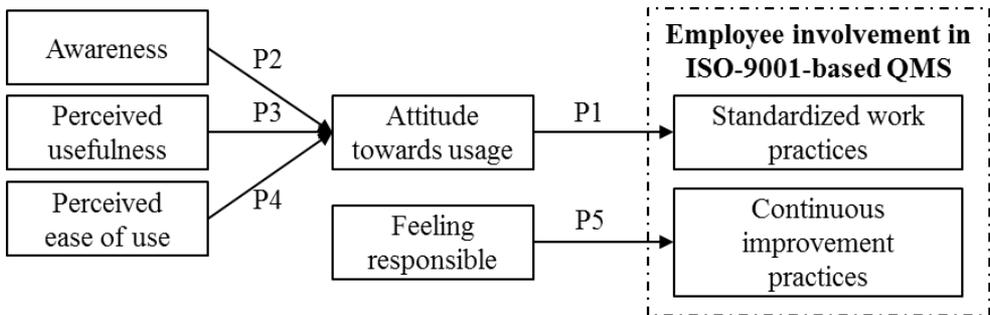
Table 4.4. Overview of case results

| Employees | Key themes | | | | | Dependent variables | |
|-----------|------------------------|-----------|----------------------|-----------------------|---------------------|--|---|
| | Attitude towards usage | Awareness | Perceived usefulness | Perceived ease of use | Feeling responsible | Involvement in standardized work practices | Involvement in continuous improvement practices |
| A | High | High | High | | High | High | Medium |
| B | Medium | Medium | | Medium | Medium | Low | Medium |
| C | Low | High | Medium | | | Medium | Medium |
| D | | Medium | High | | | High | Medium |
| E | High | Medium | High | High | High | High | High |
| F | Medium | Low | High | | Low | Low | Medium |
| G | Medium | Medium | Medium | Medium | | Medium | Medium |
| H | Low | Medium | Medium | | | Low | Medium |
| I | Medium | High | High | Medium | Low | High | Low |
| J | Low | Low | Low | Low | Medium | Low | High |
| K | Low | Low | | Medium | Low | Medium | Medium |
| L | High | High | High | Medium | High | High | High |
| M | Medium | Medium | | | | Medium | Medium |
| N | Medium | Medium | Medium | | | Low | Medium |
| O | Low | Low | Low | Low | Low | Low | Low |
| P | Low | High | Low | Low | Low | Low | Low |
| Q | Low | Medium | Medium | Medium | Low | Low | Low |
| R | Low | Medium | High | | Medium | Medium | Medium |
| S | High | | | Low | Medium | High | Medium |
| T | Low | High | High | | Low | Low | Medium |
| U | Medium | Medium | High | High | Low | Low | Medium |
| V | Medium | Low | Low | Medium | Low | Low | Medium |
| W | Medium | | | Medium | | Medium | Medium |

4.4. Findings

Involvement in an ISO-9001-based QMS is reflected by involvement in standardized work practices and involvement in continuous improvement practices. In our cases, four features differentiated employees that did participate in standardized work practices from those that did not: having a positive attitude towards ISO 9001 usage, being aware of ISO 9001, and believing that ISO 9001 is useful and easy to use. Feeling responsible was the only feature that separated employees that did participate in continuous improvement practices from those that didn't. Figure 4.2 gives the conceptual framework. In the following sections, we develop propositions on these five features to better understand involvement in the ISO-9001-based QMS at employee level.

Figure 4.2. Conceptual framework



4.4.1. Involvement in standardized work practices

4.4.1.1. Attitude toward usage

Our interviews revealed differences in employees' attitudes toward ISO 9001. The interviewed employees had different feelings toward ISO 9001, some had a more positive view, whereas others more negative. We named this theme as attitude toward usage and defined it as an individual's positive or negative feelings about using ISO 9001 (adopted from Fishbein and Ajzen (1975)).

When Dimestra got first involved with ISO 9001, they received global procedures from the US headquarters. Dimestra had an employee dedicated for QMS coordination. There were also several other employees working on quality-management-related subjects. Therefore, when they have received the global procedures to apply from US, quality people at the company sat down and rewrote those global procedures and adapted them

based on their own needs. In the case that there were no global procedure available, they wrote a local procedure from scratch. During this process they collaborated with the process owners to make sure that the documents describe the real work that is done on the shop floor and to make sure that employees have a positive attitude toward the system. In the current system, employees had the responsibility to control and update their own procedures under the guidance of the QMS coordinator.

Even though Dimestra involved employees during the implementation of ISO 9001 and gave them the responsibility of their own processes, attitudes of employees were not the same. Some employees had a positive attitude. They thought that working according to ISO 9001 was nice. They liked the procedures, checklists and work flows derived from ISO 9001. The following quotes are examples of employees with a positive attitude:

“Realizing that you document for the higher purpose, [for] trying to be a better company. So if you as an internal auditor or manager or leader like me, if you help people to see what is the higher objective [which is] to become a better company, people [will] stop resisting. It is not a procedure that is the goal. Procedure is there as a backbone to help [us] achieve higher company objectives.”

“So you have to have a kind of systematic way of having procedures, work instructions, templates, something like that. We have got templates. We have got checklists that are residing under the procedures. But it is not enough I think at the moment.”

On the other hand, some employees had a negative attitude toward ISO 9001. They were especially not happy about the procedures, checklists and the paperwork associated with ISO 9001. Mainly, they found ISO 9001 too bureaucratic. Some people also indicated negative feelings towards ISO 9001 because it did not give them enough freedom. The following quotes are reflecting the negative attitudes of employees:

“The first reaction is of course ‘Procedures, I hate them.’ ... For me, one on one procedures are bureaucratic... It's just the way of working. It needs to be done. But like I said, by nature I'm against procedures.”

“I think the quality procedures are a little bit too far away from let's say the day-to-day operations... I think they have been written by mostly the quality department or people inside the quality department with this specific part to describe business processes. And my honest opinion is that I think they have been written once, because they needed to be written, because we need to comply.”

“I worked for a cable company [before] ... It was a start-up [company]. I was responsible for all the procedures within purchasing at that time. And we kept it as

simple as possible ... It's not like this [here]. In here, you are overwhelmed ... People are responsible for their things and they don't need those big checklists ... Why? Just show that the supplier is validated ... Everything what's before that, who cares? As long this is delivered."

"According to the quality system, you have to do it (the paperwork) upfront. [But] it is always something that comes later. So that's one of the things that annoy us then. Because then you have to put something on paper that you thought of two years ago. And that's always difficult to do."

"Specifically the GNPD (global new product development) procedure has a lot of checklists and things you have to deliver. Sometimes it feels like it's a little bit over the top, too much."

Overall, interviews revealed that a positive attitude toward ISO 9001 usage is an important antecedent of involvement in standardized work practices. When employees had a negative attitude toward ISO 9001, they were not participating in standardized work practices (See Table 4.4). The following quote from the interview with the QMS coordinator also showed the variation of attitudes in the company and the importance of attitude for ISO 9001 usage:

"There is a variation of opinions toward the quality management system. Indeed some people [think] it is a burden, because it is too bureaucratic. And other people think 'Okay. We have to earn money. We don't have time to stick to the procedures'."

Theory of reasoned action (TRA), drawn from social psychology, aims to explain consciously intended human behavior (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975). TRA has been used to predict various behaviors (see Sheppard et al. (1988) for a review). Theory of planned behavior (TPB) is an extension of TRA. Different from TRA, TPB deals with behaviors over which people have incomplete volitional control (Ajzen, 1991). TPB theorizes that three factors determine a person's intention to adopt a behavior. One of these factors is referred as "*attitude toward behavior*" and defined as "an individual's positive or negative feelings (evaluative affect) about performing the target behavior" (Fishbein and Ajzen, 1975, p. 216). According to theory of planned behavior (TPB), to perform a behavior people need to have a positive feeling about the behavior and its outcome (Fishbein and Ajzen, 1975). TRA is a very general model "designed to explain any human behavior" (Ajzen and Fishbein, 1980, p. 4). We believe that TPB literature is valuable to understand how employees get involved in ISO-9001-based QMS and it

explains why we found that employees who had a positive attitude towards ISO 9001 were participating in standardized work practices more. Therefore we propose the following:

***Proposition 1:** Employees with a better attitude toward ISO 9001 usage are more likely to get involved in standardized work practices.*

4.4.1.2. Awareness

Our interviews revealed differences in employees' awareness and understanding of ISO 9001. We define awareness as the extent to which an organizational member was familiar with the ISO 9001 QMS in the organization and the requirements, and responsibilities associated with it (adopted from Rogers (2010)).

Current quality management practices at Dimestra confirm that quality was really a priority. ISO 9001 was not the only QMS implemented in the company. They were also demanded to work with ISO/TS 16949 because they were in automotive business. ISO/TS 16949 provides criteria for a quality management system in the automotive supply chain. ISO 9001 is the basis but ISO/TS 16949 includes additional criteria, for instance defect prevention and the reduction of variation and waste in the supply chain (ISO, 2009b). Dimestra was also working according to some other automotive standards (VDA 6.1, AIAG). They integrated all these additional requirements into their ISO-9001-based QMS.

Dimestra gave importance to communicate the quality mission and vision of the company to the employees. The quality policy of Dimestra was to encourage the creative involvement of employees, listen to customers and meet their needs, and continuously improve processes, products and services. The quality policy signed by the CEO was hanging on the walls. Moreover, Dimestra had a well-organized and implemented internal auditing process. The QMS coordinator acted as the lead auditor in this process and he worked with a team of 14 auditors. These auditors were actually employees at different departments and they were trained by an external consultant. Each auditor audited a department different from their own. Internal auditing aimed to improve the QMS as well as increase awareness of both auditors and audited employees.

Even though there were different initiatives taken by Dimestra to make sure employees were aware of ISO 9001, the interviews revealed that this was not always the case. Some employees associated ISO 9001 only with following work flows, checklists, procedures, controlling end product quality, and satisfying customer requirements. On the

other hand, some employees had a more complete understanding. They associated ISO 9001 with using customer feedback, increasing customer satisfaction, training of employees, internal auditing and having a quality vision, etc. Employees with a high level of awareness knew what ISO 9001 is and were aware of the overall requirements. They also knew which procedures and checklist were relevant to their job as well as when and how they should use them. The following quote is an example of an employee who indicated that he has a high awareness:

“It, [my awareness], has to be almost 100%. But I have to tell you that the first time you read ISO 9001 you pick up some things, major themes, and then you work with ISO/TS in internal audits. You are becoming more aware [of] all kind of aspects. Then you read the standard, you pick up other aspects. So it is a growing thing. I think at the beginning I had maybe 60% and now maybe 80%. It is growing because of experience.”

On the other hand, employees with low awareness did not know what ISO 9001 is and did not know the requirements. Moreover, some of them were not aware of the procedures, checklists they need to work with. In some cases, they did not know where to find the relevant documents. Following quotes show employees who had a low awareness:

“[My awareness is] 5 percent ... To be honest, I take it as given. What I mean with that is I have no clue what is in ISO 9001. I have no clue what is required ... So my awareness of ISO 9001 is actually practically zero... If something changes in the ISO 9001 procedure, I wouldn't now. I am not going to look it up unless for instance an auditor or someone makes me aware”

“On a scale from one to ten, I would see [my awareness] between two and three. Ten is high, one is low ... I don't have a two second access to those documents. I have to look where to find them. So I don't pull them out of the drawer every day or even every week or month. I'm aware of them. I'm roughly aware of what they are and what they describe.”

It became clear during the interviews that low awareness was one of the reasons why some employees had a low level of involvement in the QMS. When employees were not aware of the QMS in the company and the requirements of ISO 9001, they were not participating in the standardized work practices related to it. Two exceptions to this were employee P and employee T. Overall, these two employees had a negative attitude toward ISO 9001. However their awareness levels of ISO 9001 were quite high. Being internal auditors of ISO 9001, they had to be aware of ISO 9001 even though they did not like working according to the standard. The cross-case analysis (See Table 4.4) also showed

that medium/high level of awareness was necessary for a high level of involvement in standardized work practices. The following statements from the QMS coordinator and another employee pointed out the importance of awareness for employee involvement in ISO 9001:

“If people don’t see the advantage, they forget about it. So what I should do or what quality should do is [to] promote the added value of quality in the system and then bring that message [from] time to time again into the organization to build ... more awareness toward quality.”

“But if you [do] not know what's in [the standard]... So you go to Albert Heijn (a Dutch supermarket chain), then you don't know what the other shop has, right? So if you don't know, then you [are] not going there, you're not using it.”

“We're promoting it. And people see it now ... And actually, there is a list of mandatory [things] people should do. If we're not doing it, yeah, it's because this procedure is not promoted or not well-known.”

Innovation diffusion theory (IDT), grounded in sociology, aims to explain diffusion of innovation (Rogers, 2010). IDT has been used to explain various innovations (see Tornatzky and Klein (1982) for a review). According to IDT, there are two actors of innovation diffusion. First one is the company that will adopt the innovation. Second one is users who will use the innovation. Moreover, IDT theorizes that innovation adoption consists of five steps: knowledge, persuasion, decision, implementation and confirmation. Knowledge occurs when an individual “is exposed to an innovation’s existence and gains some understanding of how it functions” (Rogers, 2010, p. 162). Then, the person forms a positive or negative attitude toward the innovation. This persuasion step defined in IDT is similar to the “*attitude toward behavior*” construct of TPB. Next, the person decides to accept or reject the innovation. Implementation occurs when person uses the innovation. Lastly, confirmation occurs when person evaluates the results of the innovation decision already made. Adoption of ISO 9001 can also be regarded as an innovation (Guler et al., 2002). Therefore, we believe that IDT literature is valuable to understand how employees get involved in ISO 9001 and it explains why we found that employees who had high awareness of ISO 9001 were participating in standardized work practices more. Therefore we propose the following:

Proposition 2: *Employees with a higher awareness of ISO 9001 are more likely to get involved in standardized work practices.*

Interviews also revealed the ways in which Dimestra can enhance employees' awareness. First, having training on ISO 9001, its purpose and requirements can increase employee awareness. As the QMS coordinator noted:

"What I am doing right now is a preparing an ISO/TS training. And then [I will] go to the diverse departments and give a short presentation on ISO/TS. What does it mean, what are the corner stones beyond the quality management? And build awareness like that".

Second, having training on quality management documents, where they are stored, how employees can easily reach them, which documents are relevant in which processes can increase awareness. This training is important especially for new employees since they need to learn the procedures. As one employee pointed out:

"You can train people on the quality system or you can train people on the processes which already are linked to the QMS. And if you train people on processes, which [already] have links to QMS, then you can also more effectively apply let's say the quality requirements according to ISO 9001 and TS 16949."

Moreover, being a member of the internal auditing team can increase employee awareness, because first they learn the QMS by auditing and second they evaluate themselves while auditing someone else. As one employee expressed:

"Because if I am in marketing, I am distant from quality. Okay, there is a procedure about how I should be doing things, but it is not my everyday life, because my function title doesn't say quality. Right? So it is not as close to me. And I go, [and] audit somebody in purchasing. I have to have an understanding of the requirements for their procedure. I look at [it]. I have people explain to me how they are doing [things]. I make my report. It reflects on me as well. If I go back to my on job the next day, I have more of a notion of 'Well, hang on. What if tomorrow that purchasing colleague comes and says, I am going to audit you now? How are you doing?' ... It works both ways at the same time."

Furthermore, being audited by internal or external auditors can increase awareness of employees. As the QMS coordinator noted:

"Sometimes it is difficult, because people say 'Owww. We have [too] much to do'. But then I go [and] talk to their manager, and say 'Okay. I want to have that person being audited'. So there should be a kind of [system] in which everybody is being audited in a certain way. So they experience and they become aware."

Fifth, employees' awareness increases as they gain more experience in the company. So, it takes some time for new employees to gain awareness of ISO 9001. Finally,

management commitment and support can motivate employees to learn more about ISO 9001. As one employee pointed out:

“Key success factor is awareness and you can only get awareness if you get awarded by management.”

4.4.1.3. Perceived usefulness

Interview data revealed that employees had different opinions about the usefulness of ISO 9001. We named this theme as perceived usefulness and we define it as the degree to which an employee believes that using ISO 9001 QMS would enhance his or her job performance (adopted from Davis (1989) and Davis et al. (1989)). Some employees indeed believed that ISO 9001 was necessary. They believed that ISO 9001 gave them guidelines to minimize mistakes and to do their work better. The following statements are examples of high perceived usefulness:

“How your business should look like? I think it is giving indeed the general guidelines to get a good quality management into your business ... The keyword is stable way of working. It helps to achieve a stable way of working. That is how I see ISO ... The benefit is document what you do, do what you document is to secure the basis, the backbone. The business processes should be documented and executed.”

“Common procedures to avoid discussion, to avoid casualties, to avoid miscommunication, in order to speak the same language and work with the same common principles ... That not everybody is reinventing the wheel, or is miscommunicating about stuff and the interaction between companies ... They are there to make everybody go into a better mood. ... Because you know it's not something you do for doing it. No. There is a justification about that.”

“I am convinced that we do benefit from it. And things like what ISO 9000 puts forward are very sensible things. You cannot debate with that.”

On the other hand some employees believed that ISO 9001 was not that useful or even the opposite; they believed that it was harmful. First, they did not believe that each item on the checklists was important. They thought that the documents were not efficient and practical. The documents did not represent the real work they were doing, but they also did not take the responsibility to update the documents. Moreover, some employees saw the checklists as a tick box, something they had to fill in to satisfy their managers. As results, they filled out the checklists superficially and did not pay attention to the reasons behind the items given. The following quotes show employees who had a low perception of usefulness:

“We have a really strong drive to get our business as strong as possible, but it does not automatically say our business becomes much more stronger, if we get the right procedures in place. So what I mean is that procedures are more lagging than driving the business success.”

“We think it is sometimes a waste of time to work with that [check]list. Maybe take that list, but don't use it as the big deliverable of your processes, but use it as a working document.”

“Everybody also thinks that we should work according to certain processes, but not everyone including myself thinks that all processes are efficient or all let's say fit to the daily practice or the situations that we sometimes forced into.”

Overall, interviews revealed that when employees did not believe that ISO 9001 is beneficial for the organization and for their own work, they were not participating in the system. The cross-case analysis (see Table 4.4) also indicates that a high level of perceived usefulness is necessary for a high level of involvement in standardized work practices. (See Table 4.4). The following quotes also show the importance of employees' perception on usefulness of ISO 9001:

“So, if the people don't see the advantage they forget about it. So, what I should do or what quality should do is [to] promote the added value of quality.”

“In new product development, you have to stick to certain kind of management reviews. So at management reviews you have to deliver certain kind of documents. So in a way they are forced to live the ISO 9001. But it is not because they see the importance themselves, but they see the importance by ‘Okay. I have the management review next week. I have to have all the deliverables to pass that review [and to go to the] the next phase’. So that is the reason why people do the ISO 9001 stuff.”

“I think that people don't see the benefit of it, of the quality, [of] fulfilling all the quality criteria. And also that a lot of people see it more as a burden, because it means work.”

Davis (1989) introduced an adaptation of TRA, the technology acceptance model (TAM), to specifically explain computer usage behavior. TAM aims to explain why a user accepts and uses a new system, a new technology (Davis, 1989; Davis et al., 1989). TAM has been used to predict a wide range of behaviors (see King and He (2006) for a review). TAM theorizes that two factors determine a person's intention to adopt a new technology. First of these factors is referred as “*perceived usefulness*” and defined as “the degree to which a person believes that using a particular system would enhance his or her job

performance” (Davis, 1989, p. 320). The second factor is referred as “*perceived ease of use*” and will be discussed in the next section. The goal of TAM is to provide an explanation of the determinants of technology acceptance.. We believe that in a sense ISO 9001 adoption is similar to adoption of a new technology. Most of the times, the decision is made by top management and then employees are expected to adopt the system. Therefore, TAM literature provides a valuable lens to understand the case data. In addition, according to Barlette and Fomin (2010), TAM can also be used explain ISO 27001 information security standard’s adoption by employees. According to TAM, people tend to accept or reject a new system to the extent they believe it will help them to perform their job better (Davis, 1989). This is in line with our case findings. Therefore we propose the following:

Proposition 3: Employees with a higher perceived usefulness of ISO 9001 are more likely to get involved in standardized work practices.

Interviews also revealed the ways in which Dimestra can enhance employees’ perception on usefulness of ISO 9001. First, if the QMS and the documents are arranged in a way that they are not too bureaucratic and they fit with daily practices, employees’ perception of usefulness can increase. Second, the top management commitment is important, which was also reported in some other studies (e.g. Ahire and O’shaughnessy, 1998; Carlsson and Carlsson, 1996; Poksinska et al., 2006). The top management themselves can participate in standardized work practices related to an ISO-9001-based QMS so that employees do not question ISO 9001’s validity and still trust to the system.

As one employee noted:

“At that time [when it was first introduced] I believed in it, but I do not know if I still believe in it, because there are too many ways to work around [it] so to say. And you can say you are compliant with it, but there are still ways to overrule them. Yeah, what does the system then tell you? So if some companies now are saying ‘We are ISO certified’, it does not say that much to me.”

Moreover, management and quality management can promote the importance of having ISO 9001 and the QMS documents for producing high quality products and satisfying customers. As expressed by some employees:

“I think the basic understanding is that when you work according to the procedure, there is more guarantee that the product that you design in a later stage in the production will deliver high quality products.”

“Applying those processes I think is a big motivator to be able to deliver our needs to our customers ... Because if you do not deliver quality, customers are really putting your business on hold.”

Fourth, management and quality management can promote the added value of ISO 9001 and the related documents for the organization. Having a QMS system gives guidelines to the employees. It guarantees that employees don't forget important steps and they don't work on unnecessary items. Moreover, it helps to avoid miscommunication. As one employee pointed out:

“I see things like checklists more as guidelines with some minimal requirements ... It's needed to work in an organization like us: big, international, working with people you do not always see or hardly know. If you want to assure that certain information flows in the right way or that certain things are clearly aligned, then you need some hurdles, some formal checkpoints ... Otherwise it becomes unworkable and everybody just has its own little company.”

Finally, being a member of the internal auditing team can make employees realize the benefits of ISO 9001 and alter their perception. As one employee noted:

“It (internal audits) impacts it (perception of employees) very positively in that sense. Because maybe initially even if they (internal auditors) think ‘Well, I have got to audit these procedures’. They gain an understanding of what it is for and see benefits that it is much less [related] with quality but it is simply sensible to do it. Because it produces good results.”

4.4.1.4. Perceived ease of use

Interview data also showed that employees had different opinions about the ease of use of ISO 9001. We named this theme perceived ease of use, and we defined it as the degree to which an employee believes that using ISO 9001 would be free of effort (adopted from Davis (1989)). Some employees thought that ISO 9001 was not easy to use for several reasons. First, they found it hard to follow the documents step by step, because they were too long to read. Moreover, they thought the system was not transparent and easily accessible. Employees at Dimestra had to work according to procedures, work flows and checklists. Some of these were local, some of them were global. In the past, these documents were stored at employees' local computers and a local system. In the current system, they were stored in an online system. We have realized that sometimes employees were willing to use the QMS in their daily work, they wanted to follow the relevant

processes, but the system was too complicated and not accessible so they could not find what they were looking for. As the following statements show:

“The checklists are okay, but sometimes they're huge! ... You could make it more compact and easier to work with. So then it is not something [that] they will do in the end, but they will do it while they are working ... For instance for our side, for purchasing, we have a few checklists ... It's too much! Why are they asking this?”

“We need to store all the documentation according to the record retention procedure that we have in certain systems which are not the most user friendly systems. For instance, they are not working efficiently or they are offline when you want to use them ... So it is not the process [that] is not efficient, but it is the system we have to work [with] according to the processes that are not really user friendly.”

“It's all there, but it's very very difficult for most of the people to find their way within the system. If you ask here just [to] a design engineer or even [to] my colleagues, ask them ‘Okay, where can you find the QMS?’. Yeah, I have this NCS checklist. That's correct, that's derived from the ISO 9001. But do you know where to find it, or where the total system is or how it is connected with each other? And that's for me also. Even I have some trouble with [finding] where [it] was. To my opinion it's not transparent for the people ... If you ask the people ‘Do you know where it's written down, how you have to do it?’, so it's not that transparent system of course.”

Only a few employees indicated that the ISO 9001 system was not hard to use. One employee expressed that she did not have any problems with finding the relevant documents. She thought with today's technology it is easy to find everything, because everything is digital and not on paper. Moreover, the Six Sigma deployment leader found the ISO 9001 standard itself easy to use, also in the sense of easy to comply with:

“It (ISO 9001) is not saying what it (continuous improvement) is. What is continual improvement? Continual improvement on your house can be just to change the position of a painting. Is that continual, is that enough for that year? Or continual improvement for your house is [to] redecorate or even the rebuild. To what extent do you do continual improvement? For an audit, you can always satisfy the auditor. Yes I do continual improvement. Look, I changed the position of the picture in the room. So I did continual improvement. Done. So it does not quantify what is continual improvement.”

Overall, the interviews revealed that when employees think using ISO 9001 would be free of effort they have higher levels of participation in standardized work practices. The cross-case analysis (see Table 4.4) also indicates that a low level of perceived ease of use is almost sufficient for a low level of participation in standardized work practices. The

following statements from the QMS coordinator and another employee point out the importance of ease of use:

“So how to build a quality manual that is effective? Because if you ask people 'Okay. You have this process. Please can you show me according to which procedure are you doing that?' And they can't find it. So that's sometimes trouble[some].”

“If the system that we use was more easily accessible and more transparent for the people, I think they would use it much better. I see it in my purchasing department. In the end, all the deliverables are put on the table, but in the meantime it is very depending on people ... I think if it was, like I said, more easy, easy[ly] accessible, more transparent, people [would] work more with the system.”

According to the technology acceptance model (TAM), even though people believe a new system is useful, they may also think that the system is too hard to use and the performance benefits are outweighed by the efforts. This is referred as “*perceived ease of use*” and defined as “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989, p. 320). TAM explains why we found that employees who thought ISO 9001 was easy to use were participating in standardized work practices more. Therefore we propose the following:

Proposition 4: *Employees with a lower perceived ease of use of ISO 9001 are less likely to get involved in standardized work practices.*

Interviews also revealed the ways in which Dimestra can enhance employees' perception on ease of use of ISO 9001. First, the QMS documents should be based on existing process flows. This would make it easier for employees to follow procedures. As one employee noted:

“TS 16949 ... it is also kind of a process flow. You have an input, output, and ... how you begin with product development till delivering to the customer there. So in my mind, it's having a more process flow. And also that it's easier for the organization to adapt to that and to make [people] aware of that.”

Second, if the QMS documents are short, efficient, easy to read and not time consuming, employees may find them easier to follow. As one employee expressed:

“The Integrated Move Process procedure, I've never seen a procedure like [this] in another company. It's like, pages, a lot of pages. And it describes whatever you need to do to move for instance a manufacturing line from one plant to another plant. But if you go through that procedure step by step ... there is a lot of repetition.”

Third, implementing a good IT system with a sharepoint where all the documents are stored can make it easier for employees to find the documents. As one employee pointed out:

“Finding data and connection between all those data, is [difficult]. Everybody has their own source or their own storage location ... It's not easily accessible. That's a fact.”

Moreover, the QMS documents should be easy to find in the shared IT system. Documents should have clear names so that employees can easily find what they are looking for. As noted by some employees:

“You really need to know where to look, and then you can find it. If you don't know where to look, it might be difficult to find the information that you need.”

“Because they are now listed by numbers, that's the only way you can look them up. So, how can you find them, when you need to know the number? So you cannot. You can also search key words. But I already know from the share point system that it's not very easy to find documents. There are always systems, Excel sheets listing the numbers, and the procedures. So you need a translation ... [You need] the number to look them up.”

Fifth, the QMS system should be regularly updated to make sure that all the documents are up to date and all the non-relevant documents are removed from the system. This should make finding the relevant documents easier. As pointed out by an employee:

“I don't know how much garbage is in it (the share point system). When I need a QMS, I have problems finding them.”

Finally, responsibilities of people in the QMS and in processes should be made clear. This can be achieved by using RACI (Responsible, accountable, consulted, and informed) charts. By this way, employees would know whom to contact when they need to learn something about the QMS or when they need to follow a specific process. As noted by some employees:

“I think that there could be some more backup and more open organization. Who is doing what within the QMS? That would be help[ful].”

“We do have an RACI chart, a responsibility chart. I think that could be more explored or visualized ... So where is your responsibility, what should you do and at what occasion?”

4.4.2. Involvement in continuous improvement practices

4.4.2.1. Feeling responsible

We have described in the previous section that Dimestra has a well-organized internal auditing process. The QMS coordinator plans an audit circle once in every three years. He makes sure that all the processes are audited at least once during this time. The team of 14 auditors runs the actual audit. Auditors come up with a list of major nonconformities, minor conformities and opportunities for improvements. The QMS coordinator keeps track of all the issues found and makes sure that they are fixed. Internal auditing aims to continually improve the QMS as well as improve overall processes. Even though Dimestra takes initiatives to continually improve, interviews revealed that continuous improvement was not the priority of everyone.

The last theme that emerged from interviews was employees' responsibility feeling. We defined feeling responsible as the extent an employee feels personally accountable and responsible for the organization's ISO-9001-relevant goals, and results of the work he or she does (adopted from Hackman and Oldham (1976)). We found out that some employees did not feel responsible for the QMS. When employees did not feel responsible, they were not willing to participate in continuous improvement practices. Dimestra's management focused on what is urgent. We have described in the previous section that management at Dimestra really gave priority to quality. However, something that also appeared during the interviews was that the management mostly focused on urgent quality issues. If something went wrong at the production site or if a customer was dissatisfied about the quality, then it became a real priority. At those moments all the available employees were directed to solve that issue as quick as possible. However, when there was an idea that could prevent a future problem, it did not become a priority. As a result, most of the employees did not feel responsible to prevent possible future quality problems and continuously improve the system.

Dimestra was also a lean organization, so most employees were overloaded with work. As a result, if something was not part of their own work, they did not feel responsible for it and they were not willing to act on it. Moreover, when employees did not have QMS-related key performance indicators, they did not feel responsible. For example, purchasing people were responsible for new component sourcing. They had to find suitable

suppliers for the lowest costs. Additionally, marketing and sales employees were responsible for following trends and gaining new customers. They were evaluated by how many contracts they made and how much money they brought to the company. Whether these new customers were satisfied or not was managed by customer quality engineering. We have realized that purchasing, marketing and sales employees did not see continuous improvement of the QMS as part of their job, because they were not evaluated based on quality. The following quotes are example statements from employees who did not feel responsible:

“Workload is that high within Dimestra. It's very difficult to make time for it (continuous improvement). And I think if they could improve on that, a lot of things could be improved by the people themselves. I know it from my own department. We also see it. Okay, what can we do better? But we don't have the time to execute it. Okay, this is my higher priority, so I focus on my high priorities, and that's something for later. And later never comes. So that [is] the problem ... Even if this is an opportunity to improve, yes then it is on the list. Then it has the intention, attention of the management. [If] it's a quality issue, it should be solved. So then there is a lot more pressure to make it happen. So, I think it's the workload that people have, that it doesn't make [it] important for them. And so there is no drive to improve it. No, first my workload and then the rest.”

“We are very open amongst each other. So we have a lot of discussions and we do not hesitate to say, to point out an improvement to the other ones: 'Hey, we could improve this and that'. But it's all on the level of a side talk, at the coffee machine or during lunch or one or two small emails. And then, when it's not my responsibility, it stops. So I'm trying to say [that] we do not hide, we do not run away, we do not. If we see opportunities we will note, we will say this. But, we will not drive, or I will not drive, to have this change when it is not really hitting me or hurting me at that moment.”

“So we're not perfect. You see that when you talk about audits, every time we find something. But typically the auditor finds. We ourselves are not looking for that ... We are not good in I think regularly reviewing the procedures if they still fit with our business.”

*“(Response to the question: What is your impression of the general QMS at Dimestra?)
It's difficult for me to answer, because yeah, I'm not the supplier quality engineer and I'm not the customer quality engineer.”*

On the other hand, some employees felt responsible for the ISO 9001 QMS. They came up with ideas to improve processes. They took responsibility to update the procedures and make sure that they represent day to day operations. They tried to spend

some time on working on the improvement items found in external or internal audits and made sure that they are implemented. Following are the examples of employees who had a high responsibility feeling:

“It is the managers of the departments who are covering the procedures. So for example our business unit manager is responsible for the quality policy. Our quality manager is responsible for customer satisfaction management procedure. Our quality manager is also responsible for compliance management. For example the training policy, responsibility for that is residing at HR manager. So the management team is responsible for the quality management system. But I think I have the responsibility to guide the management team into the right direction.”

“I try to dedicate some time per month to actually [work] on topics like continuous improvement. I usually maintain a list of let’s say opportunities for improvement for myself and that list comes partially out of internal audits where we have formal OFIs identified. But that is definitely not all. My list of opportunities for improvement also contains discussions with my employees, since I have every two weeks work discussions. There you sometimes come up with things you say ‘Okay, well, I am facing these and these obstacles. It is more or less my job to remove obstacles as a manager. So what can we do to improve those?’. I usually ask them ‘What would be your proposal?’. And write that down as another opportunity for improvement. Then I dedicate some time in the month to work on opportunities. That is more or less the continuous improvement part of the job.”

“I want to see how to improve towards continual improvement. And I’m trying to drive certain things at internal auditing.”

“We have our regular meetings and we always look for [things] to improve in the areas where we work in. And then ... you discuss with each other what can be improved. For example with the distributors ... We see that they get information about the products we have and also where they are used. So that’s why I for example have regular meetings with the engineers. And then we look, and I get the information from them. And I can send it out. So I think we are always improving or trying to improve.”

Overall, the interviews revealed that when employees felt responsible for ISO 9001 they had higher levels of participation in continuous improvement practices. The cross-case analysis (See Table 4.4) also indicated that medium/high level of responsibly feeling was necessary for high level of participation in continuous improvement practices. The following statements from the QMS coordinator and another employee pointed out the importance of feeling responsible:

“I think it (continuous improvement) is lagging, because that should be the responsibility of the department managers. But actually the improvements are made,

because I indicate ... For example there are procedures [which are] more than 8 years old. That is a trigger for me. But also the internal audits. That internal auditor is reviewing the procedure and then looking at how it is actually done. And there are gaps in that. So I think it is a more or less a reactive one (system) instead of a proactive [one].”

“People are not really involved. ‘That is quality’s, it is not my thing’, they say ... To make sure that you improve ... you need data record and retention, and that kind of stuff. They don’t [do it]. It is not their thinking.”

“It says quality. All these procedures and everything you should do ... Quality is not just for the quality department. Unfortunately, however there are people who are called quality engineers and quality managers. So everybody thinks when they read the procedure and it says quality procedure ‘It is those guys, right?’. That is the difficulty and we can keep saying ‘Quality is for everybody and everybody is involved’ which it is basically. So I sometimes think that an opportunity for improvement is to stop calling it quality and simply say this is the business process. Because then it is for everybody.”

“As soon as they directly affected by procedures, then the willingness to improve is high. That I notice ... [If they’re not directly affected, they say] ‘That’s not my job, that’s not my concern right now, I have other concerns. So let’s make someone else take care of that’. Yeah, but that [is] logical.”

Job characteristics theory (JCT) (Hackman and Oldham, 1976) aims to explain the conditions under which individuals become internally motivated to perform effectively on their job (see Fried and Ferris (1987) for a review). According to JCT, three psychological states lead to work motivation. One of these states is “*experienced responsibility*”. It is defined as “the degree to which the individual feels personally accountable and responsible for the results of the work he or she does” (Hackman and Oldham, 1976, p. 256). JCT suggests that when employees feel more responsibility towards their work product, their intrinsic motivation and job satisfaction increases. Moreover, they get more concerned about the quality of their work. JTC is the most widely used framework to discuss felt responsibility (Fuller et al., 2006). When employees feel responsible for current and future actions, they also feel accountable. They feel a sense of failure if the results are not achieved (Wynn, 1982). In this way, JCT explains why employees who feel responsible for ISO 9001 are adopting continuous improvement practices more. Therefore we propose the following:

Proposition 5: *Employees with a lower responsibility feeling for ISO 9001 are less likely to adopt continuous improvement practices.*

Interviews also revealed the ways in which Dimestra can increase employees' responsibility feeling of ISO 9001. First, having a training on ISO 9001, its purpose and requirements, can help employees to understand that ISO 9001 is a management standard and it covers more than just quality. This can make employees realize that ISO 9001 is for everybody. As pointed out by one of the employees:

"I sometimes think that an opportunity for improvement is to stop calling it quality and simply say this is the business process. Because then it is for everybody."

Second, the QM department can increase responsibility feeling of employees by including them in the internal auditing team. As pointed out by the QMS coordinator:

"Since 2010, we trained several people to become ISO/TS auditors ... And before [that], it was always done by the quality department. But people have to be aware that quality is not the task of the quality department. Yeah it is. But it is also the responsibility of the department itself."

Third, the QM department can assign QM-related responsibilities to the managers of other departments. This includes responsibility of improving processes and updating procedures. This could prevent employees in non-quality-related departments to say '*That is quality's, it is not my thing*'. As noted by the QMS coordinator:

"Mostly I'm a consultant on how to do it. How to write a procedure? So then we go and sit around the table, and then write together a procedure. So I try to avoid being responsible for the method. I will help, and I hear, and then I say 'Maybe this and this is a good idea. What do you think about it? Are you okay with it?'. So I think the responsibility has indeed [lies] with[in] the management. And I try to push it back to the management."

Moreover, managers of the departments can assign QM related responsibilities to the employees working under them. Below is an example of a manager who has distributed responsibilities to his employees:

"There are a lot of procedures of course. And everybody in our group has some responsibility on that. There is an Excel list with a primary spokesman, and a secondary backup person who are responsible for procedures. And that's also part of our monthly meetings. And [also] once per year we are discussing this."

Finally, management should define QM related KPIs at process level, department level and individual level. This way, employees can understand how their job contributes

to quality and customer satisfaction. Employees can also evaluate their performances based on these KPIs and feel responsible for improving their KPIs. Defining KPIs is especially important for employees who are working in departments like finance, sales, and marketing which are only indirectly linked to final product quality. As noted by the QMS coordinator and an employee:

“What we have is indeed: management is making a vision; it is coming into mission statement. Because of that, there is some career development and results assessment (CDRA) process where the requirements are driven down to the employees. And the employees make plans for that year. So there are kinds of key performance indices for the employees ... But when looking at the QMS, so the product realization process from requirements towards satisfaction of your customers, what are those processes? Like marketing, engineering, customer service. What kind of key performance indices do they have in that process? So [we] can make a kind of a dashboard so that you indeed drive customer satisfaction.”

“I think a success factor is when it (KPIs) is on your CDRA, when it is on your achievements. When you can say 'Okay, this year I want to make sure that ... ' and then you have to define KPIs. So you can show your manager that you worked according to procedures and therefore we dropped our cost of quality with an x amount of percentage. So you have to define KPIs and make [them] part of a CDRA. And make sure management is aware of what is going on. These are the key success factors.”

4.5. Discussion & Conclusion

This research examines under what conditions employees get involved in an ISO-9001-based QMS. Both practitioners (Hoyle, 2009) and academicians (Heras-Saizarbitoria et al., 2013; Mantura, 2008; Prado et al., 2004) believe that employee commitment and participation are important for ISO 9001 implementation. ISO 9001 also states that employees should be aware of the ISO 9001 QMS and should understand how their job relates to the QMS (ISO, 2008b). Moreover, they should contribute to the customer satisfaction and continuous improvement. However, there is no study systematically analyzing the ISO 9001 adoption at employee level. Therefore, this paper fills this gap.

Our comparative case study reveals the antecedents of employee involvement in standardized work practices and continuous improvement practices. Four features differentiated employees that did participate in standardized work practices from those that didn't: having a positive attitude towards ISO 9001 usage, being aware of ISO 9001, and believing that ISO 9001 is useful and easy to use. On the other hand, feeling responsible

was the only feature that separated employees that did participate in continuous improvement practices from those that did not. We did not see any patterns between employees' characteristics like education, experience, gender and their involvement in ISO 9001.

Our study also suggests that involvement in standardization practices differs from involvement in continuous improvement practices in several ways. Theory of planned behavior (Ajzen, 1991), innovation diffusion theory (Rogers, 2010) and technology acceptance model (Davis, 1989; Davis et al., 1989) literatures help illustrate under what conditions employees participate in standardized work practices of ISO 9001. This indicates that adoption of standardized work practices resembles information system adoption. The decision to adopt ISO 9001 is mostly made by the managers, then the system is implemented and employees are expected to use the system in their daily activities. Moreover, involvement in standardized work practices has more antecedents. It is more complex. Employees need to have a positive attitude about ISO 9001 and it is not easy to change employees' attitudes toward ISO 9001. In other words, it is not easy for managers to influence employees' attitudes and to make them get involved in standardized work practices.

On the other hand, job characteristics theory (JCT) (Hackman and Oldham, 1976) literature helps us understand under what conditions employees participate in continuous improvement practices of ISO 9001. This indicates that adoption of continuous improvement practices is related to employees' motivation. Moreover, involvement in continuous improvement practices has fewer antecedents. In this sense, it is simpler. According to JCT, autonomy, defined as the degree to which individuals own their work outcomes, helps employees to feel responsible for their work (Turner and Lawrance 1965). Moreover, managers can alter employees' responsibility feeling by assigning accountability, by giving employees more QM related responsibilities, setting QM-related KPIs and evaluating employees based on these KPIs.

4.5.1. Theoretical implications

In conclusion, we think our study makes several important contributions to the operations management and quality management literatures. First, the explorative case analysis offers a theoretical model that explains ISO 9001 adoption at employee level. Future research can

build upon and extend this general framework. Second, this multidisciplinary research integrates existing quality management literature with several literature streams from information systems - theory of planned behavior, innovation diffusion theory and technology acceptance model - and strategy - job characteristics theory - to understand the interview data. Third, we believe that the theoretical model developed in this study has broader implications for adoption of other international standards such as ISO 14001 (environmental management), ISO 28000 (supply chain security) and ISO 13053 (Six Sigma). These standards share a common template and many features and they all point to the importance of employee commitment and participation. Therefore, insights from this study can help to understand employee involvement in other standards.

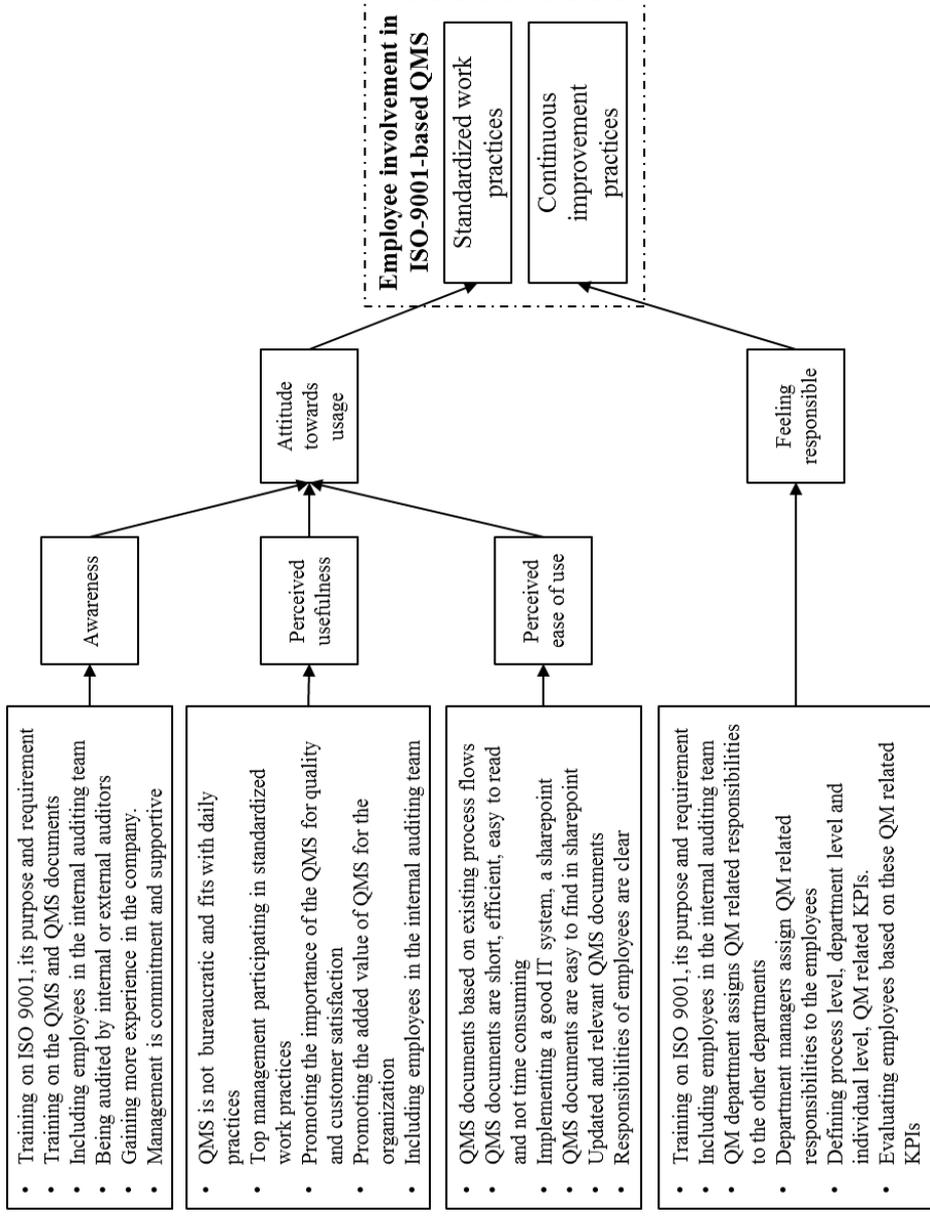
Moreover, in contrast to previous research, this research distinguishes between participation in standardized work practices and participation in continuous improvement practices. Continuous improvement is one of the most important principles of both TQM and ISO 9001. As a result, quality management literature paid close attention to continuous improvement methodologies. For example, the Plan-Do-Check-Act cycle (Deming, 1982) became one of the most frequently used continuous improvement tools. However, another well-known Japanese improvement philosophy, Kaizen, points out the importance of standardization. According to Kaizen (Masaaki, 1986), organizations first need to Standardize-Do-Control-Act. Only then can organizations use PDCA cycle and continually improve.

Even though the importance of standardization is recognized by some, the quality management literature has focused more on improvement than on standardization. Our findings suggest that adoption of standardized work practices is more behaviorally complex than adoption of continuous improvement practices. This challenges the focus of quality management literature on continuous improvement. Therefore, future studies need to focus more on the standardization aspect of ISO 9001.

4.5.2. Managerial implications

Our study also has important managerial implications. Our results suggest that firms seeking to increase employee involvement in ISO 9001 have to make sure that employees have a positive attitude towards ISO 9001 and they feel responsible. Firms can create a positive attitude by first making employees aware of ISO 9001, what it includes, what it

Figure 4.3. Overview of the findings for managers



requires. Second, firms should show employees how using ISO 9001 would enhance their job performance. Third, firms should make ISO 9001 as easy to use as possible. The QMS system and the documents should be easy to read and easy to find. Moreover, firms can create responsibility feeling by giving autonomy to employees. Managers can also increase accountability of employees by assigning them QM related responsibilities and evaluating them based on QM related KPIs. Figure 4.3 gives guidelines to managers on how to increase employees' involvement in ISO-9001-based quality management.

4.5.3. Limitations and future research

Like most studies, this research is not without limitations. The data has been collected in a single firm. Future research should collect data from employees at different firms and under different settings. Future research should also collect more data on employee characteristics like age, gender, experience. Moreover, the conceptual model presented in this paper needs further testing. Future investigations should collect quantitative data at employee level to test if our model holds. Future studies could also adapt measurements from other literature streams such as organizational change acceptance (Argyris, 1993; Weick and Quinn, 1999) to test the applicability of the theoretical model. We hope our conceptual model stimulates new thinking about adoption of quality management practices at employee level. More research is clearly needed in this emerging area of interest.

Appendix A. Interview questions

1. Personal background

- Can you tell me a bit about yourself? Education, previous experience.
- How long have you been with Company A?
- What is your current position and what are your main responsibilities?

2. Adoption

- How aware are you of the ISO 9001 QMS in your company?
- What comes to mind when you hear ISO 9001 QMS?
- What do you think about the ISO 9001 QMS at Company A in general?
- Do you use the system? Why or why not?
- How do you use ISO 9001 standards in your daily work?
- To which extent do you feel committed to use the ISO 9001 QMS?
- What do you think about the continuous improvement at Company A?

3. Motivation

- Why do you think Company A decided to implement ISO 9001 QMS and get certified?

4. Implementation/maintenance

- What do you think are the main pitfalls of the implementation/maintenance?
- What do you think are the main success factors of the implementation/maintenance?
- If you could change something about the implementation/maintenance process, what would you change?

5. Follow-up

- Is there anything else that you think we ought to be aware of regarding how the ISO 9001 QMS is working?
- Could we contact you in the future for clarification questions in case we uncover some gaps or inconsistencies as we go through our notes?

Appendix B. Characteristics of the cases

| Employees | Current position | Current responsibilities | Time at Dimestra | Management role | Internal auditor role |
|-----------|----------------------------------|---|------------------|-----------------|-----------------------|
| A | Supplier Quality Manager | (1) Supplier selection: identify new suppliers, evaluate new suppliers in terms of quality, bring the selected ones into production (2) Supplier maintenance: evaluate the existing suppliers, make sure they meet the requirements, make sure they follow up on corrective actions when there is a problem | 16 | Middle manager | No |
| B | Program Manager (PM) Manager | (1) Lead a team of project managers (10 in NL, 3 in BE) for new product development , make sure the projects are in order, guide the projects from an idea into production (2) Responsible for GNPD (Global New Product Development) process | 13 | Middle manager | No |
| C | Design Engineering Director | (1) Coordinate the work of design engineers in NL, CH, US, make sure that the work is lean, BCBC (best cost business center), bring tasks and responsibilities to best cost regions | 23 | Top manager | No |
| D | Quality Director | (1) Try to get involve in New Product Development (NPD) (2) Try to sell to the customer the current products (3) Try to satisfy the customer about the current production, try to have a low return rate, work with the make site, the design engineering and supplier in order to get the quality improved, have regular meetings with customers, run improvement programs together with customers and score class reviews | 43 | Top manager | No |
| E | Six Sigma Deployment Leader | (1) Bring expertise on Six Sigma to improve products and business processes, help organization grow, help the engineer do their jobs better and help the non-technical departments to provide tools for continual improvement on business processes | 30 | None | Yes |
| F | Marketing Segment Manager | (1) Responsible for two marketing segments, look at what is happening in the market, look at product needs in the market (2) Responsible for forecast management in Europe | 14 | None | No |
| G | Groupsleader Laboratory | (1) Responsible for the labs, lead 3 lab supervisors, make sure there is enough capacity for testing | 30 | None | No |
| H | Design Engineering Groups Leader | (1) Lead a team of design engineers working on new products, partly for new applications, but also for an existing application, come up with a product design that fully meets the customer requirements written in the customer spec (dimensional requirements, accuracy requirements, test requirements) | 16 | None | No |
| I | Field Application Engineer & | (1) Handle all the technical questions related to automotive electrical protection products, fill in the paper work related to regulations (2) Take part in the quality steering team of a | 15 | None | No |

| | | | | | |
|----------|---|---|----|----------------|-----|
| | Quality | product group produced in Asia | | | |
| J | Purchasing Manager | (1) Lead a team of purchasing program managers (in NL), keep the timeliness in all the programs, make sure that they reach the cost targets on materials purchased (2) Take part in the membership team in Europe | 7 | Middle manager | No |
| K | Design Engineer | (1) Design and development of new products, get an understanding of what a potential customer is looking for, develop a product that fits to the requirements and specification, provide samples (2) Reliability engineer in Europe: provide test reports to customers during the development of a product, if the product fails within warranty analyze it, provide AD reports | 6 | None | No |
| L | QMS Coordinator | (1) Quality management system: coordinate internal auditing, follow up on the audit results, keep the quality management system up to date, keep the quality manual in order, integrate BE facility (2) Regulation: keep up with restrictions on material use (3) Innovation: deal with patents including the design for six sigma tools | 15 | None | Yes |
| M | Product Management Team (PMT) Manager | (1) Responsible for operational business performance: productivity, costs, speed, quality performance (2) Run projects to improve the quality of products (3) Process development: develop processes for new products | 13 | Top manager | No |
| N | Product Management Team (PMT) Group Leader (Operations Manager) | (1) Lead a team of product managers (10 in NL, 8 in MY, 2 in CH) (2) Lead operational management: Profit & Loss ownership, change management projects, capacity management, keep the business sustainable both on profit, quality and delivery assurance (3) Lead process engineering: process development for new products (4) Make sure that critical information flows down to the make site | 10 | Top manager | No |
| O | Marketing Segment Manager | (1) Work with the sales team to understand the trends in the automotive industry (2) Work with the design engineers to translate those trends into new product proposals and to new business opportunities | 12 | None | No |
| P | Purchase Program Manager | (1) Supply components that are needed for new development projects: start with supplier selection, make sure that the supplier is validated, make agreements with the suppliers (lead time, minimum order quantities, etc.), make price estimations, make sure suppliers are involved with the project and they deliver the parts | 9 | None | Yes |
| Q | Process Engineer | (1) Translate the design made by design engineering into production: define the processes required, specify necessary equipment, qualify the process in the equipment and place it at the make site, make sure that the equipment is producing the right product as it should be | 15 | None | No |
| R | Design Engineering Manager | (1) Responsible for all R&D activities in Europe, responsible for about 125 people in NL (70-75 design engineers, technical assistants and project managers), 40 people in BE | 24 | None | No |
| S | Customer Quality Engineer | (1) Work on new projects, new products, make sure that there are proper agreements with the customer and those agreements are followed up properly (2) Work on changes | 7 | None | No |

| | | | | | |
|----------|--|---|----|------|-----|
| | | on products, design (3) Work on problems with a current series production: warranty claims, break downs, line stops at the customer | | | |
| T | Program Manager (PM) Change Management | (1) Implement changes in production: Integrate the new facilities bought in BE and BG, implement quality improvements there (2) Work on big production problems, failure in the field | 9 | None | Yes |
| U | Marketing & Sales Support | (1) Assist and coordinate marketers (2) Manage around 30 distributors in Europe, inform distributors about pricing, check their performances | 25 | None | No |
| V | Design Engineer | (1) Lead a design engineering team developing a new product in NL | 10 | None | No |
| W | Marketing Segment Manager | (1) Follow the trends in the Small Appliances Industrial and Lighting industry in Europe, Middle East and Africa, give directions to sales team | 7 | None | Yes |

Chapter 5.

General discussion

5.1. Summary of the main findings

Even though the ISO 9001 quality management standard is widely used by organizations to gain operational and market benefits, studies on the impact of ISO 9001 show that these objectives are not always achieved. The studies on the impact of ISO 9001 report mixed findings. A large body of literature reports positive impacts. However, some studies reveal negative results. Therefore, the aim of this dissertation is to find out what is the impact of ISO 9001, and to better understand the differences in current literature. In Chapter 2, we try to draw generalizable conclusions about the relationships between ISO 9001, business performance and some moderating factors by using meta-analysis. In Chapter 3, we study the benefits of ISO 9001 worldwide and the role of national culture and economic development in the ISO 9001-business performance relationship. In Chapter 4, we investigate employee participation in an ISO-9001-based QMS by using an exploratory case study method.

Chapter 2's meta-analysis on the financial impacts of ISO 9001 shows that in most cases ISO 9001 certification helps companies to increase their revenues. This effect may differ per region, business sector and company size. We could not prove the impact of ISO 9001 on decreasing costs. However, again dependent on region and sector, some companies are able to decrease their costs. Finally, the findings suggest that not all companies are able to gain financial benefits from ISO 9001. Again, this effect may differ per region. Overall, this chapter quantitatively brings together the literature on ISO 9001 and draws conclusions about the impact of ISO 9001 on financial performance.

The second chapter reveals that companies in some countries benefit more from ISO 9001. ISO 9001 aims to be globally applicable and it is implemented worldwide, but there is no study questioning its global applicability and benefits. Therefore in Chapter 3, we investigated the benefits of ISO 9001 and how national differences affect the relevant benefits of this standard. We show that ISO 9001 benefits both operational and market performance across various countries. However, the results also reveal that national

differences, specifically the level of economic development and national culture, affect the performance benefits of ISO 9001. The level of economic development has a significantly negative effect on operational performance and no effect on market performance. This confirms that implementing ISO 9001 leads to more operational improvements in companies located in developing countries. Moreover, national culture impacts the relationship between ISO 9001 and operational performance, but it plays a smaller role when it comes to market performance. Overall, Chapter 3 shows that the differences in impacts of ISO 9001 in different regions can be explained to a large extent by national culture and economic development of the countries.

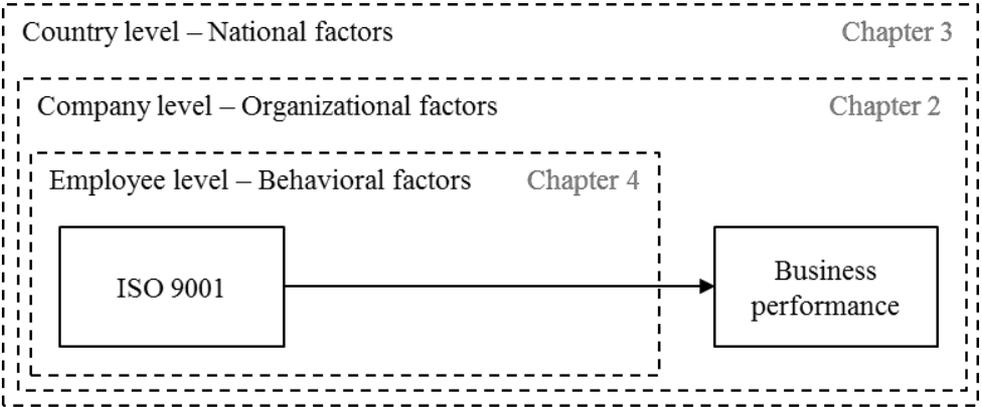
The second chapter discusses the difference between real ISO 9001 implementation and window-dressing at company level. This distinction does not only apply at company level, but also at employee level. It is possible that even though a company wants to have a real implementation of ISO 9001, some employees are actually not using the standard in their daily works. However, ISO 9001 requires employee involvement in the quality management system. Therefore in Chapter 4, we investigated the antecedents of employee involvement in an ISO-9001-based quality management system. We show that four features differentiated employees that did participate in standardized work practices from those that did not: having a positive attitude towards ISO 9001 usage, being aware of ISO 9001, and believing that ISO 9001 is useful and easy to use. Only one feature, feeling responsible, differentiated employees that did participate in continuous improvement practices from those that did not.

Overall, these three chapters together show that the relationship between ISO 9001 and business performance is not as straightforward as it is assumed by many of the researchers. The impact of ISO 9001 on performance can be studied and explained at three different levels: Country level, company level and employee level (See Figure 5.1).

First, Chapters 2 and 3 show that the impact of ISO 9001 on performance is affected by country level factors. Chapter 2 shows that companies in some regions benefit more than companies in other regions do. We believe that these results can be explained by economic and cultural differences between countries. Therefore in Chapter 3, we go deeper into the differences between regions by analyzing differences between countries and show that national culture and economic development of a country impact the benefits gained

from ISO 9001. Second, Chapter 2 discusses that the impact of ISO 9001 on performance is affected by company level factors. It shows benefits gained from ISO 9001 depend on company size and sector. It also discusses the importance of company’s motivation in gaining benefits. Moreover, Chapter 4 discusses the importance of management commitment and support in ISO 9001 implementation. Finally, Chapter 4 reveals the ISO-9001-based quality management system is affected by employee level factors. Even though Chapter 4 does not discuss the impact of ISO 9001 on performance, it shows that under some conditions employees do not use ISO 9001 in their daily lives. This is expected to affect the benefits gained from ISO 9001, which will be discussed in the Future Research section.

Figure 5.1. The impact of ISO 9001 on business performance



5.2. Theoretical implications

Our research contributes to the literature in several ways. Chapters 2 and 3 contribute to literature on the impact of ISO 9001 by bringing together existing studies and drawing generalizable conclusions based on quantitative methods unlike previous qualitative literature reviews (Heras-Saizarbitoria and Boiral, 2013; Psomas and Fotopoulos, 2009; Rusjan and Alič, 2010; Sampaio et al., 2009). They show that on average ISO 9001 leads to both operational and market performance benefits.

Chapters 2 and 3 also reveal some of the reasons why studies about the impact of ISO 9001 report different findings. Chapter 2 demonstrates that benefits gained from ISO 9001 differ depending on the length of the period since certification, standard version,

geographic location, industry sector, and company size. It also shows that results based on surveys and those based on perceptions of quality managers are positively biased. Chapter 3 demonstrates that benefits gained from ISO 9001 depend on the country in which the certified company is situated. More specifically, economic development and the national culture of the country explain why some companies benefit more than others.

Even though adoption of the ISO 9001 standard is not the same as having a certificate, the majority of the empirical studies only consider whether or not a company has obtained certification. However, Chapter 4 demonstrates that ISO 9001 certification should not be viewed as a binary variable. The explorative case study research in Chapter 4 reveals that even if a company implements the standard properly and obtains a certificate, employees might use standardized work practices and continuous improvement work practices related to ISO 9001 at different levels. Different participation of employees in ISO-9001-related practices might also explain why some companies benefit more than others.

Moreover, Chapter 3 contributes to the ongoing convergence/diverge debate in the operations management literature (Rungtusanatham et al., 2005). The results suggest that ISO 9001 positively affects operational and market performance regardless of national conditions (convergence argument). However, the relative benefits of ISO 9001 depend on national conditions (divergence). Chapters 2 and 3 respond to scholars' calls for more international operations management research (Naor et al., 2010; Prasad and Babbar, 2000) by studying firms in different countries. They also contribute to research on international quality management by studying the benefits of ISO 9001 quality management system in firms from different countries (Flynn and Saladin, 2006; Gray and Massimino, 2014; Kull and Wacker, 2010; Naor et al., 2010; Vecchi and Brennan, 2011).

Furthermore, Chapter 4 contributes to behavioral operations management literature (Bendoly et al., 2010; Croson et al., 2013) by conducting explorative case study research at employee level and analyzing employee behaviors. It also contributes to literature on ISO 9001 by providing a theoretical model that explains ISO 9001 adoption at employee level (Heras-Saizarbitoria et al., 2013; Heras-Saizarbitoria and Boiral, 2013) and by distinguishing participation in standardization practices and participation in continuous improvement practices (Naveh et al., 2004; Naveh and Marcus, 2005; Prajogo et al., 2012).

Overall, these three chapters contribute to literature on the impact of ISO 9001 and show that the impact of ISO 9001 on business performance can be explained at country level, company level and employee level. The results indicate that the impact of ISO 9001 cannot be explained only by company level moderators which are the main focus of the existing studies on ISO 9001, employee and country level factors also impact the relationship between ISO 9001 and business performance.

We believe that the findings have broader implications for the adoption of other international standards such as ISO 14001 (environmental management), ISO 28000 (supply chain security management) and ISO 13053 (Six Sigma). These standards share many features, they all aim to be globally applicable and they all point out the importance of employee commitment and participation. Therefore, our findings can explain under what conditions employees get involved in the implementation of these standards.

5.3. Methodological implications

Our research also has some methodological implications. First, Chapter 2 shows that most studies about the impact of ISO 9001 use data from surveys and that survey studies may produce an upward bias of the impacts. In other words, the average effect sizes reported in survey studies are higher than the average effect sizes reported in studies using databases. Therefore, future research projects should consider the data source as an important factor and should try to collect more objective data. Second, respondent analysis in Chapter 2 shows that quality managers are positively biased about the impact of certification. Therefore, researchers should try to collect additional data from other sources than quality managers for triangulation.

During data collection for meta-analyses in Chapters 2 and 3, we realized that studies use different scales to measure the impact of ISO 9001 on performance. Some studies use a Likert scale where the lowest score represents no or very few benefits, and where the highest score represents very substantial benefits (e.g. a scale from 1 to 5, 1=No measurable effect, 2=Little measurable effect, 3=Some measurable effect, 4=Great measurable effect, 5=Very great measurable effect). These measurement scales are biased, because they do not give respondents an option to report a negative result. However, some other studies use a Likert scale where respondents can report both positive and negative changes (e.g. a scale from -2 to 2, -2=Large decrease, -1=Small decrease, 0=No change,

1=Small increase, 2=Large increase). Chapter 3 reveals that in those studies in which respondents were not given options to report negative effects, the average effect sizes are lower. In other words, results reveal that the scales can bias the results. Similarly, Wildt and Mazis (1978) and Friedman et al. (1981) found that unbalanced scales and balanced scales produced different results. Therefore, we recommend researchers to be careful with their measurement scales.

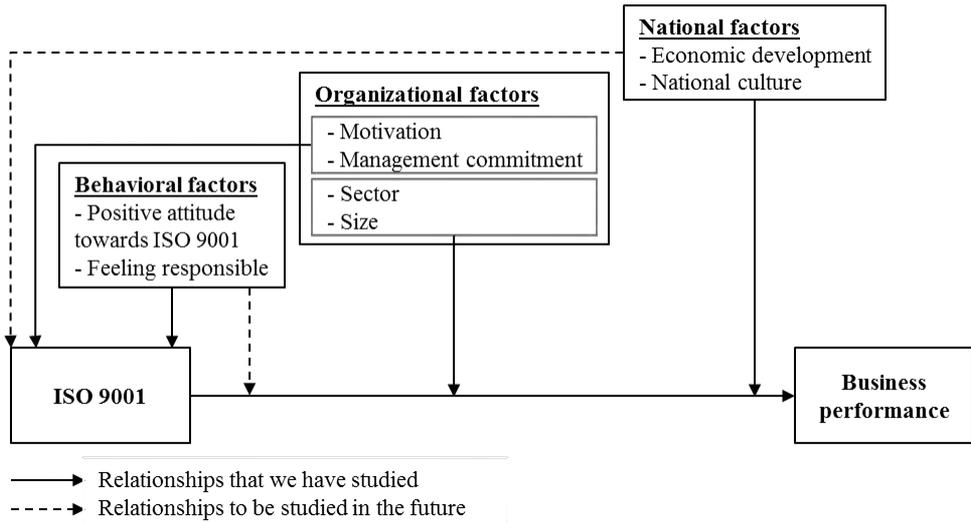
Finally, we could not include all studies of ISO 9001 and business performance in Chapters 2 and 3. Some of the studies did not report effect sizes or any other statistics that can be converted into effect sizes. When we tried to collect the necessary information, some authors did not want to cooperate, or did not respond. We recommend researchers to report descriptive statistics and the correlation matrices in the future to facilitate to the accumulation of research findings.

Overall, even though there are some biases in surveys, Chapter 2 shows that results derived from databases also indicate a positive relationship between ISO 9001 and business performance. In other words, biased data collection methods only increase the effect size and the significance of the results. Therefore, they are not expected to change the overall findings of this dissertation.

5.4. Managerial implications

Our research has some implication for business managers who consider implementing or retaining ISO 9001. First, our research gives empirical evidence that implementation leads to benefits in the majority of cases. Here, the time dimension is important. The meta-analysis in Chapter 2 shows that initially the impact might not be positive, but most companies manage to reap benefits over the medium to long term. Thus, managers can expect to see performance benefits from ISO 9001 in the long-term. These benefits arise from the signal the certificate provides in the market and/or from operational benefits generated by the quality management system itself. However, our research also shows that some national, organizational and behavioral factors affect the benefits gained from ISO 9001 (See Figure 5.2).

Figure 5.2. Overview of the findings for managers



First, managers should be aware of the employee level conditions. Results reveal that not all of the employees use ISO 9001 in their daily work. Managers who want to increase employee involvement in ISO 9001 have to make sure that employees have a positive attitude towards ISO 9001. Managers can stimulate a positive attitude by first making employees aware of ISO 9001, what it includes, what it requires. Managers should show employees how using ISO 9001 would enhance their job performance and they should make ISO 9001 as easy to use as possible. The QMS system and the documents should be easy to read and easy to find. Managers also have to make sure that employees feel responsible. They can create responsibility feeling by giving autonomy to employees, by increasing accountability of employees, by assigning them QM related responsibilities, and by evaluating them based on QM-related KPIs. In conclusion, managers should be aware of behavior of employees when implementing ISO 9001. Even though we did not study the impact of employees' behaviors on the benefits gained from ISO 9001, we that the more employees participate in ISO 9001-related practices in their daily work the more benefits a company will gain. This possible link will be discussed in the Future Research section.

Second, managers should be aware of the organizational conditions. Results reveal that manufacturing companies benefit more than service companies and large companies benefit more than small and medium-sized companies. Therefore, managers of service

companies and SMEs should be careful when implementing ISO 9001. They should make sure that their customers value certification and the costs of implementation do not exceed the benefits. Moreover, the benefits from the system itself might depend on the motivation to implement. We also discuss that companies that are internally motivated strive to develop an effective quality system instead of just getting a certificate, and therefore are more likely to correctly implement the standard and gain more benefits.

Furthermore, the benefits from the system itself might depend on management commitment and support. Managers themselves should participate in practices related to their ISO-9001-based QMS and be a good example to employees so that employees do not question ISO 9001's validity and trust the system. Moreover, they should support employees in using the quality management system by providing necessary resources. Overall, managers should consider these organizational conditions when implementing ISO 9001 or when evaluating suppliers. Even though, we did not study the impact of motivation and management commitment on the benefits gained from ISO 9001, we believe that the more employees and managers are motivated, and managers are committed and supportive, the more benefits a company will gain. This possible link will be discussed in the Future Research section.

Third, managers should be aware of the national conditions. Developing countries are likely to gain higher operational performance improvements from ISO 9001. Implementing ISO 9001 helps firms in developing countries develop more sophisticated approaches to quality management; this in turn impacts operational performance. These results indicate that managers in developing countries should not hesitate to implement ISO 9001 unless they have sophisticated process management in place already. Moreover, societies that have higher institutional collectivism and performance orientation cultures, and lower power distance and future orientation cultures gain more performance benefits. In conclusion, managers should consider national cultural conditions when implementing ISO 9001 or when evaluating suppliers.

Table 5.1 lists the power distance, institutional collectivism, future orientation and performance orientation culture values of the regions studied in GLOBE (House et al., 2004), and economic development of the countries based on IMF's classification of "advanced economies" and "emerging market and developing economies" (IMF, 2013).

Table 5.1. National cultures and economic developments (Adopted from House et al. (2004) and IMF (2013))

| Region | Power Dis. | Inst. Collect. | Future Orient. | Perform. Orient. | Econ. Dev. |
|----------------------|------------|----------------|----------------|------------------|------------|
| Albania | ✗ 3.52 | ! 4.44 | ! 5.42 | ✗ 5.63 | ✓ Low |
| Argentina | ✓ 2.33 | ✓ 5.22 | ✗ 5.78 | ✓ 6.35 | ✓ Low |
| Australia | ! 2.78 | ! 4.40 | ! 5.15 | ! 5.89 | ✗ High |
| Austria | ✓ 2.44 | ! 4.73 | ✓ 5.11 | ! 6.10 | ✗ High |
| Bolivia | ✗ 3.41 | ✓ 5.10 | ! 5.63 | ! 6.05 | ✓ Low |
| Brazil | ✓ 2.35 | ✓ 5.62 | ! 5.69 | ✓ 6.13 | ✓ Low |
| Canada | ! 2.70 | ✗ 4.17 | ! 5.35 | ✓ 6.15 | ✗ High |
| Canada ^a | ! 2.70 | ✗ 4.17 | ! 5.35 | ✓ 6.15 | ✗ High |
| China | ✗ 3.10 | ! 4.56 | ✓ 4.73 | ✗ 5.67 | ✓ Low |
| Colombia | ✓ 2.04 | ! 5.38 | ! 5.68 | ✓ 6.42 | ✓ Low |
| Costa Rica | ✓ 2.58 | ✓ 5.18 | ✓ 5.20 | ! 5.90 | ✓ Low |
| Denmark | ! 2.76 | ! 4.19 | ✓ 4.33 | ✗ 5.61 | ✗ High |
| Ecuador | ✓ 2.30 | ✓ 5.41 | ! 5.94 | ✓ 6.32 | ✓ Low |
| Egypt | ✗ 3.24 | ! 4.85 | ✗ 5.80 | ! 5.90 | ✓ Low |
| El Salvador | ! 2.68 | ✓ 5.65 | ✗ 5.98 | ✓ 6.38 | ✓ Low |
| England | ! 2.80 | ✗ 4.31 | ✓ 5.06 | ! 5.90 | ✗ High |
| Finland | ✓ 2.19 | ✗ 4.11 | ✓ 5.07 | ✓ 6.11 | ✗ High |
| France | ! 2.76 | ! 4.86 | ✓ 4.96 | ✗ 5.65 | ✗ High |
| Georgia | ✗ 2.84 | ✗ 3.83 | ! 5.55 | ✗ 5.69 | ✓ Low |
| Germany ^b | ! 2.69 | ! 4.68 | ! 5.23 | ! 6.09 | ✗ High |
| Germany ^c | ✓ 2.54 | ! 4.82 | ✓ 4.85 | ! 6.01 | ✗ High |
| Greece | ✓ 2.39 | ✓ 5.40 | ✓ 5.19 | ! 5.81 | ✗ High |
| Guatemala | ✓ 2.35 | ✓ 5.23 | ✗ 5.91 | ✓ 6.14 | ✓ Low |
| Hong Kong | ✗ 3.24 | ! 4.43 | ! 5.50 | ✗ 5.64 | ✗ High |
| Hungary | ✓ 2.49 | ! 4.50 | ✗ 5.70 | ! 5.96 | ✓ Low |
| India | ! 2.64 | ! 4.71 | ! 5.60 | ! 6.05 | ✓ Low |
| Indonesia | ! 2.69 | ✓ 5.18 | ✗ 5.70 | ✗ 5.73 | ✓ Low |
| Iran | ! 2.80 | ✓ 5.54 | ✗ 5.84 | ! 6.08 | ✓ Low |
| Ireland | ! 2.71 | ! 4.59 | ! 5.22 | ! 5.98 | ✗ High |
| Israel | ! 2.72 | ✗ 4.27 | ! 5.25 | ✗ 5.75 | ✗ High |
| Italy | ✓ 2.47 | ✓ 5.13 | ✗ 5.91 | ! 6.07 | ✗ High |

| Region | Power Dis. | Inst. Collect. | Future Orient. | Perform. Orient. | Econ. Dev. |
|---------------------------|------------|----------------|----------------|------------------|------------|
| Japan | ✗ 2.86 | ✗ 3.99 | ! 5.25 | ✗ 5.17 | ✗ High |
| Kazakhstan | ✗ 3.15 | ✗ 4.04 | ✓ 5.05 | ✗ 5.41 | ✓ Low |
| Kuwait | ✗ 3.17 | ✓ 5.15 | ✗ 5.74 | ! 6.03 | ✓ Low |
| Malaysia | ✗ 2.97 | ! 4.87 | ✓ 5.89 | ! 6.04 | ✓ Low |
| Mexico | ✗ 2.85 | ! 4.92 | ✗ 5.86 | ✓ 6.16 | ✓ Low |
| Morocco | ✗ 3.11 | ! 5.00 | ✗ 5.85 | ✗ 5.76 | ✓ Low |
| Namibia | ✗ 2.86 | ✗ 4.38 | ✗ 6.12 | ✓ 6.40 | ✓ Low |
| Netherlands | ✓ 2.45 | ! 4.55 | ✓ 5.07 | ✗ 5.49 | ✗ High |
| New Zealand | ✗ 3.53 | ✗ 4.20 | ! 5.54 | ! 5.90 | ✗ High |
| Nigeria | ! 2.69 | ✓ 5.03 | ✓ 6.04 | ✓ 6.27 | ✓ Low |
| Philippines | ! 2.72 | ! 4.78 | ✗ 5.93 | ✓ 6.31 | ✓ Low |
| Poland | ✗ 3.12 | ✗ 4.22 | ✓ 5.20 | ✓ 6.12 | ✓ Low |
| Portugal | ✓ 2.38 | ✓ 5.30 | ! 5.43 | ✓ 6.40 | ✗ High |
| Qatar | ✗ 3.23 | ✓ 5.13 | ✗ 5.92 | ! 5.96 | ✓ Low |
| Russia | ! 2.62 | ✗ 3.89 | ! 5.48 | ✗ 5.54 | ✓ Low |
| Singapore | ✗ 3.04 | ! 4.55 | ! 5.51 | ! 5.72 | ✗ High |
| Slovenia | ✓ 2.57 | ✗ 4.38 | ! 5.42 | ✓ 6.41 | ✗ High |
| South Africa ^d | ✗ 3.65 | ✗ 4.30 | ✓ 5.20 | ✓ 4.92 | ✓ Low |
| South Africa ^e | ! 2.64 | ✗ 4.38 | ! 5.66 | ✓ 6.23 | ✓ Low |
| South Korea | ✓ 2.55 | ✗ 3.90 | ! 5.69 | ✗ 5.25 | ✗ High |
| Spain | ✓ 2.26 | ✓ 5.20 | ! 5.63 | ✗ 5.80 | ✗ High |
| Sweden | ! 2.70 | ✗ 3.94 | ✓ 4.89 | ✗ 5.80 | ✗ High |
| Switzerland | ✓ 2.44 | ! 4.69 | ✓ 4.79 | ! 5.82 | ✗ High |
| Switzerland ^f | ! 2.80 | ✗ 4.31 | ✓ 4.80 | ! 5.98 | ✗ High |
| Taiwan | ✗ 3.09 | ✓ 5.15 | ✓ 5.20 | ✗ 5.74 | ✗ High |
| Thailand | ✗ 2.86 | ✓ 5.10 | ✗ 6.20 | ✗ 5.74 | ✓ Low |
| Turkey | ✓ 2.41 | ✓ 5.26 | ✗ 5.83 | ✓ 5.39 | ✓ Low |
| USA | ✗ 2.85 | ✓ 4.17 | ! 5.31 | ✓ 6.14 | ✗ High |
| Venezuela | ✓ 2.29 | ✓ 5.39 | ✗ 5.79 | ✓ 6.35 | ✓ Low |
| Zambia | ✓ 2.43 | ! 4.74 | ✗ 5.90 | ✓ 6.24 | ✓ Low |
| Zimbabwe | ! 2.67 | ! 4.87 | ✗ 6.07 | ✓ 6.45 | ✓ Low |

✓ The most suitable conditions

! Canada (English speaking)

! Conditions in between the most and the least suitable ones

! South Africa (Black sample)

! Germany (East)

! South Africa (White sample)

! Germany (West)

! Switzerland (French-speaking)

Managers can use this table to find out where their own company or their supplier stands. For example, according to the table Turkey has risky future orientation and performance orientation values for ISO 9001 implementation. Therefore, managers who are supplying products from Turkey should pay attention to these and if possible help suppliers to create a better cultural environment for ISO 9001 implementation.

5.5. Implications for ISO, certification bodies and consultants

Our research also has some implication for the International Organization for Standardization, certification bodies and ISO 9001 consultants. A new version of ISO 9001 is planned to be published in 2015. ISO standards “are based on global expert opinion ... [and] ... developed through a multi-stakeholder process” (ISO, 2014b). ISO develops standards through a consensus process that intends to promote global applicability (ISO, 2014). Even though ISO 9001 is globally adopted, our findings reveal that benefits differ per country. This raises the question whether it makes sense to have one standard for the entire world. When we look at the history of ISO 9001, we see that its predecessor AQAP, which provided requirements for contractual suppliers' organizations, was a single standard for many NATO countries. When national standardization bodies decided to adopt AQAP and make it available for civil purposes, they made some adjustments based on their needs resulting in different national standards. Later, because of the increase in international trade, the need for an international standard emerged. To satisfy this need, the International Organization for Standardization created a set of international standards for quality management including ISO 9001.

Based on our results and the history of ISO 9001, the International Organization for Standardization might consider whether to adapt certain aspects of the standard to differing national cultures. For example, in high power distance cultures the power is stratified and concentrates at higher levels of an organization (House et al., 2004). Leaders in high power distance cultures tend to communicate little with lower level employees and they do not allow employees to influence decision-making. Therefore, in high power distance cultures organizations may have problems to implement the involvement of people principle of ISO 9000 which is essential in the ‘Human Resources’ section of ISO 9001. To deal with this, ISO could modify the standard by focusing more on how management should involve employees. However, changing the standard might not be such a feasible option

considering each country has its own needs. Moreover, having different versions of the standard per country would mean that ISO 9001 is not a unique, international standard anymore. Therefore, a more feasible alternative is consultants helping companies to create the best possible cultural environment for ISO 9001 implementation. In other words, ISO 9001 consultants should be aware of the national cultures manifesting in a company and help to implement ISO 9001 based on the different cultural conditions.

The first two versions of ISO 9001 advised companies to “document what they do, and do what they document”. This leads to a documentation-based system. The latest two versions tried to alter the focus of the standard from documentation to process management and continuous improvement. However, our case study discussed in Chapter 4 shows that there may be a deviation between what is intended by ISO 9001 and how it is perceived by employees. Our case study company had ISO 9001 certification for more than 15 years. When we asked employees what comes to their mind when they hear ISO 9001, most of them mentioned work flows, checklists and procedures, in other words documents. This shows that even though ISO changed ISO 9001, employees in our case company still focus too much on control and too few on improvement. The upcoming 2015 version has fewer prescriptive requirements. It requires organizations to create update and control documents, but it does not require having any procedures. In other words, it gives more flexibility to organizations in terms of documentation (BSI, 2014). However, our study indicates that only changing the standard may not be enough to stop companies focusing on documentation. Therefore, first, ISO 9001 consultants and auditors should change their perception on ISO 9001 and understand that the quality management system does not have to be based on documentation. Then, they should try to change perceptions of companies about documentation.

Our findings also show the importance of management commitment and employee involvement. One of the changes in the new version of the standard is the emphasis on leadership. Top management has to have a greater involvement in the quality management system. They have to make sure that the requirements of the quality management system are linked with the organization’s strategic goals (BSI, 2014). Another change in the new version is the focus on awareness. The new standard requires that employees should be aware of the quality policy, objectives, their contributions to QMS, implications of non-

conformities etc. Everyone in the organization should know the implications of not conforming to the requirements (BSI, 2014). These changes are both in line with our findings. Therefore, consultants and auditors should keep focusing more on management commitment and employee involvement in the new version of the standard to increase management and employee participation in an ISO-9001:2015-based quality management system.

Moreover, we discussed that companies might have real systems according to the requirements of the standard, more rigid systems or just ‘window-dressing’ systems with all kinds of options in-between these three extremes. Therefore, auditors should be aware of this situation and try to identify companies that do not have a proper quality management system. We also discussed that even if companies want to have a good working system, some employees may not jump on the bandwagon. Consultants should pay attention to employee involvement, while they are helping companies to implement ISO 9001. Certification bodies should also pay attention to employee involvement and they should make sure that the employees are using the quality management system. Auditors should not only audit employees that are chosen by the company itself to be audited, but they should also audit people who maybe are not directly involved in ISO 9001.

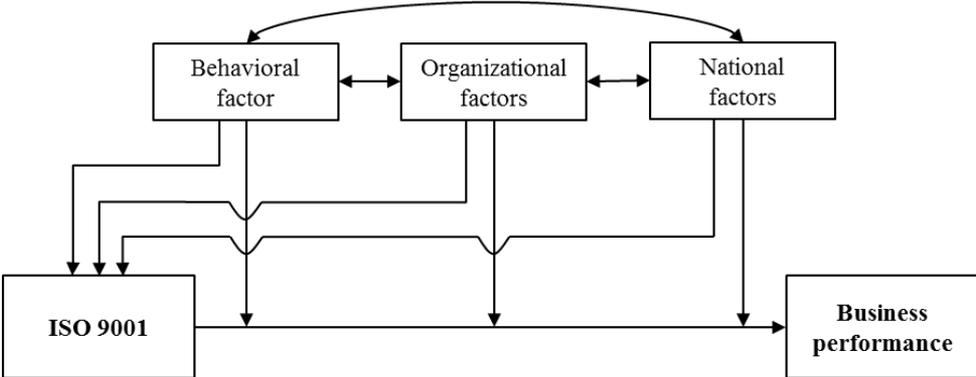
5.6. Future research

Our research also helps to identify directions for future research that can increase our understanding of the relationship between ISO 9001 and business performance. Future research should study ISO 9001 implementation and impact at three different levels: National level, organizational level and employee level. More research should be conducted at regions like Africa, South America and Central and Eastern Europe. In addition, there is need for more cross-country analysis to understand how national differences may impact the benefits gained from ISO 9001. Moreover, future research should examine how the standards are used in a company. Researchers should distinguish between companies that use standards properly in their daily operations, companies that use certification merely as window dressing and companies that have too bureaucratic systems. Researchers can do this by conducting in-depth case studies at multiple companies. We also discussed that internal motivation and management commitment may

impact the benefits gained from ISO 9001. Therefore, there is need for organization level studies that compare standard usage, motivation, and management commitment across organizations. Furthermore, future research should study employee involvement in ISO 9001 by collecting data from employees at different firms and under different settings. Future research should also look at the impact of employee involvement on the overall benefits gained from ISO 9001.

Moreover, there is also need for multi-level research (See Figure 5.3). The main focus of Chapter 2 is organizational level factors, Chapter 3 is national level factors and Chapter 4 is employee level factors. However, these three levels are also dependent on each other. National culture is expected to impact both organizational culture and employee behavior. Organizational culture is expected to impact employee behavior and vice versa. For example, in high power distance cultures, power is stratified and managers do not empower employees. So, in high power distance cultures managers are not expected to motivate and support employees to use practices related to the ISO 9001 quality management system. Managers in high power distance cultures tend to use coercion which decreases employee commitment and leads to resistance (Yukl and Heaton, 2002). So, national culture and organizational culture are expected to influence how employees react to ISO 9001 adoption. Overall, there is need for multi-level research that studies the relationships between employee involvement in ISO 9001, organizational conditions, national conditions, and the impact of ISO 9001. Researchers could do this by conducting research at different facilities of a multinational firm. Some features like sector, company policy and reasons for certification are expected to be identical at different facilities of a multi-national firm. This would allow researchers to compare the impact of national culture on organizational culture, employee involvement and the benefits gained from ISO 9001, while controlling for features like sector, company policy and reasons for certification.

Figure 5.3. Future research



References

- Aarts, F.M., Vos, E., 2001. The impact of ISO registration on New Zealand firms' performance: a financial perspective. *The TQM Magazine*. 13 (3), 180-191.
- Abdi, S.N., A, Awan, H.M., Bhatti, M.I., 2008. Is quality management a prime requisite for globalization? Some facts from the sports industry. *Quality and Quantity*. 42 (6), 821-833.
- Abdul-Aziz, Z., Chan, J., Metcalfe, A., 2000. Quality practices in the manufacturing industry in the UK and Malaysia. *Total Quality Management*. 11 (8), 1053-1064.
- Abraham, M., Crawford, J., Carter, D., Mazotta, F., 2000. Management decisions for effective ISO 9000 accreditation. *Management Decision*. 38 (3), 182-193.
- Acharya, U.H., Ray, S., 2000. ISO 9000 certification in Indian industries: a survey. (cover story). *Total Quality Management*. 11 (3), 261-266.
- Adam, E.E., Corbett, L.M., Rho, B.H., 1994. Quality improvement practices in Korea, New Zealand and the USA. *International Journal of Quality & Reliability Management*. 11 (7), 6-18.
- Adam, E.E., Corbett, L.M., Flores, B.E., Harrison, N.J., Lee, T., Rho, B., Ribera, J., Samson, D., Westbrook, R., 1997. An international study of quality improvement approach and firm performance. *International Journal of Operations & Production Management*. 17 (9), 842-873.
- Adler, N.J., 1983. Cross-cultural management research: The ostrich and the trend. *Academy of management Review*. 8 (2), 226-232.
- Adler, P.S., Goldoftas, B., Levine, D.I., 1999. Flexibility versus efficiency? A case study of model changeovers in the Toyota production system. *Organization science*. 10 (1), 43-68.
- Ahire, S.L., O'shaughnessy, K., 1998. The role of top management commitment in quality management: an empirical analysis of the auto parts industry. *International Journal of Quality Science*. 3 (1), 5-37.
- Ajzen, I., 1991. The theory of planned behavior. *Organizational behavior and human decision processes*. 50 (2), 179-211.
- Ajzen, I., Fishbein, M., 1980. *Understanding attitudes and predicting social behaviour*. Prentice-Hall, Englewood Cliffs, NJ.
- Akdeniz, M.B., Talay, M.B., 2013. Cultural variations in the use of marketing signals: a multilevel analysis of the motion picture industry. *Journal of the Academy of Marketing Science*. 41 (5), 601-624.
- Al-Refaie, A., Ghnaimat, O., Li, M.H., 2012. Effects of ISO 9001 certification and KAAE on performance of Jordanian firms. *Jordan Journal of Mechanical and Industrial Engineering*. 6 (1), 45-53.

- Anderson, J.C., Rungtusanatham, M., Schroeder, R.G., 1994. A theory of quality management underlying the Deming management method. *Academy of Management Review*. 19 (3), 472-509.
- Anderson, S.W., Daly, J.D., Johnson, M.F., 1999. Why firms seek ISO 9000 certification: Regulatory compliance or competitive advantage?. *Production and Operations Management*. 8 (1), 28-28-43.
- Angeli, F., Bolognesei, E., Toschi, L., 2008. A Meta-Analytic answer to an old dilemma: Do M&AS create value? Evidence from European Banks.
- Anwar, S.A., Jabnoun, N., 2006. The development of a contingency model relating national culture to total quality management. *International Journal of Management*. 23 (2), 272-280.
- Arauz, R., Suzuki, H., 2004. ISO 9000 Performance in Japanese Industries. *Total Quality Management and Business Excellence*. 15 (1), 3-33.
- Aravind, D., Christmann, P., 2011. Decoupling of Standard Implementation from Certification: Does Quality of ISO 14001 Implementation Affect Facilities' Environmental Performance?. *Business Ethics Quarterly*. 21 (1), 73-102.
- Ashford, S.J., 1986. Feedback-seeking in individual adaptation: A resource perspective. *Academy of Management journal*. 29 (3), 465-487.
- Ashford, S.J., Cummings, L.L., 1983. Feedback as an individual resource: Personal strategies of creating information. *Organizational behavior and human performance*. 32 (3), 370-398.
- Ashrafi, R., Bashir, H.A., 2011. Implementation of quality management in organisations operating in the Sultanate of Oman: ISO 9001:2000 vs. non-ISO 9001:2000 certified organisations. *International Journal of Productivity and Quality Management*. 7 (2), 183-201.
- Barlette, Y., Fomin, V.V., 2010. The Adoption of Information Security Management Standards. *Information Resources Management: Concepts, Methodologies, Tools, and Applications*, 69.
- Beattie, K.R., Sohal, A.S., 1999. Implementing ISO 9000: A study of its benefits among Australian organizations. *Total Quality Management & Business Excellence*. 10 (1), 95-95-106.
- Beck, N., Walgenbach, P., 2005. Technical efficiency or adaptation to institutionalized expectations? The adoption of ISO 9000 standards in the German mechanical engineering industry. *Organization Studies*. 26 (6), 841-866.
- Beirão, G., Cabral, S.J.A., 2002. The reaction of the Portuguese stock market to ISO 9000 certification. *Total Quality Management*. 13 (4), 465-474.
- Bendoly, E., Croson, R., Goncalves, P., Schultz, K., 2010. Bodies of knowledge for research in behavioral operations. *Production and Operations Management*. 19 (4), 434-452.

- Benner, M.J., Veloso, F.M., 2008. ISO 9000 practices and financial performance: A technology coherence perspective. *Journal of Operations Management*. 26 (5), 611-629.
- Bhuiyan, N., Alam, N., 2005. An investigation into issues related to the latest version of ISO 9000. *Total Quality Management and Business Excellence*. 16 (2), 199-213.
- Blind, K., 2004. *The economics of standards: theory, evidence, policy*. Edward Elgar, Cheltenham.
- Blunt, P., 1988. Cultural consequences for organization change in a Southeast Asian state: Brunei. *The Academy of Management Executive*. 2 (3), 235-240.
- Boiral, O., 2003. ISO 9000: Outside the Iron Cage. *Organization Science*. 14 (6), 720-737.
- Boiral, O., 2007. ISO 9000: integration rationales and organizational impacts. *International Journal of Operations & Production Management*. 27 (2), 226-247.
- Boiral, O., 2011. Managing with ISO Systems: Lessons from Practice. *Long range planning*. 44 (3), 197-220.
- Boiral, O., 2012a. ISO 9000 and Organizational Effectiveness: A Systematic Review. *The Quality Management Journal*. 19 (3), 16-37.
- Boiral, O., 2012b. ISO certificates as organizational degrees? Beyond the rational myths of the certification process. *Organization Studies*. 33 (5-6), 633-654.
- Boiral, O., Amara, N., 2009. Paradoxes of ISO 9000 Performance: A Configurational Approach. *The Quality Management Journal*. 16 (3), 36-60.
- Briscoe, J.A., Fawcett, S.E., Todd, R.H., 2005. The Implementation and Impact of ISO 9000 among Small Manufacturing Enterprises. *Journal of Small Business Management*. 43 (3), 309-330.
- Brown, A., van der Wiele, T., 1995. Industry experience with ISO 9000. *Asia Pacific Journal of Quality Management*. 4 (2), 8-17.
- Brown, A., van der Wiele, T., Loughton, K., 1998. Smaller enterprises' experiences with ISO 9000. *The International Journal of Quality & Reliability Management*. 15 (3), 273-285.
- BSI, 2014. ISO 9001 Whitepaper Understanding the changes Approaching change. Retrieved September 16, 2014. <http://www.bsigroup.com/LocalFiles/en-GB/iso-9001/Revisions/ISO%209001%20Whitepaper%20-%20Understanding%20the%20changes%20July%202014.pdf>.
- Buttle, F., 1997. ISO 9000: marketing motivations and benefits. *International journal of quality & reliability management*. 14 (9), 936-947.
- Calisir, F., 2007. Factors affecting service companies' satisfaction with ISO 9000. *Managing Service Quality*. 17 (5), 579-593.

- Calisir, F., Bayraktar, C.A., Beskese, B., 2001. Implementing the ISO 9000 standards in Turkey: A study of large companies' satisfaction with ISO 9000. *Total Quality Management*. 12 (4), 429-438.
- Calisir, F., Kulak, O., Dogan, I., 2005. Factors influencing Turkish textile companies' satisfaction with ISO 9000. *Total Quality Management and Business Excellence*. 16 (10), 1193-1204.
- Camisión-Zornoza, C., Lapedra-Alcamí, R., Segarra-Ciprés, M., Boronat-Navarro, M., 2004. A Meta-analysis of Innovation and Organizational Size. *Organization Studies*. 25 (3), 331-361.
- Cao, X., Prakash, A., 2007. Diffusing quality: trade, FDI, and the cross-country diffusion of ISO 9000 quality management systems. University Seminar on Global Governance and Democracy: Duke University. 6.
- Cao, X., Prakash, A., 2011. Growing exports by signaling product quality: Trade competition and the cross-national diffusion of ISO 9000 quality standards. *Journal of policy analysis and management*. 30 (1), 111-135.
- Capmany, C., Hooker, N.H., Ozuna Jr., T., Van Tilburg, A., 2000. ISO 9000 - a marketing tool for U.S. agribusiness. *International Food and Agribusiness Management Review*. 3 (1), 41-53.
- Capon, N., Farley, J.U., Hoenig, S., 1990. Determinants of financial performance: a meta-analysis. *Management Science*. 36 (10), 1143-1159.
- Carlsson, M., Carlsson, D., 1996. Experiences of implementing ISO 9000 in Swedish industry. *International Journal of Quality & Reliability Management*. 13 (7), 36-47.
- Carney, M., Gedajlovic, E.R., Heugens, P.P.M.A.R., Van Essen, M., Van Oosterhout, J., 2011. Business Group Affiliation, Performance, Context, and Strategy: a Meta-Analysis. *Academy of Management Journal*. 54 (3), 437-460.
- Carstensen, L.L., 1993. Motivation for social contact across the life span: A theory of socioemotional selectivity. Nebraska symposium on motivation. 40, 209-254.
- Casadesús, M., Gimenez, G., 2000. The benefits of the implementation of the ISO 9000 standard: empirical research in 288 Spanish companies. *TQM Journal*. 12 (6), 432-432.
- Casadesús, M., Gimenez, G., Heras, I., 2001. Benefits of ISO 9000 implementation in Spanish industry. *European Business Review*. 13 (6), 327-327-336.
- Casadesús, M., Karapetrovic, S., 2005a. An empirical study of the benefits and costs of ISO 9001: 2000 compared to ISO 9001/2/3: 1994. *Total Quality Management and Business Excellence*. 16 (1), 105-120.
- Casadesús, M., Karapetrovic, S., 2005b. Has ISO 9000 lost some of its lustre? A longitudinal impact study. *International Journal of Operations and Production Management*. 25 (6), 580-596.

- Casadesús, M., Karapetrovic, S., Heras, I., 2011. Synergies in standardized management systems: Some empirical evidence. *TQM Journal*. 23 (1), 73-86.
- Chen, J., Damanpour, F., Reilly, R.R., 2010. Understanding antecedents of new product development speed: A meta-analysis. *Journal of Operations Management*. 28 (1), 17-33.
- Child, J., Keiser, A., 1979. Organizational and managerial roles in British and west German companies: an examination of the culture-free thesis, in: Lammers, C.J., Hickson, D.J. (Eds.), *Organizations Alike and Unlike: International and Inter-institutional Studies in the Sociology of Organizations*. Routledge/Kegan Paul, London, pp. 251-271.
- Chittenden, F., Poutziouris, P., Mukhtar, S.M., 1998. Small firms and the ISO 9000 approach to quality management. *International Small Business Journal*. 17 (1), 73-88.
- Chow-Chua, C., Goh, M., Boon Wan, T., 2003. Does ISO 9000 certification improve business performance?. *International Journal of Quality & Reliability Management*. 20 (8), 936-953.
- Christmann, P., Taylor, G., 2006. Firm self-regulation through international certifiable standards: determinants of symbolic versus substantive implementation. *Journal of International Business Studies*. 37 (6), 863-878.
- Claver, E., Juan José Tarí, Molina, J.F., 2002. Areas of improvement in certified firms advancing towards TQM. *International Journal of Quality & Reliability Management*. 19 (8), 1014-1036.
- Clougherty, J.A., Grajek, M., 2008. The impact of ISO 9000 diffusion on trade and FDI: A new institutional analysis. *Journal of International Business Studies*. 39 (4), 613-633.
- Cohen, J., 1992. A power primer. *Psychological bulletin*. 112 (1), 155-159.
- Connor, P.E., 1997. Total quality management: a selective commentary on its human dimensions, with special reference to its downside. *Public administration review*. 57 (6), 501-509.
- Cooper, H.M., 1998. *Synthesizing research: A guide for literature reviews*. Sage Publications, Thousand Oaks, California.
- Cooper, H.M., 2009. *Research Synthesis and Meta-Analysis: A Step-by-Step Approach*, 4 ed. Sage Publications, Inc., Thousand Oaks, CA.
- Corbett, C.J., 2006. Global diffusion of ISO 9000 certification through supply chains. *Manufacturing & Service Operations Management*. 8 (4), 330-350.
- Corbett, C.J., Kirsch, D.A., 2001. International diffusion of ISO 14000 certification. *Production and Operations Management*. 10 (3), 327-342.
- Corbett, C.J., Kirsch, D.A., 2005. The Financial Impact of ISO 9000 Certification in the United States: An Empirical Analysis. *Management Science*. 51 (7), 1046-1059.

- Croft, N.H., 2012. ISO 9001:2015 and beyond – preparing for the next 25 years of quality management standards. Retrieved September 01, 2012. http://www.iso.org/iso/home/news_index/news_archive/news.htm?refid=Ref1633.
- Crook, T.R., Ketchen Jr, D.J., Combs, J.G., Todd, S.Y., 2008. Strategic resources and performance: a meta-analysis. *Strategic Management Journal*. 29 (11), 1141-1154.
- Crosby, P.B., 1992. *Completeness: Quality for the 21st century*. Dutton Adult, New York, NY.
- Croson, R., Schultz, K., Siemsen, E., Yeo, M., 2013. Behavioral operations: the state of the field. *Journal of Operations Management*. 31 (1), 1-5.
- Cumming, G., 2011. *Understanding the new statistics: Effect sizes, confidence intervals, and meta-analysis*. Routledge Academic, New York, NY.
- Daft, R.L., 1998. *Essentials of organization theory and design*. South-Western College Publishing, Cincinnati, OH.
- Dahlgard, J.J., Kristensen, K., Kanji, G.K., Juhl, H.J., Sohal, A.S., 1998. Quality management practices: a comparative study between East and West. *International Journal of Quality & Reliability Management*. 15 (8/9), 812-826.
- Damanpour, F., 1991. Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators. *The Academy of Management Journal*. 34 (3), 555-590.
- Damanpour, F., 2010. An Integration of Research Findings of Effects of Firm Size and Market Competition on Product and Process Innovations. *British Journal of Management*. 21 (4), 996-1010.
- Dansereau Jr, F., Graen, G., Haga, W.J., 1975. A vertical dyad linkage approach to leadership within formal organizations: A longitudinal investigation of the role making process. *Organizational behavior and human performance*. 13 (1), 46-78.
- Das, A., Handfield, R.B., 1997. A meta-analysis of doctoral dissertations in purchasing. *Journal of Operations Management*. 15 (2), 101-121.
- Das, T.K., 1986. *The subjective side of strategy making: Future orientations and perceptions of executives*. Praeger, New York.
- Davis, F.D., 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*. 13 (3), 319-340.
- Davis, F.D., Bagozzi, R.P., Warshaw, P.R., 1989. User acceptance of computer technology: a comparison of two theoretical models. *Management science*. 35 (8), 982-1003.
- Dawar, N., Parker, P.M., Price, L.J., 1996. A cross-cultural study of interpersonal information exchange. *Journal of International Business Studies*. 27 (3), 497-516.

- Dawar, N., Parker, P., 1994. Marketing universals: consumers' use of brand name, price, physical appearance, and retailer reputation as signals of product quality. *The Journal of Marketing*. 58 (2), 81-95.
- de Vries, H.J., Bayramoglu, D.K., van der Wiele, T., 2012. Business and environmental impact of ISO 14001. *International Journal of Quality & Reliability Management*. 29 (4), 425-435.
- Dean, J.W., Bowen, D.E., 1994. Management theory and total quality: improving research and practice through theory development. *Academy of management review*. 19 (3), 392-418.
- Delic, M., Radlovacki, V., Kamberovic, B., Maksimovic, R., Pecujlija, M., 2013. Examining relationships between quality management and organisational performance in transitional economies. *Total Quality Management and Business Excellence*. 25 (3-4), 1-16.
- Deming, W.E., 1982. *Quality, productivity, and competitive position*. Massachusetts Institute of Technology, Center for Advanced Engineering Study, Cambridge, MA.
- Deming, W.E., 1986. *Out of the Crisis*. Massachusetts Institute of Technology, Center for Advanced Engineering Study, Cambridge.
- Dick, G.P.M., Heras, I., Casadesús, M., 2008. Shedding light on causation between ISO 9001 and improved business performance. *International Journal of Operations & Production Management*. 28 (7), 687-708.
- DiMaggio, P., Powell, W.W., 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*. 48 (2), 147-160.
- Dimara, E., Skuras, D., Tsekouras, K., Goutsos, S., 2004. Strategic orientation and financial performance of firms implementing ISO 9000. *The International Journal of Quality & Reliability Management*. 21 (1), 72-89.
- Dissanayaka, S.M., Kumaraswamy, M.M., Karim, K., Marosszeky, M., 2001. Evaluating outcomes from ISO 9000-certified quality systems of Hong Kong constructors. *Total Quality Management*. 12 (1), 29-40.
- Docking, D.S., Downen, R.J., 2009. Market interpretation of ISO 9000 registration. *Journal of Financial Research*. 22 (2), 147-160.
- Doney, P.M., Cannon, J.P., Mullen, M.R., 1998. Understanding the influence of national culture on the development of trust. *Academy of management review*. 23 (3), 601-620.
- Douglas, A., Coleman, S., Oddy, R., 2003. The case for ISO 9000. *The TQM Magazine*. 15 (5), 316-324.
- Drew, E., Healy, C., 2006. Quality management approaches in Irish organisations. *TQM Magazine*. 18 (4), 358-371.

- Dreyfus, L.P., Ahire, S.L., Ebrahimpour, M., 2004. The impact of just-in-time implementation and ISO 9000 certification on total quality management. *IEEE Transactions on Engineering Management*. 51 (2), 125-141.
- Dunu, E.S., Ayokanmbi, M.F., 2008. The Impact of ISO 9000 Certification on the Financial Performance of Organizations. *Journal of Global Business Issues*. 2 (2), 135-144.
- Eden, D., 2002. From the editors: Replication, meta-analysis, scientific progress, and AMJ's publication policy. *Academy of Management Journal*. 45 (5), 841-846.
- Eisenhardt, K.M., 1989. Building theories from case study research. *Academy of management review*. 14 (4), 532-550.
- Ellis, P.D., 2006. Market Orientation and Performance: A Meta-Analysis and Cross-National Comparisons. *Journal of Management Studies*. 43 (5), 1089-1107.
- Erdem, T., Swait, J., Valenzuela, A., 2006. Brands as signals: a cross-country validation study. *Journal of Marketing*. 70 (1), 34-49.
- Erez, M., 1994. Toward a model of cross-cultural industrial and organizational psychology, in: Triandis, H., Dunnette, M., Hough, L. (Eds.), *Handbook of industrial and organizational psychology*. Consulting Psychologists Press, Palo Alto, CA, pp. 559-607.
- Escanciano, C., Fernández, E., Vázquez, C., 2001. Influence of ISO 9000 certification on the progress of Spanish industry towards TQM. *International Journal of Quality & Reliability Management*. 18 (5), 481-494.
- Ferreira, E.J., Sinha, A., Varble, D., 2008. Long-run performance following quality management certification. *Review of Quantitative Finance and Accounting*. 30 (1), 93-109.
- Fishbein, M., Ajzen, I., 1975. *Belief, attitude, intention and behavior: An introduction to theory and research*. Addison-Wesley, Reading, MA.
- Flynn, B.B., Saladin, B., 2006. Relevance of Baldrige constructs in an international context: a study of national culture. *Journal of Operations Management*. 24 (5), 583-603.
- Fotopoulos, C.V., Psomas, E.L., Vouzas, F.K., 2010. ISO 9001:2000 implementation in the Greek food sector. *TQM Journal*. 22 (2), 129-142.
- Fried, Y., Ferris, G.R., 1987. The validity of the job characteristics model: A review and meta-analysis. *Personnel Psychology*. 40 (2), 287-322.
- Friedman, H.H., Wilamowsky, Y., Friedman, L.W., 1981. A comparison of balanced and unbalanced rating scales. *The Mid-Atlantic Journal of Business*. 19 (2), 1-7.
- Friedman, T.L., 2006. *The world is flat [updated and expanded]: A brief history of the twenty-first century*. Macmillan.

- Fuller, J.B., Marler, L.E., Hester, K., 2006. Promoting felt responsibility for constructive change and proactive behavior: Exploring aspects of an elaborated model of work design. *Journal of Organizational Behavior*. 27 (8), 1089-1120.
- Furnham, A., 1986. Response bias, social desirability and dissimulation. *Personality and individual differences*. 7 (3), 385-400.
- Gerwin, D., Barrowman, N.J., 2002. An Evaluation of Research on Integrated Product Development. *Management Science*. 48 (7), 938-953.
- Glass, G.V., 1977. Integrating findings: the meta-analysis of research. *Review of research in education*. 5 (1), 351-379.
- Gooding, R.Z., Wagner III, J.A., 1985. A meta-analytic review of the relationship between size and performance: The productivity and efficiency of organizations and their subunits. *Administrative Science Quarterly*. 30 (4), 462-481.
- Gotzamani, K.D., Tsiotras, G.D., 2002. The true motives behind ISO 9000 certification: Their effect on the overall certification benefits and long term contribution towards TQM. *The International Journal of Quality & Reliability Management*. 19 (2/3), 151-169.
- Gotzamani, K., 2010. Results of an empirical investigation on the anticipated improvement areas of the ISO 9001:2000 standard. *Total Quality Management and Business Excellence*. 21 (6), 687-704.
- Graffin, S.D., Ward, A.J., 2010. Certifications and Reputation: Determining the Standard of Desirability Amidst Uncertainty. *Organization Science*. 21 (2), 331-346.
- Gray, J.V., Massimino, B., 2014. The effect of language differences and national culture on operational process compliance.
- Guler, I., Guillén, M.F., Muir, J., Macpherson, 2002. Global competition, institutions, and the diffusion of organizational practices: The international spread of ISO 9000 quality certificates. *Administrative Science Quarterly*. 47 (2), 207-232.
- Gunnlaugsdóttir, J., 2002. The quality must be on record: a survey of organisations having an ISO 9000 certification in Iceland. *Records Management Journal*. 12 (2), 40-47.
- Gustafsson, R., Klefsjö, B., Berggren, E., Granfors-Wellemets, U., 2001. Experiences from implementing ISO 9000 in small enterprises – a study of Swedish organisations. *The TQM Magazine*. 13 (4), 232-246.
- Hackman, J.R., Oldham, G.R., 1976. Motivation through the design of work: Test of a theory. *Organizational behavior and human performance*. 16 (2), 250-279.
- Haire, M., Ghiselli, E.E., Porter, L.W., 1966. *Managerial thinking: An international study*. John Wiley & Sons, Oxford, England.
- Hall, E.T., 1959. *The silent language*. Doubleday, New York.

- Hallström, K.T., 2004. *Organizing international standardization: ISO and the IASC in quest of authority*. Edward Elgar Publishing, Gloucestershire.
- Heras, I., Casadesús, M., Dick, G.M.P., 2002. ISO 9000 certification and the bottom line: a comparative study of the profitability of Basque region companies. *Managerial Auditing Journal*. 17 (1), 72-78.
- Heras-Saizarbitoria, I., 2011. Internalization of ISO 9000: an exploratory study. *Industrial Management + Data Systems*. 111 (8), 1214-1237.
- Heras-Saizarbitoria, I., Boiral, O., 2013. ISO 9001 and ISO 14001: Towards a Research Agenda on Management System Standards. *International Journal of Management Reviews*. 15 (1), 47-65.
- Heras-Saizarbitoria, I., Cilleruelo, E., Zamanillo, I., 2013. Adoption of ISO 9000 practices in manufacturing companies: The perspective of the shop-floor workers. *Human Factors and Ergonomics in Manufacturing & Service Industries*. 23 (4), 311-321.
- Heugens, P.P.M.A.R., Lander, M.W., 2009. Structure! Agency!(and other quarrels): A meta-analysis of institutional theories of organization. *Academy of Management Journal*. 52 (1), 61-85.
- Hofstede, G.H., 2001. *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*, 2nd ed. Sage Publications, Thousand Oaks CA.
- Hong, S.T., Wyer, R.S., 1989. Effects of country-of-origin and product-attribute information on product evaluation: an information processing perspective. *Journal of Consumer Research*, 175-187.
- House, R.J., Hanges, P.J., Javidan, M., Dorfman, P.W., Gupta, V., 2004. *Culture, leadership, and organizations*. Sage Thousand Oaks, CA.
- Hoyle, D., 2009. *ISO 9000 Quality Systems Handbook-updated for the ISO 9001: 2008 standard*. Elsevier, Burlington, VT.
- Huang, F., 1998. Integrating ISO 9000 with TQM spirits: a survey. *Industrial Management + Data Systems*. 98 (8), 373-379.
- Huang, F., Horng, C., Chen, C., 1999. A study of ISO 9000 process, motivation and performance. *Total Quality Management & Business Excellence*. 10 (7), 1009-1025.
- Hudson, J., Jones, P., 2003. International trade in 'quality goods': signalling problems for developing countries. *Journal of International Development*. 15 (8), 999-1013.
- Hunter, J.E., Schmidt, F.L., 1990. *Methods of Meta-Analysis: Correcting Error and Bias in Research Findings*. Sage, Newbury Park, CA.
- Hunter, J.E., Schmidt, F.L., 2004. *Methods of Meta-Analysis: Correcting Error and Bias in Research Findings*, 2nd ed. Sage, Thousand Oaks, CA.
- Hunter, J.E., Schmidt, F.L., Jackson, G.B., 1982. *Meta-analysis: Cumulating Research Findings Across Studies*. Sage, Beverly Hills, CA.

- Huselid, M.A., 1995. The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of management journal*. 38 (3), 635-672.
- Idris, M.A., McEwan, W., Belavendram, N., 1996. The adoption of ISO 9000 and total quality management in Malaysia. *TQM Magazine*. 8 (5), 65-68.
- IMF, 2013. World Economic Outlook. Retrieved April 3, 2014. <http://www.imf.org/external/pubs/ft/weo/2013/02/>.
- Ishikawa, K., 1984. *Quality control circles at work*. Asian Productivity Organization, Tokyo.
- ISI Web of Knowledge, 2012. Journal Citation Reports. Retrieved April 3, 2014. http://wokinfo.com/products_tools/analytical/jcr/.
- ISO, 2005. *ISO 9000:2005 Quality management systems - Fundamentals and vocabulary*, 4th ed. ISO, Geneva, Switzerland.
- ISO, 2008a. *ISO 9000 Introduction and Support Package: Guidance on the Concept and Use of the Process Approach for management systems*. Retrieved August 19, 2014. http://www.iso.org/iso/04_concept_and_use_of_the_process_approach_for_management_systems.pdf.
- ISO, 2008b. *ISO 9001:2008 Quality management systems - Requirements*. ISO, Geneva, Switzerland.
- ISO, 2009a. *ISO 9004:2009 Managing for the sustained success of an organization -- A quality management approach*. ISO, Geneva, Switzerland.
- ISO, 2009b. *ISO/TS 16949:2009 Quality management systems -- Particular requirements for the application of ISO 9001:2008 for automotive production and relevant service part organizations*. ISO, Geneva, Switzerland.
- ISO, 2009c. Selection and use of the ISO 9000 family of standards. Retrieved April 3, 2014. http://www.iso.org/iso/iso_9000_selection_and_use-2009.pdf.
- ISO, 2011. *ISO 19011:2011 Guidelines for auditing management systems*. ISO, Geneva, Switzerland.
- ISO, 2012. Quality management principles. Retrieved April 3, 2014. http://www.iso.org/iso/qmp_2012.pdf.
- ISO, 2013a. ISO Survey 2013. Retrieved April 3, 2014. <http://www.iso.org/iso/home/standards/certification/iso-survey.htm>.
- ISO, 2013b. World distribution of ISO 9001 certificates in 2013. Retrieved October 22, 2014. <http://www.iso.org/iso/home/standards/certification/iso-survey.htm?certificate=ISO%209001&countrycode=#standardpick>.
- ISO, 2014a. Certification. Retrieved August 19, 2014. <http://www.iso.org/iso/home/standards/certification.htm>.

- ISO, 2014b. How does ISO develop standards?. Retrieved April 3, 2014.
http://www.iso.org/iso/home/standards_development.htm.
- ISO, 2014c. ISO 9000 - Quality management. Retrieved July 7, 2014.
http://www.iso.org/iso/home/standards/management-standards/iso_9000.htm.
- ISO, 2014d. ISO 9001 draft now available for public comment. Retrieved August 23, 2014.
http://www.iso.org/iso/home/news_index/news_archive/news.htm?refid=Ref1850.
- ISO, 2014e. ISO/TC 176 Quality management and quality assurance. Retrieved April 3, 2014.
http://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees/iso_technical_committee.htm?commid=53882.
- ISO registration costs falling, 1994. 16 (November).
- Jang, W., Lin, C., 2008. An integrated framework for ISO 9000 motivation, depth of ISO implementation and firm performance. *Journal of Manufacturing Technology Management*. 19 (2), 194-216.
- Javidan, M., House, R.J., Dorfman, P.W., Hanges, P.J., De Luque, M.S., 2006. Conceptualizing and measuring cultures and their consequences: a comparative review of GLOBE's and Hofstede's approaches. *Journal of International Business Studies*. 37 (6), 897-914.
- Johansson, J.K., Ronkainen, I.A., Czinkota, M.R., 1994. Negative country-of-origin effects: the case of the new Russia. *Journal of International Business Studies*. 25 (1), 157-176.
- Jones, R., Arndt, G., Kustin, R., 1997. ISO 9000 among Australian companies: impact of time and reasons for seeking certification on perceptions of benefits received. *The International Journal of Quality & Reliability Management*. 14 (7), 650-660.
- Juran, J.M., Gryna, F.M., 1980. *Quality planning and analysis*. McGraw Hill, New York, NY.
- Kafetzopoulos, D., Gotzamani, K., Psomas, E., 2013. Quality systems and competitive performance of food companies. *Benchmarking*. 20 (4), 463-483.
- Kam, C.W., Tang, S.L., 1998. ISO 9000 for building and civil engineering contractors. *Transactions Hong Kong Institution of Engineers*. 5 (2), 6-10.
- Karapetrovic, S., Fa, M.C., Saizarbitoria, I.H., 2010. What happened to the ISO 9000 lustre? An eight-year study. *Total Quality Management and Business Excellence*. 21 (3), 245-267.
- Kashima, Y., Callan, V.J., 1994. The Japanese workgroup, in: Triandis, H.C., Dunette, M., Hough, L. (Eds.), *Handbook of Industrial and Organizational Psychology*. Consulting Psychologists Press, Palo Alto, CA, pp. 606-649.

- Kaynak, H., 2003. The relationship between total quality management practices and their effects on firm performance. *Journal of Operations Management*. 21 (4), 405-435.
- Kiggundu, M.N., 2002. *Managing globalization in developing countries and transition economies: Building capacities for a changing world*. Praeger, Westport, CT.
- King, W.R., He, J., 2006. A meta-analysis of the technology acceptance model. *Information & Management*. 43 (6), 740-755.
- Koc, T., 2007. The impact of ISO 9000 quality management systems on manufacturing. *Journal of Materials Processing Technology*. 186 (1-3), 207-213.
- Krasachol, L., Willey, P.C.T., Tannock, J.D.T., 1998. The progress of quality management in Thailand. *TQM Magazine*. 10 (1), 40-44.
- Kull, T.J., Wacker, J.G., 2010. Quality management effectiveness in Asia: The influence of culture. *Journal of Operations Management*. 28 (3), 223-239.
- Kuo, T., Chang, T.J., Hung, K.C., Lin, M.Y., 2009. Employees' perspective on the effectiveness of ISO 9000 certification: A total quality management framework. *Total Quality Management and Business Excellence*. 20 (12), 1321-1335.
- Lafuente, E., Bayo-Moriones, A., García-Cestona, M., 2010. ISO-9000 certification and ownership structure: Effects upon firm performance. *British Journal of Management*. 21 (3), 649-665.
- Lakhe, R.R., Mohanty, R.P., 1994. Total quality management: concepts, evolution and acceptability in developing economies. *International Journal of Quality & Reliability Management*. 11 (9), 9-33.
- Lang, F.R., Carstensen, L.L., 2002. Time counts: future time perspective, goals, and social relationships. *Psychology and aging*. 17 (1), 125-139.
- Lee, P.K.C., To, W.M., Yu, B.T.W., 2009. The implementation and performance outcomes of ISO 9000 in service organizations. *The International Journal of Quality & Reliability Management*. 26 (7), 646-662.
- Lee, T.Y., 1998. The development of ISO 9000 certification and the future of quality management A survey of certified firms in Hong Kong. *The International Journal of Quality & Reliability Management*. 15 (2), 162-177.
- Lertpachin, C., Wingwon, B., Noithonglek, T., 2013. The effect of marketing focus, innovation and learning organization on the building of competitive advantages: Empirical evidence from ISO 9000 certified companies. *Journal of Strategic Marketing*. 21 (4), 323-331.
- Leung, H.K.N., Chan, K.C.C., Lee, T.Y., 1999. Costs and benefits of ISO 9000 series: a practical study. *International Journal of Quality & Reliability Management*. 16 (7), 675-691.

- Levine, D.I., Toffel, M.W., 2010. Quality Management and Job Quality: How the ISO 9001 Standard for Quality Management Systems Affects Employees and Employers. *Management Science*. 56 (6), 978-996.
- Liebman, S., 2012. From the Trenches – Changes coming from two widely used standards.
- Lima, M.A.M., Resende, M., Hasenclever, L., 2000. Quality certification and performance of Brazilian firms: An empirical study. *International Journal of Production Economics*. 66 (2), 143-147.
- Lin, C., Jang, W., 2008. Successful ISO 9000 implementation in Taiwan: How can we achieve it, and what does it mean?. *International Journal of Productivity and Performance Management*. 57 (8), 600-622.
- Linderman, K., Schroeder, R.G., Zaheer, S., Liedtke, C., Choo, A.S., 2004. Integrating quality management practices with knowledge creation processes. *Journal of Operations Management*. 22 (6), 589-607.
- Lipsey, M.W., Wilson, D.B., 2001. *Practical meta-analysis*. Sage, Thousand Oaks, CA.
- Llopis, J., Tarí, J.J., 2003. The importance of internal aspects in quality improvement. *The International Journal of Quality & Reliability Management*. 20 (2/3), 304-324.
- Lo, L.K., Chang, D.S., 2007. The difference in the perceived benefits between firms that maintain ISO certification and those that do not. *International Journal of Production Research*. 45 (8), 1881-1897.
- Lozeau, D., Langley, A., Denis, J., 2002. The corruption of managerial techniques by organizations. *Human relations*. 55 (5), 537-564.
- Lundmark, E., Westelius, A., 2006. Effects of quality management according to ISO 9000: A Swedish study of the transit to ISO 9000:2000. *Total Quality Management and Business Excellence*. 17 (8), 1021-1042.
- Mackelprang, A.W., Nair, A., 2010. Relationship between just-in-time manufacturing practices and performance: A meta-analytic investigation. *Journal of Operations Management*. 28 (4), 283-302.
- Mady, M.T., 2011. The discrepancy between goal expectation and goal achievement of ISO 9000 internal benefits: Evidence from Egypt. *International Journal of Productivity and Quality Management*. 8 (1), 64-84.
- Magd, H.A.E., 2006. An investigation of ISO 9000 adoption in Saudi Arabia. *Managerial Auditing Journal*. 21 (1/2), 132-147.
- Magd, H.A.E., 2008. ISO 9001:2000 in the Egyptian manufacturing sector: perceptions and perspectives. *International Journal of Quality & Reliability Management*. 25 (2), 173-200.
- Magd, H., Curry, A., 2003. An empirical analysis of management attitudes towards ISO 9001:2000 in Egypt. *TQM Journal*. 15 (6), 381-390.

- Magd, H., Kadasah, N., Curry, A., 2003. ISO 9000 implementation: A study of manufacturing companies in Saudi Arabia. *Managerial Auditing Journal*. 18 (4), 313-322.
- Mantura, W., 2008. Human factors in quality management. *Human Factors and Ergonomics in Manufacturing & Service Industries*. 18 (5), 565-579.
- March, J.G., Simon, H.A., 1958. *Organizations*. Wiley, New York, NY.
- Markus, H.R., Kitayama, S., 1991. Culture and the self: Implications for cognition, emotion, and motivation. *Psychological review*. 98 (2), 224-253.
- Martínez-Costa, M., Choi, T.Y., Martínez, J.A., Martínez-Lorente, Á.R., 2009. ISO 9000/1994, ISO 9001/2000 and TQM: The performance debate revisited. *Journal of Operations Management*. 27 (6), 495-511.
- Martínez-Costa, M., Martínez-Lorente, Á.R., 2003. Effects of ISO 9000 certification on firms' performance: A vision from the market. *Total Quality Management and Business Excellence*. 14 (10), 1179-1191.
- Martínez-Costa, M., Martínez-Lorente, Á.R., 2004. ISO 9000 as a Tool for TQM: A Spanish Case Study. *The Quality Management Journal*. 11 (4), 20-30.
- Martínez-Costa, M., Martínez-Lorente, Á.R., 2007. A triple analysis of ISO 9000 effects on company performance. *International Journal of Productivity and Performance Management*. 56 (5/6), 484-499.
- Martinsons, M.G., 1996. The quest for quality management: Profiling the pioneers in Hong Kong. *Management Research Review*. 19 (9), 28-42.
- Masaaki, I., 1986. *Kaizen: The key to Japan's competitive success*. McGraw-Hill, New York, NY.
- Masakure, O., Henson, S., Cranfield, J., 2009. Standards and export performance in developing countries: Evidence from Pakistan. *Journal of International Trade and Economic Development*. 18 (3), 395-419.
- McAdam, R., Canning, N., 2001. ISO in the service sector: Perceptions of small professional firms. *Managing Service Quality*. 11 (2), 80-92.
- McAdam, R., McKeown, M., 1999. Life after ISO 9000: An analysis of the impact of ISO 9000 and total quality management on small businesses in Northern Ireland. *Total Quality Management & Business Excellence*. 10 (2), 229-241.
- McGuire, S.J., Dilts, D.M., 2008. The financial impact of standard stringency: An event study of successive generations of the ISO 9000 standard. *International Journal of Production Economics*. 113 (1), 3-22.
- Mendel, P.J., 2002. International standardization and global governance: the spread of quality and environmental management standards, in: Hoffman, A., Ventresca, M. (Eds.), *Organizations, policy, and the natural environment*. Stanford University Press, Stanford, CA, pp. 407-424.

- Meyer, J.W., Rowan, B., 1977. Institutionalized organizations: Formal structure as myth and ceremony. *American journal of sociology*. 83 (2), 340-363.
- Mezher, T., Ajam, M., Shehab, M., 2004. The historical impact of ISO 9000 on Lebanese firms. *Quality assurance (San Diego, Calif.)*. 11 (1), 25-42.
- Mezher, T., Ramadan, H., 1998. The costs and benefits of getting the ISO 9000 certification in the manufacturing sector in Saudi Arabia. *Quality assurance (San Diego, Calif.)*. 6 (2), 107-122.
- Miles, M.B., Huberman, A.M., 1994. *Qualitative Data Analysis*, 2nd ed. Sage, Thousand Oaks, CA.
- Mokhtar, M.Z., Muda, M.S., 2012. Comparative Study on Performance Measures and Attributes between ISO and Non-ISO Certification Companies. *International Journal of Business and Management*. 7 (3), 185-193.
- Montoya-Weiss, M.M., Calantone, R., 1994. Determinants of new product performance: A review and meta-analysis. *Journal of Product Innovation Management*. 11 (5), 397-417.
- Morrison, E.W., 2002. Information seeking within organizations. *Human Communication Research*. 28 (2), 229-242.
- Nadler, D., 1989. Organizational architectures for the corporation of the future. *Benchmark*. 4 (1), 12-13.
- Nair, A., Prajogo, D., 2009. Internalisation of ISO 9000 standards: The antecedent role of functionalist and institutionalist drivers and performance implications. *International Journal of Production Research*. 47 (16), 4545-4568.
- Nair, A., 2006. Meta-analysis of the relationship between quality management practices and firm performance - implications for quality management theory development. *Journal of Operations Management*. 24 (6), 948-975.
- Najmi, M., Kehoe, D.F., 2001. The role of performance measurement systems in promoting quality development beyond ISO 9000. *International Journal of Operations & Production Management*. 21 (1/2), 159-172.
- Naor, M., Linderman, K., Schroeder, R., 2010. The globalization of operations in Eastern and Western countries: Unpacking the relationship between national and organizational culture and its impact on manufacturing performance. *Journal of Operations Management*. 28 (3), 194-205.
- Naor, M., Goldstein, S.M., Linderman, K.W., Schroeder, R.G., 2008. The Role of Culture as Driver of Quality Management and Performance: Infrastructure Versus Core Quality Practices. *Decision Sciences*. 39 (4), 671-702.
- Naveh, E., Marcus, A., 2004. When does the ISO 9000 quality assurance standard lead to performance improvement? Assimilation and going beyond. *IEEE Transactions on Engineering Management*. 51 (3), 352-363.

- Naveh, E., Marcus, A., Moon, H.K., 2004. Implementing ISO 9000: Performance improvement by first or second movers. *International Journal of Production Research*. 42 (9), 1843-1863.
- Naveh, E., Marcus, A., 2005. Achieving competitive advantage through implementing a replicable management standard: Installing and using ISO 9000. *Journal of Operations Management*. 24 (1), 1-26.
- Nelson, R., Winter, S., 1982. *An evolutionary theory of economic change*. Belknap Press of Harvard University Press, Cambridge, MA.
- Newman, K.L., Nollen, S.D., 1996. Culture and congruence: The fit between management practices and national culture. *Journal of International Business Studies*. 27 (4), 753-779.
- Nield, K., Kozak, M., 1999. Quality certification in the hospitality industry. *Cornell Hotel & Restaurant Administration Quarterly*. 40 (2), 40-45.
- Nwankwo, S., 2000. Quality assurance in small business organisations: myths and realities. *The International Journal of Quality & Reliability Management*. 17 (1), 82-99.
- Ofori, G., Gang, G., Briffett, C., 2002. Implementing environmental management systems in construction: Lessons from quality systems. *Building and Environment*. 37 (12), 1397-1407.
- Okay, S., Semiz, S., 2010. The effects of iso 9000 quality management system implementation in small and medium-sized textile enterprises: Turkish experience. *African Journal of Business Management*. 4 (14), 2921-2933.
- Padma, P., Ganesh, L.S., Rajendran, C., 2008. A study on the critical factors of ISO 9001:2000 and organizational performance of Indian manufacturing firms. *International Journal of Production Research*. 46 (18), 4981-5011.
- Pan, J., 2003. A comparative study on motivation for and experience with ISO 9000 and ISO 14000 certification among Far Eastern countries. *Industrial Management + Data Systems*. 103 (8/9), 564-578.
- Parsons, T, Shils, E., 1951. *Towards a General Theory of Action*. Harvard University Press, Cambridge, MA.
- Peach, R.W., 1995. *The ISO 9000 handbook*. Irwin Professional Publishing, Fairfax, VA.
- Perrow, C., 1972. *Complex Organizations: A Critical Essay*. Scott Foresman and Company, Glenview, IL.
- Pheng, L.S., 1993. The conceptual relationship between construction quality and economic development. *International Journal of Quality & Reliability Management*. 10 (2), 18-30.
- Piskar, F., Dolinsek, S., 2006. Implementation of the ISO 9001: from QMS to business model. *Industrial Management + Data Systems*. 106 (9), 1333-1343.

- Poksinska, B., 2007. Does standardization have a negative impact on working conditions?. *Human Factors and Ergonomics in Manufacturing & Service Industries*. 17 (4), 383-394.
- Poksinska, B., Antoni, M., 2002. The state of ISO 9000 certification: A study of Swedish organizations. *TQM Journal*. 14 (5), 297-306.
- Poksinska, B., Eklund, J.A.E., Dahlgaard, J.J., 2006. ISO 9001:2000 in small organisations. *The International Journal of Quality & Reliability Management*. 23 (5), 490-512.
- Potoski, M., Prakash, A., 2009. Information asymmetries as trade barriers: ISO 9000 increases international commerce. *Journal of Policy Analysis & Management*. 28 (2), 221-238.
- Prabhu, V., Appleby, A., Yarrow, D., Mitchell, E., 2000. The impact of ISO 9000 and TQM on best practice/performance. *TQM Magazine*. 12 (2), 84-91.
- Prado, J.C.P., Fernández-González, A.J., García-Lorenzo, A., 2004. Quality management and personnel participation: Improvement teams, a solution for ISO 9000 system maintenance problems in small to medium-sized enterprises. *Human Factors and Ergonomics in Manufacturing & Service Industries*. 14 (3), 221-237.
- Prajogo, D.I., 2009. Experiences of Australian firms in implementing ISO 9001: A comparison of the 1994 and 2000 versions. *International Journal of Productivity and Quality Management*. 4 (4), 383-399.
- Prajogo, D., Huo, B., Han, Z., 2012. The effects of different aspects of ISO 9000 implementation on key supply chain management practices and operational performance. *Supply Chain Management*. 17 (3), 306-322.
- Prasad, S., Babbar, S., 2000. International operations management research. *Journal of Operations Management*. 18 (2), 209-247.
- Prasad, S., Tata, J., 2003. The role of socio-cultural, political-legal, economic, and educational dimensions in quality management. *International Journal of Operations & Production Management*. 23 (5), 487-521.
- Psomas, E.L., Fotopoulos, C.V., 2009. A meta analysis of ISO 9001:2000 research - findings and future research proposals. *International Journal of Quality and Service Sciences*. 1 (2), 128-144.
- Psomas, E.L., Fotopoulos, C.V., Kafetzopoulos, D.P., 2011. Core process management practices, quality tools and quality improvement in ISO 9001 certified manufacturing companies. *Business Process Management Journal*. 17 (3), 437-460.
- Psomas, E.L., Pantouvakis, A., Kafetzopoulos, D.P., 2013. The impact of ISO 9001 effectiveness on the performance of service companies. *Managing Service Quality*. 23 (2), 149-164.

- Quazi, H.A., Hong, C.W., Meng, C.T., 2002. Impact of ISO 9000 certification on quality management practices: A comparative study. *Total Quality Management*. 13 (1), 53-67.
- Ralston, D.A., Holt, D.H., Terpstra, R.H., 1995. The impact of culture and ideology on managerial work values: A study of The United States, Russia, Japan, and China. *Acad. Manage. Proc.*, 187-191.
- Ralston, D.A., Holt, D.H., Terpstra, R.H., Kai-Cheng, Y., 1997. The impact of national culture and economic ideology on managerial work values: A study of the United States, Russia, Japan, and China. *Journal of International Business Studies*. 28 (1), 177-207.
- Raynor, J.O., Entin, E.E., Brown, E.T., 1982. *Motivation, career striving, and aging*. Hemisphere Publishing Company, Washington, DC.
- Robinson, C., 1996. Asian culture: the marketing consequences. *Journal of the Market Research Society*. 38 (1), 55-62.
- Rogers, E.M., 2010. *Diffusion of innovations*, 4th ed. Simon and Schuster, New York, NY.
- Romano, P., 2000. ISO 9000: What is its impact on performance?. *IEEE Engineering Management Review*. 28 (4), 54-68.
- Romano, P., 2002. Impact of supply chain sensitivity to quality certification on quality management practices and performances. *Total Quality Management*. 13 (7), 981-1000.
- Rosenthal, R., 1979. The file drawer problem and tolerance for null results. *Psychological bulletin*. 86 (3), 638-641.
- Roth, M.S., 1995. The effects of culture and socioeconomics on the performance of global brand image strategies. *Journal of Marketing Research*. 32 (2), 163-175.
- Rothstein, H.R., Sutton, A.J., Borenstein, M., 2005. *Publication bias in meta-analysis: Prevention, assessment and adjustments*. Wiley, Hoboken, NJ.
- Rotter, J.B., 1966. Generalized expectations for internal vs. external locus of reinforcement. *Psychological monographs*. 80 (1).
- Rungtusanatham, M., Forza, C., Koka, B., Salvador, F., Nie, W., 2005. TQM across multiple countries: *Convergence Hypothesis* versus *National Specificity* arguments. *Journal of Operations Management*. 23 (1), 43-63.
- Rusjan, B., Alič, M., 2010. Capitalising on ISO 9001 benefits for strategic results. *International Journal of Quality and Reliability Management*. 27 (7), 756-778.
- Russian Research Institute for Certification, 2012. The 29th meeting of ISO TC/176 delegates. Retrieved February 1, 2013. <http://www.isotc176spetersburg.org/admin/delegates/>.

- Ruzevicius, J., Adomaitiene, R., Sirvidaite, J., 2004. Motivation and Efficiency of Quality Management Systems Implementation: A Study of Lithuanian Organizations. *Total Quality Management and Business Excellence*. 15 (2), 173-189.
- Sampaio, P., Saraiva, P., Rodrigues, A.G., 2009. ISO 9001 certification research: questions, answers and approaches. *The International Journal of Quality & Reliability Management*. 26 (1), 38-58.
- Sampaio, P., Saraiva, P., António Guimarães Rodrigues, 2011. The economic impact of quality management systems in Portuguese certified companies. *The International Journal of Quality & Reliability Management*. 28 (9), 929-950.
- Sandholtz, K.W., 2012. Making standards stick: A theory of coupled vs. decoupled compliance. *Organization Studies*. 33 (5-6), 655-679.
- Santos, L., Escanciano, C., 2002. Benefits of the ISO 9000: 1994 system: Some considerations to reinforce competitive advantage. *The International Journal of Quality & Reliability Management*. 19 (2/3), 321-344.
- Santos, G., Mendes, F., Barbosa, J., 2011. Certification and integration of management systems: The experience of Portuguese small and medium enterprises. *Journal of Cleaner Production*. 19 (17-18), 1965-1974.
- Scott, W.R., 1995. Introduction: Institutional theory and organizations, in: Scott, W.R., Christensen, S. (Eds.), *The institutional construction of organizations: International and longitudinal studies*. Sage, Thousand Oaks, CA, pp. xi-xxiii.
- Seddon, J., 2000. *The case against ISO 9000*. Oak Tree Press, Dublin.
- Seddon, J., 1997. Ten arguments against ISO 9000. *Managing Service Quality*. 7 (4), 162-168.
- Sharma, B., Gadenne, D., 2001. An investigation of the perceived importance and effectiveness of quality management approaches. *TQM Journal*. 13 (6), 433-443.
- Sharma, D.S., 2005. The association between ISO 9000 certification and financial performance. *International Journal of Accounting*. 40 (2), 151-172.
- Shenkar, O., Ronen, S., 1987. Structure and importance of work goals among managers in the People's Republic of China. *Academy of Management Journal*. 30 (3), 564-576.
- Sheppard, B.H., Hartwick, J., Warshaw, P.R., 1988. The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *Journal of consumer Research*. 15 (3), 325-343.
- Shih, L., Huarng, F., 1996. ISO in Taiwan: A survey. *Total Quality Management*. 7 (6), 681-690.
- Siemsen, E., Roth, A.V., Balasubramanian, S., Anand, G., 2009. The influence of psychological safety and confidence in knowledge on employee knowledge sharing. *Manufacturing & Service Operations Management*. 11 (3), 429-447.

- Sila, I., 2007. Examining the effects of contextual factors on TQM and performance through the lens of organizational theories: an empirical study. *Journal of Operations Management*. 25 (1), 83-109.
- Simmons, B.L., White, M.A., 1999. The relationship between ISO 9000 and business performance: Does registration really matter?. *Journal of Managerial Issues*. 11 (3), 330-343.
- Singels, J., Ruel, G., van de Water, H., 2001. ISO 9000 series - Certification and performance. *The International Journal of Quality & Reliability Management*. 18 (1), 62-75.
- Singh, C., Sareen, K., 2006. Effectiveness of ISO 9000 standards in Indian educational institutions: A survey. *International Journal of Services, Technology and Management*. 7 (4), 403-415.
- Singh, P.J., Power, D., Chuong, S.C., 2011. A resource dependence theory perspective of ISO 9000 in managing organizational environment. *Journal of Operations Management*. 29 (1-2), 49-64.
- Singleton, R.A., Straits, B.C., 1999. *Approaches to Social Research*, 3rd ed. Oxford University Press, New York, NY.
- Skrabec Jr., Q.R., Ragu-Nathan, T.S., Rao, S.S., Bhatt, B.T., 1997. ISO 9000: Do the benefits outweigh the costs?. *Industrial Management (Norcross, Georgia)*. 39 (6), 26-32.
- Smith, A., Dowling, P.J., 2001. Analyzing firm training: five propositions for future research. *Human Resource Development Quarterly*. 12 (2), 147-167.
- Spence, M., 1973. Job Market Signalling. *The Quarterly Journal of Economics*. 87 (3), 355-374.
- Sroufe, R., Curkovic, S., 2008. An examination of ISO 9000: 2000 and supply chain quality assurance. *Journal of Operations Management*. 26 (4), 503-520.
- Stahl, G.K., Voigt, A., 2008. Do cultural differences matter in mergers and acquisitions? A tentative model and examination. *Organization Science*. 19 (1), 160-176.
- Stevenson, T.H., Barnes, F.C., 2002. What industrial marketers need to know now about ISO 9000 certification. A review, update, and integration with marketing. *Industrial Marketing Management*. 31 (8), 695-703.
- Sun, H., 1999. Diffusion and contribution of total quality management: An empirical study in Norway. *Total Quality Management & Business Excellence*. 10 (6), 901-914.
- Tan, L.P., Sia, G.L., 2001. ISO 9000: The answer for total quality management implementation? the Malaysian case. *Total Quality Management*. 12 (2), 223-229.
- Tang, S.L., Kam, C.W., 1999. A survey of ISO 9001 implementation in engineering consultancies in Hong Kong. *The International Journal of Quality & Reliability Management*. 16 (6), 562-574.

- Tarí, J.J., Molina, J.F., 2002. Quality management results in ISO 9000 certified Spanish firms. *TQM Journal*. 14 (4), 232-239.
- Terlaak, A., King, A.A., 2006. The effect of certification with the ISO 9000 Quality Management Standard: A signaling approach. *Journal of Economic Behavior and Organization*. 60 (4), 579-602.
- Terziovski, M., Power, D., 2007. Increasing ISO 9000 certification benefits: A continuous improvement approach. *International Journal of Quality and Reliability Management*. 24 (2), 141-163.
- Terziovski, M., Power, D., Sohal, A.S., 2003. The longitudinal effects of the ISO 9000 certification process on business performance. *European Journal of Operational Research*. 146 (3), 580-595.
- Terziovski, M., Samson, D., Dow, D., 1997. The business value of quality management systems certification evidence from Australia and New Zealand. *Journal of Operations Management*. 15 (1), 1-18.
- Thawesaengskulthai, N., Tannock, J.D., 2008. Pay-off selection criteria for quality and improvement initiatives. *The International Journal of Quality & Reliability Management*. 25 (4), 366-382.
- To, W.M., Lee, P.K.C., Yu, B.T.W., 2012. Benefits of implementing management system standards: A case study of certified companies in the Pearl River Delta, China. *The TQM Journal*. 24 (1), 17-28.
- Tornatzky, L.G., Klein, K.J., 1982. Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on Engineering Management*. 29 (1), 28-45.
- Torre, P.G., Adenso-Díaz, B., González, B.A., 2001. Empirical evidence about managerial issues of ISO certification. *TQM Magazine*. 13 (5), 355-360.
- Triandis, H.C., 2002. Individualism and collectivism, in: Gannon, M., Newman, K. (Eds.), *Handbook of cross-cultural management*. Lawrence Erlbaum, New York, pp. 16-45.
- Triandis, H.C., 1995. *Individualism & collectivism*. Westview Press, Boulder.
- Trompenaars, F., Hampden-Turner, C., 1997. *Riding the Waves of Culture: Understanding cultural diversity in business*, Nicholas Brealy. London, England.
- Trompenaars, F., Hampden-Turner, C., 1998. *Riding the waves of culture*. McGraw-Hill New York.
- Tsekouras, K., Dimara, E., Skuras, D., 2002. Adoption of a quality assurance scheme and its effect on firm performance: A study of Greek firms implementing ISO 9000. *Total Quality Management*. 13 (6), 827-841.
- Turner, C.R., Ortmann, G.F., Lyne, M.C., 2000. Adoption of ISO 9000 quality assurance standards by South African agribusiness firms. *Agribusiness*. 16 (3), 295-307.

- Tzelepis, D., Tsekouras, K., Skuras, D., Dimara, E., 2006. The effects of ISO 9001 on firms' productive efficiency. *International Journal of Operations & Production Management*. 26 (10), 1146-1165.
- van Bruggen, W.A., de Vries, H.J., van Werven, G., 2002. Procedures en bureaucratie - de valkuilen, in: de Vries, H.J. (Ed.), *Procedures voor ISO 9000:2000*. NEN - Nederlands Normalisatie-instituut, Delft, pp. 37-46.
- van der Wiele, T., van Iwaarden, J., Williams, R., Barrie, D., 2005. Perceptions about the ISO 9000 (2000) quality system standard revision and its value: the Dutch experience. *The International Journal of Quality & Reliability Management*. 22 (2/3), 101-119.
- van Essen, M., Otten, J., Carberry, E.J., 2012. Assessing Managerial Power Theory: A Meta-Analytic Approach to Understanding the Determinants of CEO Compensation. *Journal of Management*.
- Vecchi, A., Brennan, L., 2011. Quality management: a cross-cultural perspective based on the GLOBE framework. *International Journal of Operations & Production Management*. 31 (5), 527-553.
- Victor, B., Boynton, A., Stephens-Jahng, T., 2000. The effective design of work under total quality management. *Organization Science*. 11 (1), 102-117.
- Webb, E., Campbell, D., Schwartz, R., Sechrest, L., Belew Grove, J., 1981. *Non-reactive Measures in the Social Sciences*, 2nd ed. Houghton Mifflin Company, Boston.
- Weston, F.C., Jr, 1995. What do managers really think of the ISO 9000 registration process?. *Quality Progress*. 28 (10), 67.
- White, G.P., 1996. A meta-analysis model of manufacturing capabilities. *Journal of Operations Management*. 14 (4), 315-331.
- Wilcock, A., Karapetrovic, S., Boys, K., Piche, P., 2006. Use of ISO 9004:2000 and other business excellence tools in Canada. *International Journal of Quality & Reliability Management*. 23 (7), 828-846.
- Wildt, A.R., Mazis, M.B., 1978. Determinants of scale response: Label versus position. *Journal of Marketing Research*. 15 (2), 261-267.
- Withers, B.E., 2001. Impacts of ISO 9000 registration on European firms: a case analysis. *Journal of Manufacturing Technology Management*. 12 (2), 139-151.
- Wu, J., Lederer, A., 2009. A meta-analysis of the role of environment based voluntariness in information technology acceptance. *Mis Quarterly*. 33 (2), 419-432.
- Wu, S.I., Chen, J.H., 2012. The performance evaluation and comparison based on enterprises passed or not passed with ISO accreditation: An appliance of BSC and ABC methods. *International Journal of Quality and Reliability Management*. 29 (3), 295-319.

- Wynn, C.T., 1982. Responsibility: A potential keystone to effective organizational behavior. Paper Presented at the Western Academy of Management Meeting.
- Yahya, S., Goh, W., 2001. The implementation of an ISO 9000 quality system. *International Journal of Quality & Reliability Management*. 18 (9), 941-966.
- Yeung, G., Mok, V., 2005. What are the impacts of implementing ISOs on the competitiveness of manufacturing industry in China?. *Journal of World Business*. 40 (2), 139-157.
- Yeung, A.C.L., Lee, T.S., Chan, L.Y., 2003. Senior management perspectives and ISO 9000 effectiveness: An empirical research. *International Journal of Production Research*. 41 (3), 545-569.
- Yeung, A.C.L., Lo, C.K.Y., Cheng, T.C.E., 2011. Behind the Iron Cage: An Institutional Perspective on ISO 9000 Adoption and CEO Compensation. *Organization Science*. 22 (6), 1600-1612.
- Yin, R.K., 2003. *Case study research: Design and methods*, 3rd ed. Sage, Thousand Oaks, CA.
- Young, S.M., 1992. A framework for successful adoption and performance of Japanese manufacturing practices in the United States. *Academy of Management Review*. 17 (4), 677-700.
- Yu, A., Yang, K., 1994. The nature of achievement motivation in collectivist societies., in: Kim, U., Triandis, H.C., Kagitcibasi, C., Choi, S.C., Yoon, G. (Eds.), *Individualism and collectivism: Theory, method, and applications*. Sage Publications, Inc, Newbury Park, pp. 239-250.
- Yukl, G.A., Heaton, H., 2002. *Leadership in organizations*, 5th ed. Prentice Hall, Upper Saddle River, NJ.
- Zaramdini, W., 2007. An empirical study of the motives and benefits of ISO 9000 certification: the UAE experience. *The International Journal of Quality & Reliability Management*. 24 (5), 472-491.
- Zeng, S.X., Tam, C.M., Wang, H.C., Deng, Z.M., 2002. Quality certification scheme in the construction industry of China. *Architectural Science Review*. 45 (2), 83-89.
- Zeng, S.X., Tian, P., Tam, C.M., Tam, V.W.Y., 2005. Evaluation of implementing ISO 9001:2000 Standard in the construction industry of China. *Architectural Science Review*. 48 (1), 11-16.
- Zhao, X., Flynn, B.B., Roth, A.V., 2006. Decision Sciences Research in China: A Critical Review and Research Agenda—Foundations and Overview. *Decision Sciences*. 37 (4), 451-496.
- Zuckerman, A., 1994. The high price of admission. *Appliance Manufacturer*. 42 (5), 8-10.

Summary in English

The ISO 9001 quality management standard has been implemented by more than one million organizations in 187 countries since its introduction in 1987. A newer version of ISO 9001 is planned to be introduced in 2015. Even though it is widely used by organizations to gain both operational and market benefits, the studies on the impact of ISO 9001 report mixed findings. A large body of literature reports positive findings. However, some studies reveal negative results. Therefore, the aim of this dissertation is to find out what is the impact of ISO 9001, and to better understand the differences in the current literature.

First, we examine the relationship between ISO 9001 and a company's business performance by means of meta-analysis, and aim to find the true effects of certification. We show that in most cases, ISO 9001 helps companies to increase their revenues. However, we cannot prove the impact of ISO 9001 on decreasing costs. The findings suggest that not all companies are able to gain financial benefits from ISO 9001. Moreover, we demonstrate that the benefits gained from ISO 9001 differs depending on the length of the period since certification, standard version, geographic location, industry sector, and company size (Chapter 2).

Second, we investigate the benefits of ISO 9001 worldwide and the role of national culture and economic development in the ISO 9001-business performance relationship by means of meta-analysis. We show that ISO 9001 benefits both operational and market performance across various countries. However, the results also reveal that national differences, specifically the level of economic development and national culture, affect the performance benefits of ISO 9001. The level of economic development has a significantly negative effect on operational performance and no effect on market performance. Moreover, national culture impacts the relationship between ISO 9001 and operational performance, but it plays a smaller role when it comes to market performance (Chapter 3).

Third, we investigate the antecedents of employee involvement in standardized work practices and continuous improvement practices related to an ISO-9001-based quality management system by using an exploratory case study methodology. We show that four features differentiated employees that did participate in standardized work practices from those that did not: having a positive attitude towards ISO 9001 usage, being aware of ISO

9001, and believing that ISO 9001 is useful and easy to use. Only one feature, feeling responsible, differentiated employees that did participate in continuous improvement practices from those that did not (Chapter 4).

Chapter 2 is the first meta-analytic review of the impact of ISO 9001. Chapter 3 is the first extensive cross-country comparison of the benefits gained from ISO 9001. Chapter 4 contributes to the ISO 9001 literature first by studying employees rather than companies and second by revealing the antecedents of employee involvement in ISO 9001-related practices. Together, these three chapters illustrate that the relationship between ISO 9001 and business performance is not as straightforward as it is often assumed. Our findings indicate that the implementation and the impact of ISO 9001 can be studied and explained at three different levels: Country level, company level and employee level.

Samenvatting (Summary in Dutch)

De ISO-9001-norm voor kwaliteitsmanagement is inmiddels geïmplementeerd door meer dan een miljoen organisaties in 187 landen sinds haar introductie in 1987. Een nieuwe versie van ISO 9001 is gepland voor 2015. Hoewel de norm op grote schaal wordt gebruikt door organisaties, om zowel de voortbrengingsprocessen als de marktpositie te verbeteren, blijken de resultaten van studies naar de invloed van ISO 9001 onderling te verschillen. Een grote hoeveelheid literatuur meldt positieve bevindingen, maar sommige andere onderzoeken laten negatieve resultaten zien. Het doel van dit proefschrift is om uit te zoeken wat nu de werkelijke invloed is van ISO 9001 en om de verschillen in de huidige literatuur beter te begrijpen.

Om te beginnen onderzoeken we de relatie tussen ISO 9001 en bedrijfsprestaties door middel van meta-analyse om achter de daadwerkelijke effecten van certificering te komen. We laten zien dat in de meeste gevallen ISO 9001 bedrijven helpt om hun inkomsten te verhogen. We konden geen bewijs vinden voor het verminderen van de kosten onder invloed van ISO 9001. Uit onze bevindingen blijkt dat niet alle bedrijven financieel voordeel behalen uit ISO 9001. De met ISO 9001 bereikte resultaten zijn afhankelijk van de lengte van de periode sinds de certificering, normversie, geografische locatie, bedrijfssector en bedrijfsgrootte (Hoofdstuk 2).

Vervolgens onderzoeken we door middel van meta-analyse de voordelen van ISO 9001 wereldwijd en de invloed van de nationale cultuur en economische ontwikkeling van een land op de relatie tussen ISO 9001 en bedrijfsprestaties. We laten zien dat ISO 9001 voordelen biedt op zowel het operationele vlak als voor de marktprestaties in diverse landen. De resultaten laten echter ook zien dat de verschillen tussen landen qua economische ontwikkeling en nationale cultuur de resultaten van ISO 9001 beïnvloeden. Het niveau van economische ontwikkeling heeft een significante negatieve invloed op de toegevoegde waarde van ISO 9001 voor operationele prestaties, en geen invloed op de marktprestaties. Bovendien heeft de nationale cultuur invloed op de relatie tussen ISO 9001 en de operationele prestaties, maar de cultuur speelt een minder grote rol als het gaat om de marktprestaties (Hoofdstuk 3).

Ook onderzoeken we, met een verkennende case-studie, betrokkenheid van de werknemers bij het op ISO 9001 gebaseerd kwaliteitsmanagementsysteem van hun

organisatie. Hierbij onderscheiden we tussen gestandaardiseerde werkmethode en praktijken gerelateerd aan continue verbetering. Vier kenmerken blijken het verschil te maken tussen medewerkers die hebben deelgenomen aan gestandaardiseerde werkmethode en hen die dat niet deden: een positieve houding ten opzichte van het gebruik van ISO 9001, ISO 9001 kennen, en geloven dat ISO 9001 nuttig is en makkelijk is toe te passen. Slechts één variabele, namelijk het zich verantwoordelijk voelen, onderscheidt medewerkers die hebben deelgenomen aan de voortdurende-verbeterpraktijken van degenen die dat niet deden (Hoofdstuk 4).

Hoofdstuk 2 is de eerste meta-analyse over de invloed van ISO 9001. Hoofdstuk 3 is de eerste uitgebreide cross-country-vergelijking van de resultaten van ISO 9001. Hoofdstuk 4 draagt bij aan de ISO-9001-literatuur door vooral de werknemers te bestuderen in plaats van bedrijven en door de onthulling van de factoren die de betrokkenheid van de werknemers in aan ISO 9001 gerelateerde praktijken beïnvloeden. Samen illustreren deze drie hoofdstukken dat de relatie tussen ISO 9001 en bedrijfsprestaties niet zo eenvoudig is als vaak wordt verondersteld. Onze bevindingen tonen aan dat de invloed van ISO 9001 op de bedrijfsprestaties kan worden bestudeerd en uitgelegd op drie verschillende niveaus: nationaal, bedrijfs- en werknemersniveau.

Özet (Summary in Turkish)

ISO 9001 kalite yönetimi sistemi standardı, 1987 yılında pazara sunulmasından bu yana 187 ülkede bir milyondan fazla kuruluş tarafından uygulamaya konmuştur. ISO 9001'in yeni bir sürümünün 2015 yılında piyasaya sunulması planlanmaktadır. ISO 9001 her ne kadar hem operasyonel hem de piyasa avantajı kazanmak için şirketler tarafından yaygın olarak kullanılıyor olsa da, ISO 9001 hakkında yapılmış olan bilimsel çalışmalar çelişkili sonuçlar göstermektedir. Bilimsel çalışmaların büyük bir bölümü ISO 9001'in şirket performansı üzerine pozitif bir etkisi olduğunu gösterirken, bazı çalışmalar da ISO 9001'in negatif sonuçlara yol açtığını ortaya koymaktadır. Bu nedenle, bu doktora tezinin ana amacı ISO 9001'in şirket performansı üzerine olan etkilerini ortaya koymak ve şimdiye kadar yapılan bilimsel çalışmaların neden farklı sonuçlar bulduğunu daha iyi anlayabilmektir.

İlk olarak, ISO 9001'in şirket performansı üzerindeki net etkilerinin bulunabilmesi için, ISO 9001 ve şirket performansı arasındaki ilişki meta-analiz yoluyla incelenmiştir. Araştırmamızın sonuçları ISO 9001'in çoğunlukla şirketlerin gelirlerini arttırmaya yardımcı olduğunu göstermektedir. Ancak ISO 9001'in şirket maliyetlerini azaltmaya yönelik etkisi kanıtlanamamıştır. Sonuçlar aynı zamanda ISO 9001'den bütün şirketlerin değil, sadece bazı şirketlerin mali yararlar sağlayabildiğini göstermektedir. Son olarak, ISO 9001'den edinilen faydaların belgelendirmeden bu yana geçen süreye, standard versiyonuna, şirketlerin coğrafi konumuna, sanayi sektörüne ve şirketlerin büyüklüğüne bağlı olarak değiştiği gözlemlenmiştir (Bölüm 2).

İkinci olarak, ISO 9001'in dünya çapındaki faydaları, ve milli kültür ve ekonomik kalkınma düzeyinin ISO 9001-şirket performansı üzerine olan etkisi, meta-analiz yoluyla araştırılmıştır. Araştırmamızın sonuçları şirketlerin dünya genelinde ISO 9001'den hem operasyonel hem de piyasa performansı açısından faydalandığını göstermektedir. Ancak, sonuçlar aynı zamanda ulusal farklılıkların, daha detaylı olarak ekonomik kalkınma düzeyinin ve milli kültürün, ISO 9001'den elde edilen faydaları etkilediğini göstermektedir. Ekonomik kalkınma düzeyinin operasyonel performans üzerinde önemli ölçüde olumsuz etkisi olduğu, ancak piyasa performansı üzerinde hiçbir etkisi olmadığı bulunmuştur. Diğer taraftan, milli kültür ISO 9001 ve operasyonel performans arasındaki

ilişkide önemli bir rol oynarken, ISO 9001 ve piyasa performans ilişkisinde küçük bir rol oynamaktadır.

Üçüncü olarak, şirket çalışanlarının hangi koşullarda ISO 9001 kalite yönetimi sisteminden türetilmiş standart iş uygulamalarına ve sürekli iyileştirme uygulamalarına katıldığı *keşif vaka* çalışması yöntemi kullanılarak araştırılmıştır. Araştırmamızın sonuçları standart iş uygulamalarına katılan çalışanların katılmayan çalışanlara kıyasla dört ayırt edici özelliği olduğunu göstermektedir. Bu özellikler, çalışanların ISO 9001 kullanımına yönelik olumlu bir tutuma sahip olmaları, ISO 9001 hakkında bilgili olmaları ve ISO 9001'in kullanışlı olduğuna inanmaları ve ISO 9001'in kullanımının kolay olduğuna inanmalarıdır. Diğer yandan sürekli iyileştirme uygulamalarına katılan çalışanları katılmayan çalışanlardan ayıran sadece bir özellik bulunmuştur. Bu özellik, çalışanların kendilerini ISO 9001 için sorumlu hissetmeleridir (Bölüm 4).

Tezin ikinci bölümü ISO 9001'in faydaları hakkında yapılmış olan ilk meta-analitik incelemeyi sunmaktadır. Üçüncü bölüm ISO 9001'in faydaları üzerine yapılmış olan ilk geniş kapsamlı ve ülkeler arası olan karşılaştırmayı sunmaktadır. Dördüncü bölüm, çalışanların hangi koşullar altında ISO 9001 kalite yönetimi sistemine katıldığını inceleyerek ISO 9001 literatürüne katkıda bulunmaktadır. Birlikte bu üç bölüm, ISO 9001'in şirket performansı üzerindeki etkisinin genellikle kabul edildiği gibi basit olmadığını göstermektedir. Bulgularımız, ISO 9001'in şirket performansı üzerindeki etkisinin üç farklı seviyede izah edilebilir olduğunu göstermektedir:

Ülke düzeyinde, şirket düzeyinde ve çalışanlar düzeyinde.

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IMPLEMENTATION AND IMPACT OF ISO 9001

The ISO 9001 quality management standard has been implemented by more than one million organizations in 187 countries since its introduction in 1987. Even though it is widely used by organizations to gain both operational and market benefits, the studies on the impact of ISO 9001 report mixed findings. Therefore, the aim of this dissertation is to find out what is the impact of ISO 9001, and to better understand the differences in current literature.

The findings demonstrate that ISO 9001 leads to operational and market benefits in the majority of cases. We also show that the benefits gained from ISO 9001 differs depending on the length of the period since certification, standard version, geographic location, industry sector, and company size. We further demonstrate that national differences, specifically the level of economic development and national culture, impact the performance benefits of ISO 9001. Moreover, we find that not all of the employees in a company use ISO 9001 in their daily work. Having a positive attitude towards ISO 9001 usage, being aware of ISO 9001, believing that ISO 9001 is useful and easy to use, and feeling responsible for ISO 9001 differentiated employees that did participate in ISO 9001-related practices from those that did not.

Together, these three chapters illustrate that the relationship between ISO 9001 and business performance is not as straightforward as it is often assumed. Our findings indicate that the implementation and the impact of ISO 9001 can be studied and explained at three different levels: Country level, company level and employee level.

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