

Purchasing and Supply

Research on the importance of ISO 9001 and ISO 14001 for the core suppliers of Ovimex.

A qualitative study based on literature and benchmarking with
regard to the practice of Ovimex.

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Abstract: This thesis relates to the ISO 9001 and ISO 14001 obligations for suppliers and is specifically aimed at Ovimex, a printing company based in Deventer, The Netherlands. The aim of this research is to determine whether ISO 9001 and ISO 14001 obligations for suppliers of Ovimex leads to higher product quality and delivery reliability. This thesis uses a literature study and a benchmark that involved interviewing companies that work with such obligations. Both the benchmark and the literature study indicate that an ISO 9001 obligation on suppliers has a positive influence on delivery reliability and product quality. In addition, having an ISO 9001 and/or ISO 14001 obligation positively influences the buyer-supplier relationship due to a common language and the willingness to share knowledge with suppliers and customers. However, the above results only occur when the ISO guidelines are implemented with the intention of improving internal processes and will not occur if the supplier obtains the certificate for marketing purposes only. Because ISO 9001 certified suppliers are related to higher delivery reliability and product quality, Ovimex is advised to make this certificate mandatory for all suppliers of leverage items.

Keywords: Quality Management, ISO 9001, ISO 14001, Supplier Quality, Product Quality, Delivery Reliability, Communication, Supplier Obligation, Supplier Selection.

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1. Description of Ovimex, the situation, and complication

1.1 Ovimex as an innovator in the difficult printing sector

Ovimex is a Dutch printing company located in Deventer, the Netherlands. Ovimex was founded in 1922 as a trading company, where Ovimex stood for Overijssel import and export. Shortly after its founding, it started with printing because a printing machine was taken over from a bankrupt entrepreneur. Nowadays, printing is still the core business of Ovimex.

Nevertheless, some things have changed over the years. Due to changes in the market and innovation of the machines, Ovimex currently only uses digital printing and no longer uses offset printing. Offset means that printing is done with large traditional presses, which is especially suitable for large quantities. Ovimex's switch to digital printing enables it to supply customers more flexibly and provide the customer with personalized printing that can place a unique code or name on each sheet. This makes it possible to create for example flyers for contests that require a unique promotional code or a book in which the reader is the main character. The customers of Ovimex are mainly other businesses but private persons occasionally request large orders.

In recent years, Ovimex has implemented a number of innovations, such as the introduction of the HP 30000 printer. The purchase and installation of these HP 30000 printer make Ovimex the first company in the Netherlands to have a machine that can print folding cartons. With the HP 30000 and the newly purchased KAMA FF52i (gluing machine), Ovimex can print and fold small cardboard packaging materials, which provides Ovimex with extra market share. Boxes that are pressed and folded include the packaging of nasal spray or lip balm. The goal behind investments in these machines is to enter a new market and to appeal to a broader target group. These machines help Ovimex to reach customers who could not be served in the past.

These innovations are especially necessary when the industry as a whole is considered. The GOC (2018)¹, a research institute from the graphics media industry, has compiled a report that covers market developments within the sector based on figures from Statistics Netherlands. This report indicates that turnover in the printing sector has steadily declined. One of the reasons could be that paper prices continue to rise while prices for printed matter continue to fall. In

¹ See GOC (2018) p. 11-19

contrast to this falling turnover, there has been a rising trend in exports.² So, in short the market is becoming more difficult due to the falling print prices and rising paper prices. To remain nationally and internationally competitive, Ovimex attaches importance to innovation and diversification, for example by investing in the HP 30000.

1.2 Product quality and delivery reliability as core values for Ovimex.

Quality is a precondition to remain competitive in this market.³ However, there are many interpretations of the concept of “quality.” The Cambridge Dictionary gives the following definitions for quality: “how good or bad is something,” “a high standard,” and “the degree of excellence or something, often a high degree of it.”⁴ In line with these definitions, research by Arditi and Gunaydin (1997) has provided the following definition: “Quality can be defined as meeting the legal, aesthetic and functional requirements of a project.”⁵

In this research, quality is related to the products that Ovimex offers to its customers, which are mostly printed matter. Giri, Chakraborty, and Maiti (2015)⁶ have defined product quality as follows: “...the product quality can be defined as the fulfillment of customer expectations...” Based on the above definitions, product quality can be seen as the extent to which the customer's expectations can be met. Research by Giri, Chakraborty, and Maiti (2015) has indicated that product quality is extremely important. When product quality is low, it affects the image of the company, customer confidence, and operating profit. This results in customers making their purchases somewhere else in the future⁷.

Another important aspect of this research is the delivery reliability. In a competitive market it is important that agreements are fulfilled and that the customer is not disappointed. In addition, Ovimex has shifted to using less stock and producing more on demand. This makes it even more important for the supplier to deliver products on time because otherwise Ovimex will have reduced delivery reliability. Delivery reliability has been defined in many ways. Yao, Kurata, and Mukhopadhyay (2002) have defined delivery reliability as “The ratio of deliveries as promised to the total number of deliveries.”⁸ Similarly, Chang, Tang, Lau, and Ip (2002)⁹

² See GOC (2018) p. 11-19

³ See Chen, Wang & Wang (2002) p. 301; Goodhue, Heien Lee, Sumner (2003) p. 267 ; Toivonen, Hansen, Järvinen and Enroth (2005) p. 279

⁴ See <https://dictionary.cambridge.org/dictionary/english/quality>

⁵ See Arditi & Gunaydin (1997)

⁶ See Giri, Chakraborty & Maiti (2015) p. 1

⁷ See Giri, Chakraborty & Maiti (2015) p. 1

⁸ See Yao, Kurata & Mukhopadhyay (2007) p. 325

⁹ See Chang, Tang, Lau & Ip (2002) p. 119

have defined delivery reliability as “The percentage of orders that are delivered by the due date.” In line with the definitions above, this research defines delivery reliability as the extent to which the supplier meets their commitments regarding the buying firm. This delivery reliability can be measured as the percentage of the times that the supplier delivers as agreed. Thus, when delivery reliability declines, buyers can opt for cooperation with the competitor. It is therefore important for Ovimex to keep its delivery reliability, even as its quality, high to avoid customers switching to competitors.

Ovimex has achieved the ISO 9001 certification, which indicates that Ovimex has a working quality system. In addition, it also has the ISO 14001 certification, which has more common ground with environmental aspects. These ISO 9001 and ISO 14001 are so-called management information standards. These management information standards, also called meta-standards, are increasingly popular.¹⁰ These meta-standards are rules with regard to the systematization of processes and the use of definitions, instructions, procedures, and records based on quality or the environment.¹¹

The ISO 9001 standard and the ISO 14001 standard are the most popular management information standards.¹² The International Organization for Standardization (ISO), an independent organization, has set these standards.¹³ These two meta-standards are also important for the customers of Ovimex because there are a number of customers who require Ovimex to have these certifications. Ovimex has not set up ISO obligations for suppliers although it meets the wishes of its own customers. Yet, it was asked by auditor Rand Hamam (2018) whether it would be wise for Ovimex to require suppliers to have an ISO 9001 and an ISO 14001 as well. These certifications would give Ovimex some degree of certainty that its suppliers' processes are well organized. When the processes are well organized, the continuity of the business benefits. Beside this, the end user of the product can also count on its quality when Ovimex and its suppliers comply with ISO 9001 and ISO 14001. That is why this research examines the advantages and disadvantages of an obligatory ISO 9001 and ISO 14001 for suppliers of Ovimex. In addition, this study also provides recommendations regarding the implementation of this obligation.

¹⁰ See Heras-Saizarbitoria & Boiral (2012) p. 47; Lo, Yeung & Cheng (2009) p. 367; Heras-Saizarbitoria, Boiral & Arana (2016) p. 1

¹¹ See García-Arca, González-Portela Garrido & Prado-Prado (2016) p. 262; Ferreira Rebelo, Santos & Silva (2014) p. 143

¹² See Heras-Saizarbitoria & Boiral (2012) p. 47; Kafel & Nowicki (2014) p. 505; Marimon, Llach & Bernardo (2011) p. 1734; Specchiarello & Giagnorio (2009) p. 159

¹³ See <https://www.iso.org/members.html>

1.3 Central research question and sub-research questions

As described above, the purpose of this research is to give advice to Ovimex on whether it is sensible to oblige its suppliers to obtain an ISO 9001 and ISO 14001 certificate.

This aim leads to the following main question and sub-questions of this research:

Main research question

Would mandatory ISO 9001 and ISO 14001 certification for suppliers add value for Ovimex, and how could that be implemented?

Sub-research questions

1. What is the essence of ISO 9001 and ISO 14001, and how do they contribute to better business operations?
2. What are the advantages and disadvantages for a company that makes ISO 9001 and 14001 certification mandatory for their suppliers?
 - a) What are, according to theory, the advantages and disadvantages for a company that makes ISO 9001 and ISO 14001 certification mandatory for their suppliers?
 - b) What are, according to respondents, the advantages and disadvantages for a company that makes ISO 9001 and ISO 14001 certification mandatory for their suppliers?
3. Which factors are necessary to successfully implement obligatory ISO 9001 or ISO 14001 certification for suppliers?
4. Should Ovimex implement ISO 9001 and ISO 14001 requirements for their suppliers and how can they implement a possible ISO 9001 and ISO 14001 requirement in the future?

Defining the research question

The ISO 9001 and the ISO 14001 are two of the many certificates that can be obtained. The ISO 9001 and ISO 14001 certificates were chosen because they are the certificates that Ovimex has achieved and considers to be highly important. These ISO 9001 and ISO 14001 certifications are the most adopted ISO standards worldwide.¹⁴ In addition to this, only the most important suppliers will be addressed. So, the paper will focus on 11 suppliers that are included annually in the supplier survey by Ovimex. These suppliers supply semi-finished products (paper and ink), machines, and services (transport). Thus, all suppliers that deliver products that

¹⁴ See Heras-Saizarbitoria & Boiral (2012) p. 47; Kafel & Nowicki (2014) p. 505; Marimon, Llach & Bernardo (2011) p. 1734; Specchiarello & Giagnorio (2009) p. 159

are processed in the end product and transporters are considered to be suppliers to the primary processes.

1.4 Relevance due to an upcoming ISO audit

As indicated before, the problem that this research seeks to address was discussed during an internal audit of ISO 14001. The auditor repeatedly noted that Ovimex meets the requirements of customers but does not impose any requirements on its suppliers regarding the ISO 9001 and ISO 14001 certificates. The auditor indicated that Ovimex had to take a closer look at the possible benefits associated with the ISO 9001 and ISO 14001 obligation to suppliers. In the next internal and external annual audits, the points for attention must be discussed again, and some action is expected regarding these points. So, thorough answer must be given to the question, why Ovimex does or does not require suppliers to have ISO 9001 and ISO 14001, which makes this a relevant problem for study.

This research has practical relevance to Ovimex but also has academic relevance. The numerous studies on ISO 9001 and ISO 14001 suggests that they are important subjects of study. In addition, the high degree of ISO 9001 and ISO 14001 certified companies also indicates that much value is attached to these certificates. However, there is still not much available information on ISO 9001 and ISO 14001 obligations for suppliers. The information that is available often uses the American companies Ford and General Electric as examples. No research has been done on Dutch companies and their motivations and experiences in making ISO 9001 and ISO 14001 certification compulsory for their suppliers.

This research contributes to the existing body of knowledge by interviewing a number of Netherlands-based companies that have an ISO 9001 or ISO 14001 obligation for their suppliers. The results are interesting, particularly for the purchasing manager and the supply chain manager because quality, the environment, and supplier relationships play an increasingly important role in their field.¹⁵

A contribution was made to the existing literature by testing this literature by means of a benchmark. This was done by comparing the information of the literature study with the interviews held in the benchmark. As mentioned, a significant amount of research is based on American companies, which may differ from the views held by Dutch companies. This will

¹⁵ See Monczka, Trent & Handfeld indicated (1997) retrieved via Handfeld, Walton, Sroufe & Melnyk (2002) p. 70-71; Handfeld, Walton, Sroufe & Melnyk (2002) p. 71; Flynn & Flynn (2005) p. 3421

lead to interesting results and to verification of the existing literature. When the existing literature is confirmed, it can also be generalized to Dutch companies. The results of this comparison are converted into opportunities and risks for companies that want to implement ISO 9001 and ISO 14001 obligations.

As a result of this comparison, certain sources from literature seem outdated. The respondents of the benchmark indicated, for example, that they disagreed with some statements from a specific academic source and suggested that this may have been due to developments within ISO 9001 and ISO 14001. In addition, it has also appeared that the overwhelming majority of the literature has been confirmed by the respondents from the benchmark. This confirmation shows that this literature is still relevant, and also applies to Dutch companies.

This research is predominantly of practical relevance by providing Ovimex an answer to whether ISO 9001 and ISO 14001 certification that is obligatory for suppliers is of added value. In addition, this research includes important implementation actions for the mandatory ISO 9001 and ISO 14001 certificates. These implementation actions and the advice in general, are without obligation, which means that Ovimex decides whether to undertake them.

Although the advice did require Ovimex to make changes, even if it did not, it would still be of value to Ovimex. This because at the next audit of the ISO 9001 and ISO 14001 certificates, the QHSE coordinator must give a thorough answer to why Ovimex does or does not make ISO 9001 and ISO 14001 mandatory for its suppliers.

2. Research design and data collection

A literature study and benchmark were carried out to answer the research question “Would mandatory ISO 9001 and ISO 14001 certification for suppliers add value for Ovimex, and how could that be implemented?” The literature study cites earlier studies regarding the ISO 9001, ISO 14001, and the obligation to obtain these certificates. In addition, the benchmark is used to confirm or debunk the literature used in this study. This chapter first explains the literature study and why it was chosen. Next, it explains the benchmark, after which chapter 2.3 will elaborate on the reliability and validity of the benchmark and the literature study.

2.1 *The literature study as the foundation for the benchmark*

The majority of the information in this study is obtained through a literature study. Existing literature led to deeper insights into ISO 9001 and ISO 14001 and provided a well-founded

basis for the benchmark. Because many studies have been conducted on the added value of ISO certificates, there is a significant amount of secondary literature that was used in this research. The advantage of this information is that it can be consulted quickly and involves little or no costs.¹⁶ Preference was given to peer-reviewed articles. These peer-reviewed articles ensure that the published articles have been checked, increasing their reliability.¹⁷

The data was only examined on academic sites such as Elsevier, Scopus, and Web of Science. In addition, this paper also relied on literature that was found in the library of the University of Twente in Enschede. General search terms were used to find this literature. Examples of these search terms include “ISO 9001 and ISO 14001,” “ISO 9001 obligation for suppliers,” and “ISO 9001 and ISO 14001 obligation for suppliers.” The most up-to-date and cited articles were subsequently selected and read. Next, all sources in these articles that related to ISO 9001 and ISO 14001 certification and obligation were also read. The articles and the corresponding sources were read systematically until the point of data saturation occurred. This point meant that no more new information could be found, which meant that the information gathering process was considered to be complete. This led to a total number of 167 sources that were used and that can all be found in the list of references. This paper tried to use sources that dated after 2000 to ensure that they were actual and relevant.

2.2 Information from practice through the use of a benchmark

A benchmark is a procedure to execute a problem or a test that can be compared with a system, a standard, or other results.¹⁸ The results can be used for training opportunities or tests.¹⁹ In this research, the literature is tested on the basis of practical information obtained from the benchmark. The benchmark in this study will be conducted through interviews. Conducting interviews is the best method for this research because not much is known about the pros and cons of companies that mandate ISO 9001 and 14001 certifications for suppliers. In addition, the result must be a practical implementation and it is therefore desirable to include the positive and negative experiences of other companies during this research. The benchmark will therefore provide a better picture of the practical experience within the business community. This

¹⁶ See Hofferth (2005) p. 893; Sørensen, Sabroe & Olsen (1996) p. 435

¹⁷ See Babbie (2017) p. 507

¹⁸ See Sim, Easterbrook & Holt (2003) p. 74-77; IEEE (1990) retrieved via Heckman & Williams (2008) p. 41

¹⁹ See Vihinen (2011) p. 3-4

practical knowledge is then tested against the literature to verify its findings. Advice has been drawn up for Ovimec on the basis of this comparison and the confirmed literature

The benchmark consists of semi-structured interviews, which allow respondents can add extra information during the interview, which allows for new insights. These new insights may be less likely to emerge from a fixed questionnaire which is used for structured interviews.²⁰ These new insights may come from companies that have experiences that are not in line with expectations. A semi-structured interview is better for including these experiences than a structured interview that has less room for deviation. The aim of the interviews is to gain insight into the advantages and disadvantages to companies of mandating ISO 9001 and ISO14001 certification for their suppliers. All the interview questions are included in Appendix I.

A total of seven interviews were held, all with different respondents. Six of the seven interviewed companies require their suppliers to obtain ISO 9001 and ISO 14001 certification. One company did not and was in the sample to help determine why companies do not require such a certificate from their suppliers. The respondents were chosen on the basis of the inclusion of the ISO 9001 and/or ISO 14001 obligation in the purchase conditions. All companies within the Netherlands that fell within the search terms were approached, which makes the selection as much random as possible. The search terms used can be found in the appendix (Appendix IV). Because it was not possible to draw from a large group (23 companies) of respondents, the answers cannot be subdivided into sectors such as the printing sector. This is also evident from the distribution of respondents within different sectors. The respondents who were willing to participate in this study were employed by government institutions (two respondents), service companies (two respondents), production companies (two respondents) and a trading company (one respondent). Thus, the benchmark provides a general overview of the experiences that Dutch companies have with these ISO obligations. This overview is not sector-specific.

In 2015, the Dutch government spent around 134 billion euros on public procurement.²¹ Given this high amount, government institutions have also been approached to participate in this investigation. The benchmark indicated that government institutions had a greater willingness to cooperate than private companies. Therefore, a division was made between government organizations and private organizations to prevent the results being influenced by

²⁰ See Kajoerboon (2005) p. 6

²¹ See OECD (2019); CBS (2017)

the dominance of government institutions and for the benchmark to be representative of the Dutch economy. For this reason, the number of respondents in the government sector is equivalent to the highest number of respondents from other sectors.

All interviews held were recorded to prevent information from being incorrectly described or for lost, which is a measure that has been recommended in the literature.²² Recording only took place upon the respondent's consent. The recording is done via GarageBand, which is a program that makes it possible to listen to the interview recording later and pause it. The interviews were transcribed verbatim. This prevented misinterpretation and had the advantage of improving the research's transparency and reliability. All interviews were processed anonymously for privacy reasons unless the respondent gave permission for the use of their personal data.

Deductive coding was used to process the literal interviews into useful information. Deductive coding means that someone searches the data for answers that confirm or disprove this theory.²³ In this study, the benchmark is used to confirm or disprove the literature, what means that deductive coding is appropriate for this study. During the coding of the interviews, use was made of the structure from the pre-prepared questionnaire (Appendix III). This questionnaire was drawn up on the basis of the literature study. To test the literature in practice, the questionnaire contained questions regarding: the company in general, the influence of the supplier obligation on the purchasing process, the influence of the supplier obligation on product quality, and the influence of the supplier obligation on delivery reliability. Since all interviews were transcribed verbatim, all information was subdivided by question and category. This is done by marking the transcribed datasets and copying the relevant sections under the relevant category in the questionnaire. After all the interviews were categorized, the information was summarized per category, these categories are then merged into a chapter. In order to see if the information from the respondents corresponded with the literature, the literature found was compared with the data collected from the benchmark. Subsequently, it was indicated per category whether the data collected from the benchmark was in line with the information found in the literature study.

²² See Rabionet (2011) p. 565

²³ See Kodish & Gittelsohn (2011) p. 53; Bryman (2012) retrieved via Kontisiwe (2018) p. 18

2.3 Reliability and validity

2.3.1 Recordings, peer reviewed articles and data triangulation to guarantee reliability

Research by Taylor and Watkinson (2007)²⁴ has provided the following definition of reliability: “Reliability is the extent to which independent surveyors evaluate a characteristic of an object or population, such as condition, and reach the same conclusions.” This description is completely in line with research by Hoffman (2009),²⁵ which has indicated that reliability is based on the extent to which measurements or observations are consistent.

Only research results that have been published in academic journals were used in this study to guarantee this reliability of the literature search. Preference was given to peer-reviewed sources²⁶. In addition, data triangulation was employed in the form of conducting both a literature study and a benchmark study. Reliability is improved when the results of both studies are mutually confirmatory.

The reliability of the benchmark was guaranteed through the use of concrete and neutral questions. This means that the researcher did not try to lead the respondent in a certain direction. For example, questions were not asked about purely positive or purely negative experiences, but all questions were focused on the general experience. Depending on the answer, the follow-up questions following these general questions focused more specifically on examples of situations specific situations. In addition, several respondents of different firms received the same questions, which made it easier to detect major deviations and allowed statements to be confirmed by multiple respondents. Another way in which reliability is ensured is in the recording of the interviews. As stated earlier, all interviews were recorded, and are literally worked out based on these recordings without data being missed or incorrectly described.

2.3.2 Neutral search terms and clear questions to guarantee validity

Research by Van Waelvelde and Peersman (2007)²⁷ has provided the following definition of validity: “Validity can be defined as an evaluative summary of both the evidence for the actual-as-well-as-potential-consequences of score interpretation and use.” Research by

²⁴ See Taylor & Watkinson (2007) p. 49

²⁵ See Hoffman (2009) p. 25

²⁶ See Babbie (2017) p. 507

²⁷ See Van Waelvelde & Peersman (2007) p. 61

Kogovšek, Ferligoj, Coenders, and Saris (2002)²⁸ have added that a measurement is valid when it accurately measures what it wants to measure.

Multiple sources will be compared to ensure the validity of the literature search.²⁹ Only neutral search terms were used to find these articles. Examples of these search terms are indicated earlier in paragraph 2.1. These neutral search terms ensure that searches are not made from a certain angle, which would result in a skewed information supply. In addition, only academic articles were used, which should also improve validity.³⁰

The validity of the benchmark is ensured by approaching the largest possible group of respondents. It was not possible in this study to randomly select the respondents because of the condition that the respondents were working at companies that require its suppliers to have ISO 9001 or ISO 14001 certification. However, all companies that indicate an ISO 9001 or ISO 14001 requirement for their suppliers were approached for participation in this research. These companies were found via internet search engines. The search terms and the search engines that were used to find companies which require ISO 9001 and ISO 14001 are set out in Appendix IV. All companies that fall within the search terms were approached, which meant that every company had the same opportunity to participate in this research. Another measure that was taken to improve validity was that respondents were interviewed in a familiar environment. In addition, working with a pre-formulated set of questions meant that the respondent could read the questions prior to the interview and ask for any clarification if necessary. This helped to prevent ambiguities during the interview. If new questions were formulated during the interview due to its semi-structured nature, the respondent was reminded before the interview that they could ask questions if things were unclear.

3. Literature

3.1 ISO 9001 and ISO 14001, the same foundation aimed at different directions.

Defining ISO 9001 and ISO 14004 and their significance for companies is key for assessment of mandatory participation.

²⁸ See Kogovšek, Ferligoj, Coenders & Saris (2002) p. 2

²⁹ See Downing (2003) p. 830

³⁰ See Obuaku-Igwe (2017) p. 8

ISO 9001

The ISO 9001 certification is specifically developed for quality management and is designed for the continual improvement of a firm's processes.³¹ This certification is suitable for all companies, regardless of size or industry. Worldwide, more than 1 million companies (1,058,504³²) are ISO 9001 certified across more than 170 countries.³³ Of these companies, 9,991 are located in the Netherlands, of which 26 are printing companies³⁴.

The main objective of the ISO 9001 is to help an organization demonstrate that it is able to meet customer and regulatory requirements and to improve customer satisfaction through sharper procedures.³⁵ It is therefore not surprising that, the customer's desire is one of the most important motivations for companies to achieve the ISO 9001 certification.³⁶

That ISO 9001 contributes to better business operations has been demonstrated by different research.³⁷ A survey of Taiwanese companies found that companies with an ISO 9001 experienced improved financial performance.³⁸ In addition, an extensive literature review by Tarí, Molina-Azorín, and Heras Saizarbitoria (2012) has found that an ISO 9001 also offers benefits in terms employee satisfaction and image.³⁹ In addition to this, ISO 9001 also contributes to improved financials and product quality⁴⁰.

The ISO 9001 is seen as a so-called quality management system⁴¹. As the term "quality management system" suggests, quality is central to the ISO 9001.⁴² It is therefore unsurprising that recent research by Kafetzopoulos, Psomas and Gotzamani (2015)⁴³ has also indicated that

³¹ See Zeng, Tian, & Tam (2007) p. 249; Yao & Lee (2004) p. 141; Farooqui & Ahmed (2009) p. 3

³² See International Organization for Standardization (2018) (ISO 9001-Data per country and sector)

³³ See <https://www.iso.org/iso-9001-quality-management.html>

³⁴ See International Organization for Standardization (2018) (ISO 9001-Data per country and sector); International Organization for Standardization (2018) (Data for sectors per country)

³⁵ See Altinkilinc, Searcy & Souza-Poza, (2009) p.220; Beattie (1999) p.101; Pen & Fong (2002) p. 407; Zeng, Tian, & Tam (2007) p. 249; Yao & Lee (2004) p. 141; Farooqui & Ahmed (2009) p. 3

³⁶ See Magd & Curry (2003) p. 387; Douglas, Coleman & Oddy (2003) p. 320-321; Yahya & Goh (2001) p. 942; Bhuiyan & Alam (2005) p. 205; Rospi et al., (2006) p. 7; Castka, Balzaro & Kenny (2007) p. 4-5; Simmons & White (1999) retrieved via Briscoe, Fawcett & Todd (2005) p.311; Rao, Ragu-Nathan & Solis (1997) p. 335; Van der Wiele, Brown (1998) retrieved via Briscoe, Fawcett & Todd (2005) p. 311; Buttle (1997) p.6

³⁷ See Shafiq, Abid & Jalil, (2014) p. 99; Prajogo, Huo & Han (2012) p. 308

³⁸ See Lin & Jang (2008) p. 600

³⁹ See Tarí, Molina-Azorín & Heras Saizarbitoria (2012) p. 307; Rusjan & Alič (2009) p. 763; Pan (2003) p. 570; Piskar (2007) p. 58; Casadesus, Giménez & Heras (2001) p 330; Jang & Lin (2008) p. 211

⁴⁰ See Tarí, Molina-Azorín & Heras Saizarbitoria (2012) p. 307

⁴¹ See Sumaedi & Yarmen (2015) p. 436; Lee & Chang (2006) p. 101; Lim & Prakash (2017) p. 66

⁴² See Psomas, Fotopoulos & Kafetzopoulos (2010) p.441; Dumas et al., (2003) p. 287; Terziovski & Guerrero (2014) p. 5

⁴³ See Kafetzopoulos, Psomas and Gotzamani (2015) p. 393

ISO 9001 certification is positively related to product quality. Especially when the effectiveness of the ISO 9001 is maximized, this is clearly noticeable in product quality.⁴⁴ In addition to Kafetzopoulos et al., (2015), there are several other studies that have established a positive relationship between ISO 9001 certification and product quality.⁴⁵

Research by Magd and Curry (2003) has added that the employee satisfaction mentioned earlier is mainly due to the stable environment and consistency that is required by the ISO guidelines.⁴⁶ In line with Magd and Curry (2003), a relatively older study by Krause (1996)⁴⁷ has indicated that this employee satisfaction results from better indication of roles and responsibilities under ISO 9001. These clarified roles and responsibilities lead to an increased sense of responsibility among employees.

As already mentioned, the ISO 9001 certificate also improves company image. A certified company can communicate to the customer that it values quality management and will deliver to a high standard. This is a useful tool, especially for marketing purposes.⁴⁸

Assessing delivery reliability on the basis of the ISO 9001 indicates that the ISO 9001 also has a positive influence. Delivery reliability is increased at companies with ISO 9001 certification.⁴⁹ Sıtkı İlkey and Aslan (2012)⁵⁰ have also demonstrated positive influences on delivery reliability but went beyond ISO 9001 to cover the positive influence of quality management systems on delivery reliability in general. Since the ISO 9001 is one of these quality management systems, it is also considered to have a positive influence on delivery reliability.⁵¹

On the financial side, Corbett, Montes-Sancho, and Kirsch (2005)⁵² have demonstrated that companies that achieve ISO 9001 certification generate improved financial returns, mainly due to increased productivity. The same point was also demonstrated by Hendricks and Singhal

⁴⁴ See Kafetzopoulos, Psomas and Gotzamani (2015) p. 393

⁴⁵ See Gilbert & Sia (2001) p. 228-229; Brown, Van Der Wiele & Loughton, (1998) p 279; Tarí, Molina-Azorín & Heras Saizarbitoria (2012) p. 303

⁴⁶ See Magd & Curry (2003) p. 252-253; Mondel & Rondinelli (2002) p. 159; Yin & Schmeidler (2009) p. 470

⁴⁷ See Krause (1996) p. 1564

⁴⁸ See Santos & Escanciano (2001) p. 331-340

⁴⁹ See Poksinska, B., Jörn Dahlgaard, J., & Eklund, J. A. (2003) p. 603; Koc (2017) p.211; Shih, Huarng & Lin (1996) p. 689; Sampaio, Saraiva & Guimaraes Rodrigues, (2010) p. 1281

⁵⁰ See Sıtkı İlkey & Aslan (2012) p. 764;

⁵¹ See Sıtkı İlkey & Aslan (2012) p. 764

⁵² See Corbett, Montes-Sancho & Kirsch (2005) p. 1056

(1997).⁵³ However, their research was not specifically focused on the ISO 9001; instead, it was more dedicated towards general total quality management. Research by Corbett et al., (2005)⁵⁴ have indicated that especially the audit phase and the start-up phase are decisive. This is especially the case for companies that have the right resources in management but do not yet make full use of them. When these companies then decide to obtain an ISO 9001, it appears that these right resources in management are triggered in the right way, resulting in a positive advantage.

ISO 14001

The ISO 14001 is a so-called environment management system (EMS) that identifies, controls and measure the environmental impacts of a company⁵⁵. Research by Chen (2005) has described an EMS as: “An environmental management system is seen as a framework for assessing environmental impacts and then helping management to form firm-level environmental strategies.”⁵⁶ The difference between an internal EMS that was designed by the company and an ISO 14001 is that an ISO 14001 must be continuously improved through KPIs and must meet the requirements set by the International Organization for Standardization, which means less freedom for own intuition of the company to be certified.⁵⁷

Another aspect in which the ISO 14001 distinguishes itself from the in-house EMS is that an ISO 14001 is certified and is achieved through an external audit. Due to this external audit, the ISO 14001 certificate is generally recognized by external stakeholders such as suppliers and customers.⁵⁸ For example, Ford or General Motors specifically require an ISO 14001 instead of an in-house EMS.⁵⁹

As there has been growing interest in the environment,⁶⁰ increasing numbers of companies use an ISO 14001 certification to continuously improve sustainability objectives.⁶¹ This leads to the fact that ISO 14001 is the most voluntarily integrated environment certificate.⁶² To express this in figures, there are 362,610 companies that are ISO 14001 certified⁶³. Of these

⁵³ See Hendricks and Singhal (1997), retrieved via Corbett, Montes-Sancho & Kirsch (2005) p. 1056

⁵⁴ See Corbett, Montes-Sancho & Kirsch (2005) p. 1057

⁵⁵ See Darnall & Edwards Jr (2006) p. 301; Delmas, & Montes-Sancho, (2011) p. 103; Pratama et al. (2018) p. 8

⁵⁶ See Chen (2005) p. 928

⁵⁷ See Jiang & Bansal (2003) p. 1049

⁵⁸ See Bansal & Hunter (2003) p. 290

⁵⁹ See Jiang & Bansal (2003) p. 1049

⁶⁰ See Nawrocka, Brorson, Lindqvist (2009) p. 1435

⁶¹ See Chen (2005) p.927

⁶² See Prakash & Potoski (2006) p. 350 & Rondinelli, D & Vastag, (2000) p. 499-500; Pibia (2009) p. 9

⁶³ See International Organization for Standardization (2018) (ISO 14001-Data per country and sector)

certificates, 2,739 were issued to Dutch companies, of which eight were issued to printing companies.⁶⁴

Research by Bellesi, Lehrer, and Tal (2005)⁶⁵ have described the aim of an ISO 14001 certification as follows: “The purpose of ISO 14001 is to raise industry awareness of the interaction between production, the company's products, and the environment.” These researchers also indicated that the international standard of the ISO 14001 is meant to prevent different standards and to facilitate international trade. Research by Ionaşcu, Ionaşcu, Săcărin and Minu (2017)⁶⁶ have added that ISO 14001 not only reduces the impact of business operations on the environment but also focuses on facilitating sustainable development. For this reason, the ISO 14001 is based on the plan-do-check-act model. Development is central in this model, due to the continuous improvement.

The ISO 14001 focuses on three key principles: pollution prevention, continuous improvement, and voluntary participation.⁶⁷ One of the characteristics of the ISO 14001 is that it creates an obligation for certified companies to draw up environmental targets. These targets can then be evaluated by means of the aforementioned plan-do-check-act model and tightened if possible. Furthermore, although the ISO 14001 is voluntary, it creates an obligation to comply with national and international regulations in the field of the environment. Due to this, ISO 14001 certificate holders are becoming more compliant with legislation and generating less pollution.⁶⁸

Various studies have been carried out on the results of an ISO 14001 implementation. Bansel and Hunter (2003) have suggested that the achievement of an ISO 14001 certificate contributes less direct value than an ISO 9001 certification, for example. An ISO 9001 certification emphasises quality, which ultimately leads to higher quality. In contrast to this direct contribution, the ISO 14001 mainly creates social benefits which do not directly lead to financially positive results.

⁶⁴ See International Organization for Standardization (2018) (ISO 14001-Data per country and sector); International Organization for Standardization (2018) (Data for sectors per country)

⁶⁵ See Bellesi, Lehrer & Tal (2005) p.1943

⁶⁶ See Ionaşcu, Ionaşcu, Săcărin & Minu (2017) p. 166-167

⁶⁷ See Bansel & Hunter (2003) p. 289-291

⁶⁸ See Prakash & Potoski (2006) p. 351-352; Heras-Saizarbitoria, Arana Landín & Molina-Azorín (2011) p. 201; Gomez & Rodriguez (2011) p. 1092

In contrast to the research by Bansel and Hunter (2003), a study by Melnyk, Sroufe, and Calantone (2003)⁶⁹ have demonstrated significant positive relationships between an EMS and direct benefits for the company. The benefits include increased quality, cost savings, reduced waste flow, and a reduction in lead times. Similarly, research by Zeng, Tam, Tam, and Deng (2005) have indicated that an ISO 14001 indeed has positive consequences on waste reduction. Research by Handfeld, Walton, Sroufe, and Melnyk (2002) have added that waste only has adverse consequences. When this waste is reduced, the costs can also be reduced.⁷⁰

Research by Bansal and Bogner (2002)⁷¹ has demonstrated that an ISO 14001 helps an organization to improve its image. This research indicates that the image of an organization is the total representation of how stakeholders view the organization. A positive image of the organization will help to build trust with stakeholders. ISO 14001's improvement of the firm's image has also been confirmed in research by Sambasivan and Fei (2008)⁷².

Auditing of ISO 9001 and ISO 14001

Because the audit of the ISO 9001 is the same as of the ISO 14001, this section describes both together. All the ISO audits are never carried out by the ISO itself but always by third parties that are certified by ISO.⁷³ For example, the ISO 9001 and ISO 14001 certifications are audited at Ovimex by the Grafimedia Services Center. Companies can also choose between different types of guidance during the ISO process. For example, it is possible to do an internal audit prior to the external audit. The internal audit is a test for the external audit and involves feedback from the certification institute being given to the company on the situation at the moment of the internal audit. An interim judgment of sufficiency is also provided. Based on the feedback, a firm can optimise the processes to obtain the ISO certificate at the external audit.

Since there are several costs to an ISO certificate, limiting these costs is beneficial for companies. This is the case if a company decides to attain an ISO 14001 when it already has an ISO 9001, or vice versa. In such a case, it can opt for a combined audit, and both certificates

⁶⁹ See Melnyk, Sroufe & Calantone (2003) p. 344

⁷⁰ See Handfeld, Walton, Sroufe and Melnyk (2002) p. 71

⁷¹ See Bansal & Bogner (2002) p. 277

⁷² See Sambasivan and Fei (2008) p. 1432

⁷³ See <https://www.iso.org/certification.html>

will be tested at the same time.⁷⁴ Since a number of the aspects of both certificates are the same, a combined audit is not only cheaper but also less time-consuming.

Disadvantages of the ISO 9001 and ISO 14001

ISO 9001 and ISO 14001 certifications also entail disadvantages, which mainly occur in the start-up phase⁷⁵. For example, at the start-up phase in small businesses, the ISO 9001 can lead to a great deal of documentation and effort in complying with accompanying guidelines.⁷⁶ Research from Simmons and White (1999) has indicated that this invested time leads to high costs within the company because management has to release this time somewhere else.⁷⁷ To be more specific, an ISO certification process takes about 12-18 months and includes a number of pre-audits to determine if the company is ready for the implementation.⁷⁸

Research by Hua, Chin, Sun, and Xu (2000)⁷⁹ have also commented on the advantages of the ISO 9001. Their research indicated that there were a number of companies that obtained an ISO 9001 for marketing purposes only and did not use it for quality purposes. It turned out that the companies that only adhered to the ISO 9001 for marketing purposes did not experience any internal positive consequences from that certification. This indicates that a certificate obtained does not inherently produce positive internal effects. Those effects only occur when the certificate is implemented with the motivation to improve internal business processes. In line with this, research by Gotzamani and Tsiotras (2002)⁸⁰ has indicated that companies that want to improve their position in the short term will only achieve external benefits. This indicates that in addition to the right intention, a long-term vision is required for the proper implementation of the ISO 9001.

Another disadvantage of ISO 9001 and ISO 14001 is that critical questions can always be raised about the third party that carries out the audits. Research by Bansal and Bogner

⁷⁴ See Bansal & Bogner (2002) p. 275; Briscoe, Fawcett & Todd (2005) p. 314

⁷⁵ See Briscoe, Fawcett & Todd (2005) p. 314

⁷⁶ See Lee and Palmer (1999) retrieved via Briscoe, Fawcett & Todd (2005) p. 314

⁷⁷ See Simmons and White (1999) retrieved via Briscoe, Fawcett & Todd (2005) p. 314; Berk & Berk (2000) as retrieved by Pratama, Kumar, Kumari, Garza Reyes & Nadeem (2018) p. 2

⁷⁸ See Berk & Berk (2000) as retrieved by Pratama, Kumar, Kumari, Garza Reyes & Nadeem (2018) p. 2; Corbett (2006) as retrieved by Castka (2018) p. 163; Singh, Feng & Smith (2006) as retrieved by Castka (2018) p. 163

⁷⁹ See Hua, Chin, Sun & Xu (2000) p. 1181-1121

⁸⁰ See Gotzamani, and Tsiotras (2002)

(2002)⁸¹ and other studies⁸² have indicated that there may be major differences in the capacities of these third parties. However, there have been attempts to be reduce this issue by monitoring and assessing the third parties for their assessed audits. For example, the Canada Environmental Auditing Association (CEAA) exists for the ISO 14001 and must guarantee that third parties examine according to the standards as set by the ISO.⁸³

ISO 9001 and ISO 14001 in a framework

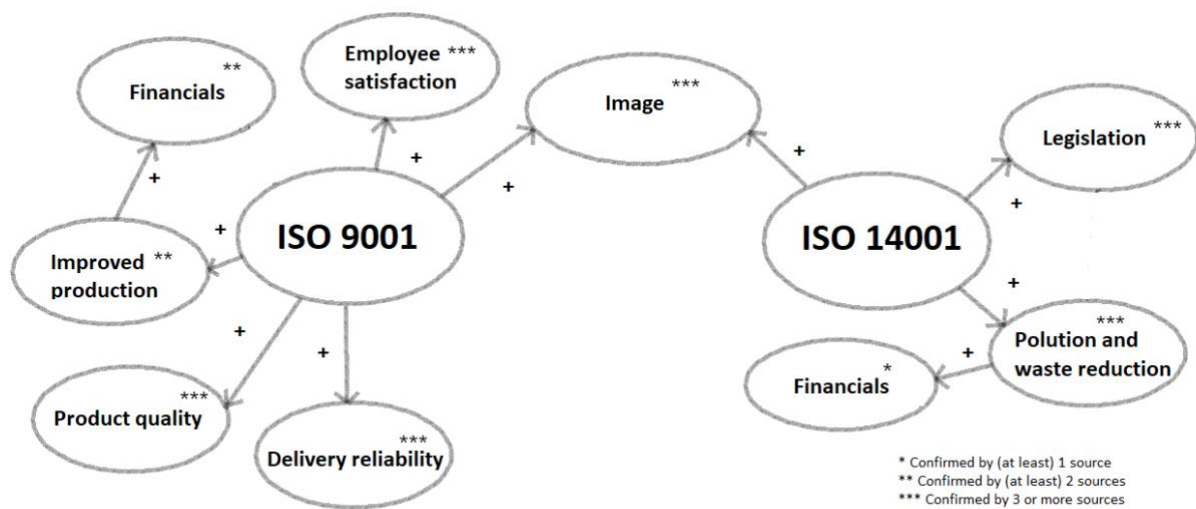


Figure 1. The influence of the ISO 9001 and ISO 14001 on the certified company

Figure 1 describes the relations associated with an ISO 9001 and ISO 14001 certificate, focused on internal benefits. The legend denotes how the asterisks indicate the extent to which the relationship is backed up by a source. The + and – signs indicate whether there is a negative or a positive relationship, and the direction of the arrow indicates the direction in which the relationship occurs. This framework can be found in more detail in appendix V.

The framework is aimed at companies that already have the ISO 9001 and ISO 14001 certificates. The disadvantages mentioned in the previous section focus mainly on the start-up phase to obtaining the certificate and are therefore not included in the framework. However, these disadvantages must be considered. For example, if one of the certificates has been

⁸¹ See Bansal & Bogner (2002) p. 282

⁸² See Poksinka (2003) as retrieved via Poksinska, Jörn Dahlgaard & Eklund(2003) p. 889; Zeng, Tian & Tam (2007) p. 250

⁸³ See Owen (ND), retrieved via Bansal & Bogner (2002) p. 282

implemented with the wrong intentions, the benefits will not occur or only to a limited extent.

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3.2 Complex purchasing in addition to the benefits of an ISO 9001 and ISO 14001 obligation to suppliers.

This research focuses on the advantages and disadvantages of having an ISO 9001 and ISO 14001 certified supplier. The advantages and disadvantages mentioned in the previous section accrue to the company which has obtained the ISO 9001 and/or ISO 14001 certificate. This chapter focuses on the advantages and disadvantages of the certified supplier for the purchasing company. In addition, this section examines the effects of ISO 9001 and ISO 14001 obligation on the entire supply chain. Here the effects of this obligation are considered when both direct supplier and secondary suppliers are required to possess ISO 9001 and ISO 14001 certification.

Quality management

In the past, buyers and suppliers conducted transactions with no external contact outside the negotiations. This is no longer the case today: there is an increased degree of supplier integration in customer processes.⁸⁵ Research by Corsten and Kumar (2005) and Nyaya, Whipple and Lynch (2010) has demonstrated that this level of supplier integration and cooperation with the supplier positively influences the company's performance.⁸⁶ The supply function is crucial for companies because suppliers determine the quality of the products.⁸⁷ The purchased products are often not of the desired quality, which can cause problems immediately or later in the production process.⁸⁸ Customers with healthy relationships with the supplier can remain aware of the quality they can expect from the supplier and reduce quality-related issues.

In line with the increasing supplier involvement, research by Hackman and Wageman (1995)⁸⁹ has demonstrated that organisations that implement a quality management system are more consistent in assessing customer preferences, entering into relationships with suppliers, investing more in training, and tackling problems faster. In addition, research by Lawler, Mohrman, and Ledford (1992)⁹⁰ has demonstrated that more than half of companies that have

⁸⁴ See Hua, Chin, Sun & Xu (2000) p. 1181-1121; Gotzamani, and Tsiotras (2002)

⁸⁵ See Das, Norasinha & Tallvic (2005) p. 563; Schiele (2001) p. 138; Danese (2013) p. 1029; Allal-Chérif (2011) p. 499

⁸⁶ See Corsten & Kumar (2005) p. 91; Nyaya, Whipple & Lynch (2010) p. 111

⁸⁷ See Savic, Djordjevic, Milosevic, Mihajlovic & Zickovic (2016) p.2; Lo & Yeung (2004) p. 263; Wen, Li & Wang (2007) p. 1891

⁸⁸ See Savic, Djordjevic, Milosevic, Mihajlovic & Zickovic (2016) p.2

⁸⁹ See Hackman & Wageman (1995) p. 315

⁹⁰ See Lawler, Mohrman, & Ledford (1992) retrieved via Hackman & Wageman (1995) p. 316

a quality management system work together with suppliers to improve quality. Research by Sashkin and Kisher (1993)⁹¹ has added that during such a collaboration, suppliers also help to implement a quality management system to further analyse and improve their own activities. Also, Dahlgaard-Park (2001)⁹² has indicated that building a relationship with a supplier is one of the core elements of a quality management system.

ISO 9001 and 14001 obligations for suppliers

Monczka, Trent, and Handfeld (1997)⁹³ have argued the purchasing manager is playing an increasingly important role. This manager delivers an important contribution to the quality of the products, the speed of the deliveries, the cost price of the products, and the flexibility of the company. Handfeld et al., (2002)⁹⁴ have more recently added that this is not the only development within the purchasing function. They have stated that managers and policymakers are increasingly recognising that purchasing can play an important role in the environmental field. One of the reasons why the environment is having an increasingly prominent role in the purchasing decisions is the introduction of ISO 14001. These researchers have also suggested that the complexity of the purchasing process will increase when suppliers must meet quality and environmental conditions. In line with this, many large and medium-sized companies have accordingly given guidelines to suppliers. Many of these guidelines are about quality or the environment. For example, well-known companies such as Xerox, Honda, Toyota, and Ford have an ISO 14001 obligation for its suppliers.⁹⁵ The same requirements apply to the ISO 9001, which is also often mandatory for a supplier.⁹⁶

ISO 9001 and ISO 14001 guidelines are often used as obligations on suppliers because they are internationally accepted and are well-known within the business world.⁹⁷ Since most suppliers have more than one important customer, it would be difficult for suppliers if each customer outlined different conditions. In addition, it would be difficult for the customer to find

⁹¹ See Sashkin and Kiser (1993) retrieved via Hackman & Wageman (1995) p. 316

⁹² Dahlgaard-Park (2011) P. 497; Dahlgaard-Park, Reyes & Cheng (2018) p. 1119

⁹³ Monczka, Trent & Handfeld indicated (1997) retrieved via Handfeld, Walton, Sroufe & Melnyk (2002) p. 70-71

⁹⁴ See Handfeld, Walton, Sroufe & Melnyk (2002) p. 71

⁹⁵ See Bansal & Bogner (2002) p. 275; Bakakri, Benett & Franchetti (2002) p. 750-751; Gutowski, Murphy, Allen, Bauer, Bras, Piwonka, Sheng, Sutherland, Thurston, Wolff (2005) p. 6; King, Lenox, Terlaak (2005) p. 1049; Darnall (2006) p. 376

⁹⁶ See Sampaio, Saraiva & Guimaraes Rodrigues, (2010) p. 42; ⁹⁶ See Poksinska, B., Jörn Dahlgaard, J., & Eklund, J. A. (2003) p. 492; Dos Reis & Neto (2012) p. 525

⁹⁷ See Skrabec and Ragu-Nathan (1997) retrieved via Briscoe, Fawcett & Todd (2005) p. 313

an individual system that applies to all companies, which would result in many individual audits.⁹⁸

ISO 9001 obligation for suppliers

Apart from the fact that the ISO guidelines are internationally accepted and known within the business community, research has demonstrated that mutual certifications such as ISO 9001 improve the competence and market position of both the supplier and the company.⁹⁹ In line with this, research by Savic et al. (2016)¹⁰⁰ have indicated that many companies choose their suppliers on the basis of quality management certifications such as ISO 9001. These ISO 9001 certifications has a positive impact on the quality of material and delivery reliability.¹⁰¹ In addition, Romano (2002)¹⁰² has added that ISO 9001 certified suppliers generally have more quality management procedures than companies without ISO 9001. In addition, this research indicated also that those quality management procedures are more well-known within the certified companies than at companies without ISO 9001. These quality management procedures also contribute to higher quality and increased delivery reliability.

Another supplier related advantage is that ISO 9001 certified companies maintain better and longer relationships with the main suppliers than companies without the ISO 9001 certification.¹⁰³ In addition, research by Simoens and Erlacher (2018)¹⁰⁴ has indicated that ISO 9001 certified companies maintain a better relationship with their buyers than companies without that certification. So, the ISO 9001 improves not only quality and delivery reliability but also the buyer-supplier relation.

⁹⁸ See Briscoe, Fawcett & Todd (2005) p. 313

⁹⁹ See Arauz & Suzuki (2014), retrieved via Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2

¹⁰⁰ See Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2

¹⁰¹ See Kafetzopoulos et al. (2015) p. 393; Gilbert & Sia (2001) p. 228-229; Brown, Van Der Wiele & Loughton, (1998) p 279; Tarí, Molina-Azorín & Heras Saizarbitoria (2012) p. 303; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2 Romano (2002) retrieved via Okay & Semiz (2010) p. 2922; Poksinska, B., Jörn Dahlgaard, J., & Eklund, J. A. (2003) p. 603; Koc (2017) p.211; Shih, Huarng & Lin (1996) p. 689; Sampaio, Saraiva & Guimaraes; Rodrigues, (2010) p. 1281; Sıtkı İlkay & Aslan (2012) p. 764; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Ai Chin, Hon Tat & Sulaiman (2015) p. 696

¹⁰² See Romano (2002) retrieved via Okay & Semiz (2010) p. 2922

¹⁰³ See Dowlats Shahi & Hooshangi (2010) p. 981

¹⁰⁴ See Simoens & Erlacher (2018) p. 87

ISO 14001 obligation for suppliers

There has been a general increase in companies' environmental awareness,¹⁰⁵ which results in purchasers integrating environmental issues into their purchasing decisions.¹⁰⁶ Due to this, Nawrocka, Brorson, and Lindqvist (2009)¹⁰⁷ have demonstrated that companies prefer ISO 14001 certified companies over companies that are not certified. The ISO 14001 is also frequently used to enable companies to qualify for a tender project. Companies that do not indicate interest in the environment are left out of consideration. Despite the fact that it was mentioned earlier that an ISO 14001 obligation will make the purchasing process more complex, companies with an ISO 14001 obligation for suppliers do not suffer any negative effects in terms of price, quality, or lead time.¹⁰⁸ In that respect, products do not differ if they were ordered from a company with or without ISO 14001 certification.

Research by Nawrocka et al., (2009)¹⁰⁹ has indicated the advantage of customers and suppliers having a closer relationship if they are both ISO 14001 certified. The ISO 14001 plays a facilitating role in both communication and knowledge sharing. This is because certified companies use a common language. That means that the companies share the same goals, use the same EMS, and want to improve both continuously.

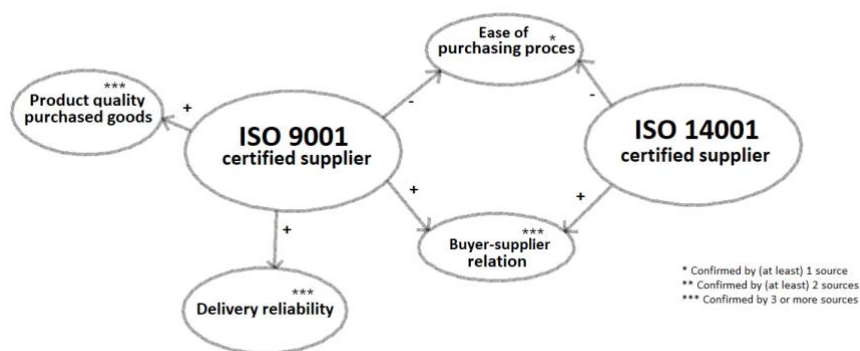
ISO 9001 and ISO 14001 obligations for suppliers as a framework

Figure 2. Relationships between the mandatory ISO 9001 and ISO 14001 for suppliers and their influence on the purchasing company.

¹⁰⁵ See Nawrocka, Brorson, Lindqvist (2009) p. 1435; Chen (2005) p.927

¹⁰⁶ See Handfeld, Walton, Sroufe & Melnyk (2002) p. 71

¹⁰⁷ See Nawrocka, Brorson, Lindqvist (2009) p. 1442

¹⁰⁸ See Handfeld, Walton, Sroufe & Melnyk (2002) p. 71

¹⁰⁹ See Nawrocka, Brorson, Lindqvist (2009) p. 1442

Figure 2 depicts the relationships of the mandatory ISO 9001 and ISO 14001 in the business processes of the customer. The legend notes that the asterisks indicate the extent to which the relationship is backed up by a source. The + and – signs indicate whether there is a negative or a positive relationship, and the direction of the arrow indicates the direction in which the relationship occurs. This framework can be found in greater detail in appendix VI.

Supply chain integration of ISO 9001 and 14001

Supply chain and supply chain management are increasingly important in business. Mentzer et al. (2001)¹¹⁰ have described supply chain as “a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer.” In addition to Mentzer et al. (2001), Chopra and Meindl (2010)¹¹¹ have added that a typical supply chain consists of five stages: component/raw suppliers, manufacturers, retailers, customers, and wholesalers/distributors. Supply chain management (SCM) is closely linked to the concept of the supply chain. Mentzer et al. (2001)¹¹² have described SCM “as the systemic, strategic coordination of the traditional business and the tactics of the long-term performance of the individual companies and the supply chain as a whole.” Basher (2010) has added that SCM focuses on delivering the right product to the right customer at the right quality in the right form at the right time in the right quantity.¹¹³ In short, the supply chain is only the chain where SCM focuses on controlling and adjusting that chain. As stated by Mentzer et al. (2010) and Basher (2010), SCM is an active function within the company that is performed by the supply chain manager. The tasks of the supply chain manager have changed due to developments within the supply chain. The supply chain manager previously only had to consider the price and competitive relationships, but there has been a shift to quality management and collaborations within the chain.¹¹⁴

In line with the upcoming importance of the supply chain and supply chain management research by Dellana and Kros¹¹⁵ has added that companies with an ISO 9001 certificate do more business with suppliers that are also ISO 9001 certified. In addition, these researchers have indicated that companies at the top of the supply chain are more often ISO 9001 certified than

¹¹⁰ See Mentzer, DeWitt, Keebler, Min, Nix, Smith & Zacharia (2001) p. 4

¹¹¹ See Chopra & Meindl (2010), retrieved via Ai Chin, Hon Tat & Sulaiman (2015) p. 696

¹¹² See Mentzer, DeWitt, Keebler, Min, Nix, Smith & Zacharia (2001) p. 18

¹¹³ See Basher (2010) retrieved via Chin, Tat & Sulaiman (2015) p. 696

¹¹⁴ See Flynn & Flynn (2005) p. 3421

¹¹⁵ See Dellana & Kros (2015) p. 311 - 312

companies that operate lower in the supply chain. One reason for this is that the end consumer is often less aware of the ISO 9001 certificates and what they stand for.

With regard to the ISO certification in the supply chain, research by Kushwaha and Barman (2010)¹¹⁶ has stated: “Traditional quality programs focusing on approaches such as TQM, and ISO 9001, must now transform into a supply chain perspective.” In addition, the researchers have stated that the integration of quality management can broaden the scope of supply chain management and lead to more collaborations within the chain. These partnerships result in a competitive advantage for the chain. This is in line with the findings of Facett, Ellram and Ogden (2006),¹¹⁷ which indicated that there is an increasing amount of business and supply chain competition. Thus, there is an increasing level of competition between supply chains, in which the supply chain with the right quality management implementation will have an advantage over the competing chains.

Research by Savic, Djordjevic, Milosevic, Mihajlovic, and Zickovic (2016)¹¹⁸ has indicated that certifications such as ISO 9001 are associated with supply chain efficiency. This efficiency can take the form of improvements of the material and cash flows in the manufacturing supply chain.¹¹⁹ Thus, when ISO 9001 is implemented in the supply chain, supply chain partners can experience positive consequences in material quality and cash flows, which can lead to competitive advantages above other supply chains or direct competitors.

3.3 Profit impact and supply risk as important factors for introducing a supplier obligation.

Presumably, not every supplier will be immediately forced by the purchasing company to achieve ISO 9001 and/or ISO 14001 certification. Whether a supplier will accept the obligation will depend on the sort of product that the purchaser buys from the supplier, on the extent to which the buyer is dependent on the supplier, and vice versa. To determine these type of products, Kraljic has developed the Kraljic matrix (Figure 3).¹²⁰

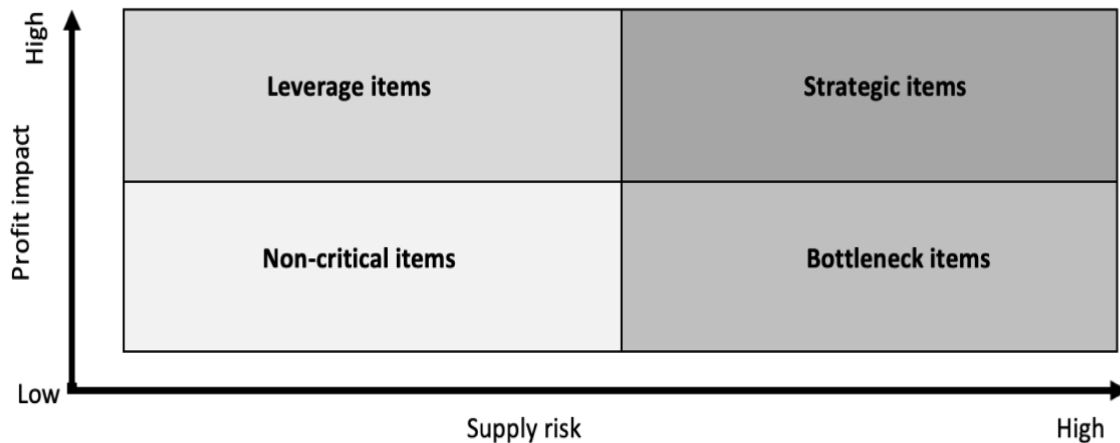
¹¹⁶ See Kushwaha & Barman (2010) p. 128

¹¹⁷ See Facett, Ellram & Ogden (2006) as retrieved via Kushwaha & Barman (2010) p. 128

¹¹⁸ See Savic, Djordjevic, Milosevic, Mihajlovic & Zickovic (2016) p. 2

¹¹⁹ See Lo, Yeung & Cheng (2009) retrieved via Savic, Djordjevic, Milosevic, Mihajlovic & Zickovic (2016) p. 2

¹²⁰ See Gelderman & Van Weele (2003) p.207-209



Note: Reprinted from Gelderman and Van Weele (2003)

Figure 3. The Kraljic matrix

The Kraljic matrix subdivides suppliers based on supply risk and profit impact.¹²¹ This profit impact can be determined on the basis of the purchased volumes, the percentage of the total purchase costs, and the added value of the purchased goods.¹²² The supplier's risk can be determined on the basis of the supply market. This can be done by assessing whether the supplier has a monopoly position, the speed of technological developments, the existence of access barriers, and the logistical costs and risks.¹²³

When classifying the goods to be purchased, the purchaser can also determine the degree of dominance between the supplier and buyer.¹²⁴ When items are purchased that are characterized by a high profit impact and a low delivery risk (leverage items), there is a buyer's dominance. Conversely, when items are purchased that are characterized by a low profit impact and a high delivery risk (bottleneck items), it can be assumed that the supplier has a dominant position in relation to the buyer. For non-critical and strategic items, the type of dominance depends on the level of the supply risk and the profit impact. This relationship can therefore be dominated by both the supplier and the buyer, but can also be in balance.¹²⁵

Each component of the matrix has a corresponding procurement strategy, which can be observed in table 1.¹²⁶

¹²¹ See Gelderman & Van Weele (2003) p. 207-209

¹²² See Hallikas (2003) p. 19-20

¹²³ See Hallikas (2003) p. 19-20

¹²⁴ See Gelderman (2003) p. 107

¹²⁵ See Gelderman & Van Weele (2003) p.207-209; Gelderman (2003) p. 107-108

¹²⁶ See Gelderman (2003) p. 135-137

| Item category | Strategic recommendation | Objective | Impact on dependence |
|--|--------------------------|--|---|
| Bottleneck | Volume insurance | Prevent shortage of critical supplies | Reduces the negative effects of resource critically, and dependence does not remove the sources for the high level of buyer's dependence |
| Non-critical | Efficient processing | Reduce cost of ordering and materials handling | Does not affect the low level of buyer's dependence |
| Leverage | Exploit purchasing power | Reduce direct purchasing cost | Increases the supplier's dependence |
| Strategic buyer's dominance | Exploit power | Increase overall supplier performance, incl. favourable pricing and reduced inventories | Increases the supplier's dependence |
| Strategic supplier's dominance | Diversify | Find material substitutes and/or new suppliers. Or prevent shortage of critical suppliers by accepting higher prices or longer-term obligations, for example | In case substitutions or new suppliers are found, the high level of buyers' dependence reduces In case there is the prevention of the shortage of critical suppliers, the level of high buyer's dependence does not change |
| Strategic balanced relationship | Balance | Develop long term supply relations | Increases the high levels of buyer and supplier's dependence |
| Note: Reprinted from Gelderman (2003) | | | |

Table 1. Procurement strategies belonging to the Kraljic matrix

Based on these strategies, it appears that purchasing power can be exploited in a number of cases. This purchasing power can be used through aggressive negotiating, for example.¹²⁷ In this negotiation, the buyer could require its supplier to have ISO 9001 or ISO 14001 certification. In line with this, research by Pulles, Veldman, Schiele, and Sierksma (2014)¹²⁸ has demonstrated that the use of coercive tactics has no negative effect on the supplier's resource allocation, which is beneficial for the purchaser. Nevertheless, if there are strategic items with supplier dominance, a bottleneck of suppliers, or a balanced relationship, it will be difficult to impose strict requirements. In a strategic balanced relationship, it is important to build a long-term relationship in which the buyer and seller depend on each other. As a result, it may not be desirable to impose a strict obligation, but it will be better to talk to the supplier about the

¹²⁷ See Gelderman & Van Weele (2002) p. 31; Arabzad, Ramzi & Mazaher (2011) p. 84

¹²⁸ See Pulles, Veldman, Schiele & Sierksma (2014) p. 30-31

benefits of an ISO 9001 and/or ISO 14001 obligation. Setting hard requirements will become completely difficult when buying strategic items from a dominating supplier or a bottleneck supplier¹²⁹. If the buyer still wants to make this requirement, they have to search for substitutes or extra suppliers.¹³⁰ This will shift the products from strategic items to leverage items¹³¹. If there are no substitutes or alternative suppliers, the purchaser must keep the supplier satisfied by setting lower requirements, for example.¹³² In such a case, the purchaser can refer to the added value of an ISO 9001 and/or ISO 14001 for both the purchaser and supplier, but cannot make ISO 9001 and/or ISO 14001 mandatory.

In line with the procurement strategies mentioned above, many large, dominating, companies have used their purchasing power by making an ISO 9001 and an ISO 14001 certificate mandatory to their suppliers. For example, major car manufacturers (Ford, General Motors, and Daimler-Chrysler) implemented the ISO 14001 obligation in 1999 and gave their suppliers until 2003 to finalise their implementation. In the time between this period, they reminded their suppliers that they had to meet the coming obligation. The car companies did the same thing with ISO 9001.¹³³ If suppliers could not become ISO certified in 2003, sanctions were imposed. For example, preferred suppliers of Ford that could not meet the ISO obligation were no longer designated as preferred suppliers and lost the benefits associated with this status.¹³⁴ Research by King and Lenox (2000)¹³⁵ and later by Delmas and Montes-Sancho (2007)¹³⁶ have indicated that actual sanctions are necessary to ensure that companies comply with those obligations.

When ISO 9001 and/or ISO 14001 are mandatory, it is for the purchasing firm also important that the supplier implemented these certificates in a correct manner. The employees and management of suppliers play important roles in this implementation of ISO 9001 and ISO 14001 certification. When a supplier intends to obtain an ISO certificate and maximise its use, it is important that both, the employees and management, fully cooperate.¹³⁷ Without the full

¹²⁹ See Gelderland (2003) p. 135-137

¹³⁰ See Gelderman & Van Weele (2002) p. 31; Gelderland (2003) p. 135-137

¹³¹ See Gelderman & Van Weele (2002) p. 31

¹³² See Gelderman (2003) p. 135-137

¹³³ See Whitmore & De Mink (2002) via Delmas & Montiel (2007) p. 9-10

¹³⁴ See Detwiler & Sedlak (2005) via Delmas & Montiel (2007) p. 9-10

¹³⁵ See King & Lenox (2000) p. 713

¹³⁶ See Delmas & Montes-Sancho (2007) p. 582

¹³⁷ See Beckford (2000) as retrieved by Pratama, Kumar, Kumari, Garza Reyes & Nadeem (2018) p. 2; Poksinka, Jörn Dahlgaard & Antoni (2002) p. 299; Mohammed (2000) p. 186; Psomas, Fotopoulos & Kafetzopoulos (2010) p.446

cooperation of, especially, the top management, there may be too much resistance to change for proper implementation.¹³⁸

The knowledge of the personnel is also of great importance during implementation. While personnel who must directly implement the system are important, it is also crucial that there are other personnel who can work with the system on an operational, tactical, and managerial level. For this reason, it may be necessary for employees to get extra studies to ensure this.¹³⁹

It is also important that the ISO 9001 or ISO 14001 certified supplier uses the ISO guidelines with the right intention. This because ISO 9001 and ISO 14001 certificates that are only obtained for marketing purposes do not lead to internal benefits for the certified company.¹⁴⁰ This means that a supplier that has only obtained the certificate for marketing purposes will not lead to increased quality or delivery reliability for the purchasing company.

Despite the fact that these points are of great importance for the implementation of the ISO 9001 and ISO 14001 certificates, an extra aspect comes into play in the supply chain integration of these certificates. Key aspects in the supply chain integration are the awareness of the function the company has in the supply chain and how much power that company can exert within the chain. The companies that are capable of determining the standards in the chain are known as “lead firms.”¹⁴¹ The power to set parameters in the supply chain is closely linked to the chain coordination exercised these the lead firm.¹⁴² In line with this research by Gereffi, Humphrey, and Sturgeon (2005)¹⁴³ has indicated that lead firms can impose requirements on suppliers in the supply chain. These lead firms can be both at the beginning or in the end of the value chain. In line with this, research by Gereffi (2001)¹⁴⁴ has stated:

Lead firms are not necessarily the traditional vertically integrated manufacturers, nor do they even need to be involved in making finished products. They can be located

¹³⁸ See Poksinka, Jörn Dahlgaard & Antoni (2002) p. 299; Prajogo, Huo and Han (2012)

¹³⁹ See Sousa-Poza, Altinkilinc & Searcy (2009) p. 223-226; Psomas, Fotopoulos & Kafetzopoulos (2010) p. 440; Zeng, Tam, Tam, Deng (2005) p. 650; Sambasivan and Fei (2008) p. 1427

¹⁴⁰ See Hua, Chin, Sun & Xu (2000) p. 1181-1121; Gotzamani, and Tsiotras (2002)

¹⁴¹ See Bitzer, Francken & Glasbergen (2008) p. 273

¹⁴² See Petkova (2006) p. 321-328

¹⁴³ See Gereffi, Humphrey & Sturgeon (2005) p. 84-88

¹⁴⁴ See Gereffi (2001) p. 1622

upstream or downstream from manufacturing (such as the fashion designers or private-label retailers in apparel), or they can be involved in the supply of critical components (such as microprocessor companies like Intel and software firms like Microsoft in the computer industry). What distinguishes lead firms from their followers or subordinates is that they control access to major resources (such as product design, new technologies, brand names, or consumer demand) that generate the most profitable returns in the industry.

Thus, a lead firm does not have a permanent place within the supply chain but distinguishes itself by having access to major resources that lead to the most profitable returns within the chain.

3.4 Summary of the literature study

The literature study shows that the ISO 9001 and the ISO 14001 have positive influences on the certified company. For example, the ISO 9001 certification has positive links with employee satisfaction¹⁴⁵, company image¹⁴⁶, production improvement¹⁴⁷, product quality¹⁴⁸ and delivery reliability¹⁴⁹ within the certified company. In addition, ISO 14001 has positive influences on compliance with legislation and regulations¹⁵⁰, the reduction of waste flows¹⁵¹, and on the company image¹⁵². On the other hand, there are also disadvantages for the company

¹⁴⁵ See Rusjan & Alič (2009) p. 763; Pan (2003) p. 570; Piskar (2007) p. 58; Casadesus, Giménez & Heras (2001) p. 330; Jang & Lin (2008) p. 211; Magd & Curry (2003) p. 252-253; Mondel & Rondinelli (2002) p. 159; Yin & Schmeidler (2009) p. 470; Krause (1996) p. 1564

¹⁴⁶ See Rusjan & Alič (2009) p. 763; Pan (2003) p. 570; Piskar (2007) p. 58; Casadesus, Giménez & Heras (2001) p. 330; Jang & Lin (2008) p. 211; Santos & Escanciano (2001) p. 331-340

¹⁴⁷ See Corbett, Montes-Sancho & Kirsch (2005) p. 1056; Hendricks and Singhal (1997), retrieved via Corbett, Montes-Sancho & Kirsch (2005) p. 1056

¹⁴⁸ See Kafetzopoulos et al. (2015) p. 393; Gilbert & Sia (2001) p. 228-229; Brown, Van Der; Wiele & Loughton, (1998) p. 279; Tarí, Molina-Azorín & Heras Saizarbitoria (2012) p. 303; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Romano (2002) retrieved via Okay & Semiz (2010) p. 2922

¹⁴⁹ See Poksinska, Jörn Dahlgaard, & Eklund (2003) p. 603; Koc (2017) p.211; Shih, Huarng & Lin (1996) p. 689; Sampaio, Saraiva & Guimaraes Rodrigues, (2010) p. 1281; Sıtkı İlkey & Aslan (2012) p. 764; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Ai Chin, Hon Tat & Sulaiman (2015) p. 696

¹⁵⁰ See Prakash & Potoski (2006) p. 351-352; Heras-Saizarbitoria, Arana Landín & Molina-Azorín (2011) p. 201; Gomez & Rodriguez (2011) p. 1092

¹⁵¹ See Prakash & Potoski (2006) p. 351-352; Heras-Saizarbitoria, Arana Landín & Molina-Azorín (2011) p. 201; Gomez & Rodriguez (2011) p. 1092; Zeng, Tam, Tam & Deng (2005)

¹⁵² See Bansal & Bogner (2002) p. 277; Sambasivan and Fei (2008) p. 1432

that wants to obtain an ISO certificate. These disadvantages occur in the start-up phase¹⁵³ to the certificate and consist of high costs,¹⁵⁴ large time investments¹⁵⁵, and a lot of documentation¹⁵⁶.

In addition to the benefits for the certified company itself, an ISO 9001 and ISO 14001 certified company has also positive influence on customers. Namely, ISO 9001 certified suppliers are positive related to higher quality products¹⁵⁷ and an increased delivery reliability¹⁵⁸. In addition, suppliers with an ISO 9001 as well as suppliers with an ISO 14001 are related to a better buyer-supplier relationship¹⁵⁹. However, when a purchaser makes an ISO 9001 and/or an ISO 14001 mandatory, it appears that the purchasing process will be more complicated because this purchaser must take these additional criteria into account when selecting suppliers.¹⁶⁰

Unfortunately for the buyer, not every supplier will be obliged to achieve ISO 9001 and ISO 14001. To determine whether an obligation can be implemented, the buyer can use the Kraljic matrix. In this matrix it is possible to classify goods to be purchased on the basis of the supply risk and profit impact.¹⁶¹ Subsequently, this purchaser can use the purchasing strategies associated with the Kraljic Matrix to determine whether it is wise to use his purchasing power or whether the introduction of such a hard obligation is not desirable.¹⁶² A company that wants to introduce an obligation within the supply chain first have to determine whether it is a lead firm within this chain, because only lead firms are able to set parameters for the whole supply chain¹⁶³. When a company is able to impose an ISO 9001 and/or ISO 14001 obligation, it is important that this certificate is correctly implemented at the supplier. This can be done by

¹⁵³ See Briscoe, Fawcett & Todd (2005) p. 314

¹⁵⁴ See Simmons and White (1999) retrieved via Briscoe, Fawcett & Todd (2005) p. 314; Berk & Berk (2000) as retrieved by Pratama, Kumar, Kumari, Garza Reyes & Nadeem (2018) p. 2

¹⁵⁵ See Simmons and White (1999) retrieved via Briscoe, Fawcett & Todd (2005) p. 314; Berk & Berk (2000) as retrieved by Pratama, Kumar, Kumari, Garza Reyes & Nadeem (2018) p. 2

¹⁵⁶ See Lee and Palmer (1999) retrieved via Briscoe, Fawcett & Todd (2005) p. 314

¹⁵⁷ See Kafetzopoulos et al. (2015) p. 393; Gilbert & Sia (2001) p. 228-229; Brown, Van Der Wiele & Loughton, (1998) p. 279; Tarí, Molina-Azorín & Heras Saizarbitoria (2012) p. 303; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Romano (2002) retrieved via Okay & Semiz (2010) p. 2922

¹⁵⁸ See Poksinska, Jörn Dahlgaard & Eklund (2003) p. 603; Koc (2017) p.211; Shih, Huarng & Lin (1996) p. 689; Sampaio, Saraiva & Guimaraes Rodrigues, (2010) p. 1281; Sıtkı İlkey & Aslan (2012) p. 764; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Ai Chin, Hon Tat & Sulaiman (2015) p. 696

¹⁵⁹ See Dowlatshahi & Hooshangi (2010) p. 981; Dellana & Kros (2015) p. 312; Simoens & Erlacher (2018) p. 87; Nawrocka, Brorson, Lindhqvist (2009) p. 1442

¹⁶⁰ See Handfeld, Walton, Sroufe & Melnyk (2002) p. 71

¹⁶¹ See Gelderman & Van Weele (2003) p.207-209; Gelderman (2003) p. 107-108; Gelderman (2003) p. 135-137

¹⁶² See Gelderman (2003) p. 135-137

¹⁶³ See Gereffi (2001) p. 1622

actively involvement of management and staff, investments in training, and using the certificates to improve internal processes.¹⁶⁴

4. Benchmark

As indicated earlier, this benchmark study was designed by approaching respondents who emerged according to the search keywords (appendix IV). This yielded a list of 23 possible respondents, all of whom were approached. However, government institutions were more willing than private companies to cooperate in this benchmark research. For this reason, it is decided to work with a maximum of two government institutions. This maximum has been set to prevent the results from the benchmark from being influenced by a predominant degree of respondents working for a government institution. In addition to the two people working for governmental organizations, the other people are employed by service companies (two respondents), production companies (two respondents) and a trading company (one respondent).

It is important to note that all interviews were conducted in Dutch. After which the interviews were transcribed verbatim. Due to this all quotes are translated from Dutch and incorporated in the text as correctly as possible but also legibly as possible. All relevant and clear quotes have been combined in a table, this table is too large to be included in this chapter and is therefore included in appendix VII.

4.1 No adverse consequences for purchasers when obliging ISO 9001 and/or ISO 14001 to suppliers.

It is important for purchasing managers that work for a company that wants to introduce an ISO 9001 and/or ISO 14001 obligation for suppliers, to be aware of how that obligation will affect the purchasing activities. However, five respondents indicated that making an ISO 9001 and ISO 14001 mandatory for their suppliers had little or no influence on their purchasing process. One of the respondents stated, “It does not make the purchasing process more difficult, because suppliers that do not have such a certificate are not eligible. So, you automatically have a supplier selection.” The respondent went on to say,

¹⁶⁴ See Beckford (2000) as retrieved by Pratama, Kumar, Kumari, Garza Reyes & Nadeem (2018) p. 2; Poksinka, Jörn Dahlgaard & Antoni (2002) p. 299; Mohammed (2000) p. 186; Psomas, Fotopoulos & Kafetzopoulos (2010) p.446; Poksinka, Jörn Dahlgaard & Antoni (2002) p. 299; Prajogo, Huo and Han (2012); Sousa-Poza, Altinkilinc & Searcy (2009) p. 223-226; Psomas, Fotopoulos & Kafetzopoulos (2010) p. 440; Zeng, Tam, Tam, Deng (2005) p. 650; Sambasivan and Fei (2008) p. 1427; Hua, Chin, Sun & Xu (2000) p. 1181-1121; Gotzamani, and Tsiotras (2002)

Before we select a supplier, we check their website. Most suppliers have linked their ISO 9001 and ISO 14001 certificates to the website. If this is not the case, we will call the potential supplier to ask if he is ISO 9001 and ISO 14001 certified. However, almost all suppliers and potential suppliers are ISO 9001 and ISO 14001 certified, because nowadays an ISO 9001 and ISO 14001 certificate is a kind of standard.

Similarly, another respondent stated,

When I am abroad, for example in Poland, I see that firms are very proud of their ISO 9001 and ISO 14001 certificate. All their certificates are hanging in the directors' room. This is something we do not have at our own office, just because the ISO 9001 and ISO 14001 certificates are almost standard in the Netherlands.

These findings contradict the findings by Handfeld et al., (2002) that the purchasing process is often more complicated after an ISO 9001 and ISO 14001 obligation. A possible explanation for this can be found in the increase of the ISO 9001 and ISO 14001 certificates. In 2002, the year of research by Handfeld et al., there was a total of 561,766 certified companies.¹⁶⁵ In 2017, this number more than doubled to 1,056,855.¹⁶⁶ For the ISO 14001, this increase was even greater: in 2002, 49,440 companies were ISO 14001 certified; this figure rose to 358,953 in 2017.¹⁶⁷ Hence, The findings of Handfeld et al., (2002) on the mandatory application of these certificates may no longer be relevant because many companies now have access to ISO 9001 or ISO 14001 certificates.

It is also important for the purchasing manager that the ISO 9001 and the ISO 14001 obligations do not influence the price charged by the supplier. It appears from the interviews that suppliers do not charge a higher price when an ISO 9001 and/or ISO 14001 is required. Five respondents indicate that due to the high degree of ISO 9001 and ISO 14001 certifications, it is no longer possible to compete on price. One of the respondents describes this as follows: "When every supplier has ISO 9001 and ISO 14001, one individual supplier cannot ask for a higher price because of they have the ISO 9001 and 14001 certificates." Similarly, one of the

¹⁶⁵ See International Organization for Standardization (2018) (ISO 9001-Data per country and sector)

¹⁶⁶ See International Organization for Standardization (2018) (ISO 9001-Data per country and sector)

¹⁶⁷ See International Organization for Standardization (2018) (ISO 14001-Data per country and sector)

other respondents stated, “The suppliers know that when an ISO 9001 and ISO 14001 is mandatory, every competing supplier will also have this certificate. That is why they still want to compete on price and quality.” Another respondent who has achieved the ISO 14001 certificate also stated that their own price did not rise after certification. These findings are in line with those of Handfeld et al., (2002) on the ISO 14001.¹⁶⁸

Although ISO 9001 and 14001 have no influence on the complexity of the purchasing process and the requested price, they do influence the buyer-supplier relationship. One of the respondents clearly stated that it was better to have contact with certified suppliers than with suppliers which do not have an ISO 9001 and ISO 14001 certificate. In line with this, another respondent indicated also that the ISO 9001 and ISO 14001 obligations entail an advantage in the relationship with the supplier: “You speak the same compliance language.” This is also confirmed by another respondent: “Sometimes it can just improve communication.” However, one of the respondents also stated that this depends on the extent to which the supplier acted according to the ISO 9001 and ISO 14001. These findings are in line with the findings of Nawrocka, Brorson, and Lindqvist (2009), Simoens & Erlacher (2018), Dellana & Kros (2015) and Dowlatshahi & Hooshangi (2010).¹⁶⁹

4.2 A rigid but reliable delivery by ISO 9001 certified companies

A central concept in this research is delivery reliability. In line with the research of Poksinska et al. (2003), Koc (2017), Shih et al. (1996), Sampaio et al. (2010), Ai Chin et al (2015), Savic et al. (2016), and Sitki İlkay et al. (2012),¹⁷⁰ four of the respondents indicated that the ISO 9001 was positively related to the delivery reliability of the certified company. However, one of the respondents indicated that working according to the ISO 9001 results in less flexibility. He stated that a company that works according to the ISO 9001 must have job separation. When, in case of an ISO 9001 certified supplier, the purchasing company makes a last-minute order, it is sometimes difficult for the supplier to comply with this. This because, due to the ISO 9001 certification, all processes within the supplier are divided into different functions. This is not necessary at a supplier without ISO 9001, which can more easily meet the

¹⁶⁸ See Handfeld, Walton, Sroufe & Melnyk (2002) p. 71

¹⁶⁹ See Nawrocka, Brorson, Lindqvist (2009) p. 1442; Dowlatshahi & Hooshangi (2010) p. 981; Dellana & Kros (2015) p. 312; Simoens & Erlacher (2018) p. 87

¹⁷⁰ See Poksinska, B., Jörn Dahlgaard, J., & Eklund, J. A. (2003) p. 603; Koc (2017) p.211; Shih, Huarng & Lin (1996) p. 689; Sampaio, Saraiva & Guimaraes Rodrigues, (2010) p. 1281; Sitki İlkay & Aslan (2012) p. 764; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Ai Chin, Hon Tat & Sulaiman (2015) p. 696

last-minute wishes of the customer. However, the respondent did state that deliveries are normally smoother because of this separation of duties and processes, and that there is only a disadvantage in the case of a last-minute order.

One of the respondents indicated that ISO 9001 affects the delivery reliability as long as that the influence is internal to the organization. He stated that when external influences such as extreme weather occur, an ISO 9001 will no longer influence the delivery reliability of the supplier. Another respondent indicated that an ISO 9001 is positively related to the delivery reliability but noted that this depends on the extent to which the business processes within the supplier are known to the employees of this supplier. Similarly, one of the other respondents indicated that delivery reliability is not immediately improved when a supplier achieves an ISO 9001, although the ISO 9001 does help in the longer term:

The operational person responsible for the delivery tries to achieve this delivery within the agreed time, but mostly without the help of ISO 9001. This because he is often not aware of the processes as they should be according to ISO 9001. However, if the products are delivered multiple times too late, management will be informed of this. This because, according to ISO 9001, all data related to customer satisfaction have to be monitored. When senior management encounters a declining delivery reliability, actions will be taken. For this reason, results are not immediately visible, but after several wrong deliveries, action will be taken to increase delivery reliability.

All respondents indicated that the ISO 14001 had no influence on delivery reliability. So, delivery reliability does not increase or decrease regardless of the existence of a mandatory ISO 14001 obligation.

4.3 Improved quality by ISO 9001 certified suppliers

Product quality is also a main aspect of this research. As indicated by Kafetzopoulos et al., (2015), Gilbert and Sia (2001), Brown et al., (1998), Tarí et al. (2012), Ai Chin et al., (2015), Savic et al., (2016), and Romano (2002),¹⁷¹ five respondents also indicated that the ISO 9001 is positively related to quality. However, three of respondents added that this depends on how

¹⁷¹ See Kafetzopoulos et al. (2015) p. 393; Gilbert & Sia (2001) p. 228-229; Brown, Van Der Wiele & Loughton, (1998) p 279; Tarí, Molina-Azorín & Heras Saizarbitoria (2012) p. 303; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Romano (2002) retrieved via Okay & Semiz (2010) p. 2922

the ISO 9001 has been translated into the company. In line with this, one respondent added that it is better for the purchasing manager to deal with suppliers which have been ISO 9001 certified for a long time, because the processes are then better grounded in the company:

ISO requires something from the total organization. Suppliers cannot implement the ISO 9001 in half a year. For this reason, we do not work with suppliers who have recently implemented ISO 9001. We usually enter into long-term relationships of at least 4 years. During this period we do not want any start-up problems in the supplier's quality management system.

Another respondent also stated that he did not like to work with suppliers who narrowly achieved ISO 9001 after a long and difficult process. He indicated that the processes within such suppliers are probably limited, as a result of which the ISO 9001 certificate may have been achieved but probably have less impact in practice. In line with this, this respondent indicated that positive influences on quality only result when the internal processes are properly ensured by the ISO 9001 certification.

One of the respondents indicated that working with ISO 9001 certified suppliers ensures that employees do not have to check the quality of these supplier on an ongoing basis. In line with this another respondent stated,

If the quality system of the supplier is properly implemented, this can save us a lot of work with regard to the inspection of this supplier. For example, we perform fewer entry controls at suppliers with a well-guaranteed quality system.

A third respondent also stated,

There are less quality checks at certified suppliers. Nevertheless, quality problems can also occur with ISO 9001 certified companies. When this happens, we request the ISO 9001 quality plan and a plan of action with regard to improvements. In this case, the quality plan is one of the advantages when you work with ISO 9001 certified suppliers. All ISO 9001 certified suppliers will have this at their disposal.

In line with the delivery reliability, the ISO 14001 has, according to the respondents, no influence on product quality.

4.4 Incorrect implementation as a counteracting factor of the ISO obligation

As mentioned in paragraph 6.3, three respondents indicated that the success of the ISO 9001 and ISO 14001 mandates is often accompanied by the company acting in accordance with the certificate. Another respondent stated, “If you do not use it, the result can be the same as if you do not have it.” This is fully in line with the research of Hua, Chin, Sun, and Xu (2000),¹⁷² which has indicated that an ISO certificate that is only obtained for marketing purposes will not lead to other improvements. One of the respondents indicated that he can usually identify these companies by the way they indicate their certification: “When I visit a trade show, I often see Greek or Indian companies. Although these companies often produce relatively simple products, they have gigantic billboards which states ‘ISO 9001 certified!’” He indicated that this outward show of satisfaction tends to occur when the certification is aimed more at marketing instead of as a substantive standard.

Not every respondent considered ISO 9001 and ISO 14001 obligations to be feasible.

We work a lot with freelancers, which is common in our sector. Of course, these freelancers do not have ISO 9001 and ISO 14001, that would be impossible for them. During the day-to-day work these freelancers are simply treated as our own staff, where expect the same quality as from our own staff. In addition to this, due to economic developments, our products to be purchased are becoming scarcer. Partly because we often have to act quickly when products are available, we cannot apply strict purchasing conditions. This also has to do with the fact that we are a small player in a big chain, which means that suppliers will not be in trouble if we buy our products somewhere else.

The respondent stated that these cases occur almost exclusively in the cyclical market in which his company operate. In addition, it is not possible for them to work with regular customers, and every project is unique. This means that virtually no goods can be purchased in stock, and suppliers are selected depending on the project. When the quotation mentioned above is traced to the Kraljic matrix, it can be seen that this respondent purchases mainly strategic

¹⁷² See Hua, Chin, Sun & Xu (2000) p. 1181-1121

items and bottleneck items¹⁷³. In line with the associated procurement strategies, it is difficult to impose an ISO 9001 and/or ISO 14001 obligation on suppliers of strategic items with supplier's dominance and on suppliers of bottleneck items. This is fully in line with the statements made by the respondent¹⁷⁴.

4.5 Influence of the benchmark on the theoretical framework

After comparing the theory to the benchmark, it appears that the introduction of an ISO 9001 and ISO 14001 obligation will not have a negative impact on the purchasing process. The previously established theoretical framework has therefore been adjusted and is shown below in Figure 4.

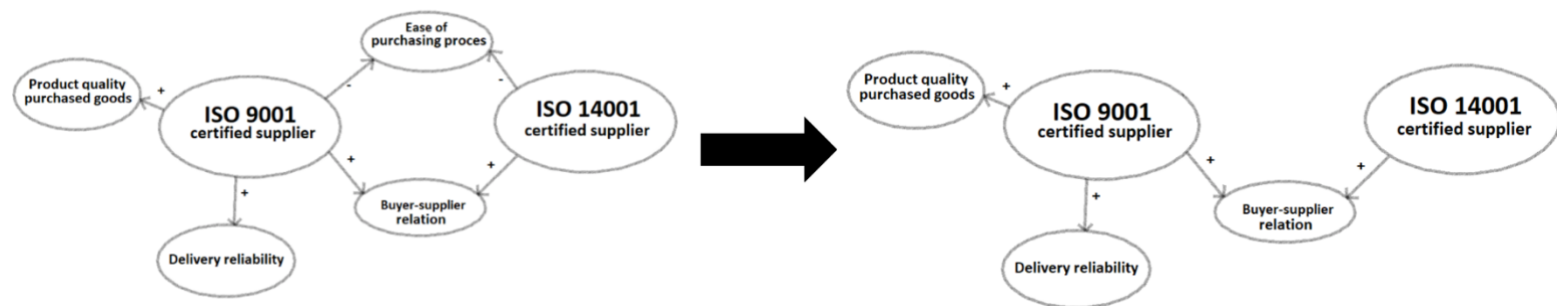


Figure 4. Change in the framework due to results of the benchmark

The framework on the left side of the arrow is the framework that has been drawn up on the basis of the literature study. This framework has been adjusted based on the benchmark, this adjusted framework is shown on the other side of the arrow. The + and – signs indicate whether there is a negative or a positive relationship, and the direction of the arrow indicates the direction in which the relationship occurs.

As can be seen, the framework has only been changed in one place because the positive influences on product quality, delivery reliability and buyer-supplier relationships have been confirmed in the benchmark.

¹⁷³ See Gelderman & Van Weele (2002) p. 31

¹⁷⁴ See Gelderland (2003) p. 135-137

5. An ISO 9001 obligation for suppliers as recommendation for Ovimex

Based on the collected data in the literature study as well the benchmark, it can be seen that ISO 9001 certified suppliers will be beneficial for the purchasing company. It appears from both the literature and the benchmark that suppliers with an ISO 9001 have an increased delivery reliability¹⁷⁵ and deliver better products¹⁷⁶. In addition, the ISO 9001, even as the ISO 14001, has also positive influence on the buyer-supplier relation.¹⁷⁷ This is also the only advantage found at an ISO 14001 obligation for suppliers. This ISO 14001 has in particular added value for the supplier and for the environment, for example through reduced emissions and reduced waste.

Because the ISO 9001 obligation to suppliers has a positive influence on product quality and delivery reliability, it is advised to make this certificate mandatory to suppliers. Conversely, it is not recommended to make ISO 14001 mandatory. Suppliers with an ISO 14001 are related to an improved buyer-supplier relationship but are not related to improved product quality and higher delivery reliability, while these are important factors for Ovimex.

As stated above it will be advisable for Ovimex to include an ISO 9001 as a requirement in the purchasing conditions. However, as stated in chapter 3.3, it can be difficult to oblige every supplier to have an ISO 9001 and ISO 14001. This also applies to Ovimex as it has the main supplier, Hewlett Packard (HP), in the strategic segment.¹⁷⁸ For Ovimex, HP is the most important supplier since all printing machines within Ovimex are supplied by HP. These HP printing machines can only use original ink types that must also be supplied by HP. When looking at HP's market position, it can be seen that HP is a large company with a leading position in the market. In this market, it is difficult for other companies to join because a great deal of knowledge is required as technological developments take place quickly. In short, with suppliers like HP, Ovimex will not be able to impose a strict requirement with regard to an ISO

¹⁷⁵ See Poksinska, B., Jörn Dahlgaard, J., & Eklund, J. A. (2003) p. 603; Koc (2017) p.211; Shih, Huarng & Lin (1996) p. 689; Sampaio, Saraiva & Guimaraes Rodrigues, (2010) p. 1281; Sitki İlkay & Aslan (2012) p. 764; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Ai Chin, Hon Tat & Sulaiman (2015) p. 696

¹⁷⁶ See Kafetzopoulos et al. (2015) p. 393; Gilbert & Sia (2001) p. 228-229; Brown, Van Der Wiele & Loughton, (1998) p 279; Tarí, Molina-Azorín & Heras Saizarbitoria (2012) p. 303; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Romano (2002) retrieved via Okay & Semiz (2010) p. 2922

¹⁷⁷ See Dowlatshahi & Hooshangi (2010) p. 981; Dellana & Kros (2015) p. 312; Simoens & Erlacher (2018) p. 87; Nawrocka, Brorson, Lindqvist (2009) p. 1442

¹⁷⁸ See Gelderman & Van Weele (2002) p. 31

9001 and/or ISO 14001 obligation. Although this appears to be unnecessary at HP, since HP already has an ISO 9001 and ISO 14001.

If Ovimex wants to do business with other dominant strategic suppliers, it is advisable to add ISO 9001 to the selection criteria. This is advised because it appears that a strict ISO 9001 obligation is not desirable with dominant strategic suppliers. By including an ISO 9001 selection criteria, Ovimex can still ensure that these suppliers are certified.

The other suppliers of Ovimex are mainly leverage suppliers¹⁷⁹, such as transport companies and paper suppliers. Ovimex has a fairly wide selection here, but the purchased goods and services are of great importance for Ovimex. When, for example, the paper supply stops, it will not be possible to produce, as a result of which the customer cannot be served. With these leverage suppliers, the purchaser can make full use of his purchasing power and, by negotiating hard, require an ISO 9001 and/or ISO 14001 obligation.¹⁸⁰

When Ovimex complies with the advice to make ISO 9001 mandatory for suppliers, it is important that these suppliers implement their ISO 9001 in a correct manner. Both the literature and the benchmark indicate that correct implementation has a major impact on the results of the ISO 9001 certificate. It is therefore advisable for Ovimex to enter into discussions with suppliers who do not yet have ISO 9001. By entering into a discussion with the supplier, it can be prevented that the supplier achieves ISO 9001 only because it is made mandatory. If the supplier achieves ISO 9001 only because it is mandatory, the certificate will have no added value for the supplier and no added value for the buyer.¹⁸¹ It appears that only ISO 9001 certificates aimed at improving the internal processes will actually bring positive effects like improved product quality and higher delivery reliability¹⁸².

When the supplier implements the certificate to improve the internal processes, it is important that both management and staff are fully committed to working according to the ISO 9001 guidelines. Management has an extra important role in this, because without dedication of the management there will be less support among the employees to work according to the

¹⁷⁹ See Gelderman & Van Weele (2002) p. 31

¹⁸⁰ See Gelderman (2003) p. 135-137

¹⁸¹ See Hua, Chin, Sun & Xu (2002) p. 1181; Gotzamani & Tsiotras (2002)

¹⁸² See Poksinska, B., Jörn Dahlgaard, J., & Eklund, J. A. (2003) p. 603; Koc (2017) p.211; Shih, Huarng & Lin (1996) p. 689; Sampaio, Saraiva & Guimaraes Rodrigues, (2010) p. 1281; Sıtkı İlkay & Aslan (2012) p. 764; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Ai Chin, Hon Tat & Sulaiman (2015) p. 696; Kafetzopoulos et al. (2015) p. 393; Gilbert & Sia (2001) p. 228-229; Brown, Van Der Wiele & Loughton, (1998) p 279; Tarı, Molina-Azorín & Heras Saizarbitoria (2012) p. 303; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Romano (2002) retrieved via Okay & Semiz (2010) p. 2922

procedures of the ISO 9001 certificate.¹⁸³ In addition to this, management must also be prepared to invest in its staff. This will be necessary if it appears that employees have no knowledge or insufficient knowledge to be able to follow the ISO 9001 guidelines in the correct manner.¹⁸⁴

6. Concluding remarks

6.1 Conclusion

Multiple sub-research questions are used in this study. These sub-research questions are answered below. The ultimate conclusion can be found under these sub-research questions.

1. What is the essence of ISO 9001 and 14001, and how do they contribute to better business operations?

The ISO 9001 is a quality management system that focuses on the continuous improvement of business processes. The implementation of an ISO 9001 has positive influences on the business operations of a company. ISO 9001 has a positive influence on delivery reliability¹⁸⁵, product quality¹⁸⁶, image¹⁸⁷, employee satisfaction¹⁸⁸, and production, resulting a positive influence on the company's financial results¹⁸⁹.

In contrast to the ISO 9001, the ISO 14001 is focused on the environment instead of on quality. The ISO 14001 is therefore also known as an environmental management system and is aimed at making business processes more environmentally friendly through continuous improvement. The ISO 14001 has positive influences on company image, working according

¹⁸³ See Poksinka Dahlgaard & Antoni (2002) p. 299; Prajogo, Huo & Han (2012)

¹⁸⁴ See Souza-Poza, Altinkilinc & Searcy (2009) p. 223-226; Psomas, Footopoulos & Kafetzopoulos (2010) p. 440; Zeng, Tam, Tam, Deng (2005) p. 650; Sambasivan & Fei (2008) p. 1427

¹⁸⁵ See Poksinska, Jörn Dahlgaard, & Eklund (2003) p. 603; Koc (2017) p.211; Shih, Huarng & Lin (1996) p. 689; Sampaio, Saraiva & Guimaraes Rodrigues, (2010) p. 1281; Sıtkı İlkey & Aslan (2012) p. 764; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Ai Chin, Hon Tat & Sulaiman (2015) p. 696

¹⁸⁶ See Kafetzopoulos et al. (2015) p. 393; Gilbert & Sia (2001) p. 228-229; Brown, Van Der; Wiele & Loughton, (1998) p 279; Tarí, Molina-Azorín & Heras Saizarbitoria (2012) p. 303; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Romano (2002) retrieved via Okay & Semiz (2010) p. 2922

¹⁸⁷ See Rusjan & Alič (2009) p. 763; Pan (2003) p. 570; Piskar (2007) p. 58; Casadesus, Giménez & Heras (2001) p 330; Jang & Lin (2008) p. 211; Santos & Escanciano (2001) p. 331-340

¹⁸⁸ See Rusjan & Alič (2009) p. 763; Pan (2003) p. 570; Piskar (2007) p. 58; Casadesus, Giménez & Heras (2001) p. 330; Jang & Lin (2008) p. 211; Magd & Curry (2003) p. 252-253; Mondel & Rondinelli (2002) p. 159; Yin & Schmeidler (2009) p. 470; Krause (1996) p. 1564

¹⁸⁹ See Corbett, Montes-Sancho & Kirsch (2005) p. 1056; Hendricks and Singhal (1997), retrieved via Corbett, Montes-Sancho & Kirsch (2005) p. 1056

to environmental regulations¹⁹⁰ and on reducing emissions and waste¹⁹¹, what results in financial benefits¹⁹².

There are also a number of disadvantages to obtaining the certificates. The implementation of the certificates costs significant amounts of time and money. In addition, if a certificate is only obtained for marketing purposes, it will not have any further positive effects on business operations. In short, ISO 9001 and ISO 14001 certification offers advantages if they are implemented correctly.

2. What are the complications and advantages for a company that makes ISO 9001 and 14001 certification mandatory for their suppliers?

The literature has demonstrated that creating ISO 9001 and ISO 14001 obligations for suppliers have both advantages and disadvantages. For example, an ISO 9001 obligation has a positive influence on delivery reliability¹⁹³ and product quality¹⁹⁴. In addition, both ISO 9001 and ISO 14001 have positive influences on the buyer-supplier relationship¹⁹⁵. This is because both supplier and buyer will be able to communicate more easily and because ISO 9001 certified suppliers attach more value to the relationship with the customer than uncertified suppliers. The buyer-supplier relationship is also the only advantage with the ISO 14001 obligation.

In contrast to the advantages mentioned above, it appears that a supplier obligation complicates the purchasing process. This is because the purchaser must take this extra criteria (ISO 9001 and/or ISO 14001) into account when selecting suppliers¹⁹⁶.

Respondents from the benchmark indicated that an ISO 9001 obligation has a positive influence on product quality and delivery reliability, which is in line with the literature. They

¹⁹⁰ See Prakash & Potoski (2006) p. 351-352; Heras-Saizarbitoria, Arana Landín & Molina-Azorín (2011) p. 201; Gomez & Rodriguez (2011) p. 1092

¹⁹¹ See Prakash & Potoski (2006) p. 351-352; Heras-Saizarbitoria, Arana Landín & Molina-Azorín (2011) p. 201; Gomez & Rodriguez (2011) p. 1092; Zeng, Tam, Tam & Deng (2005)

¹⁹² See Hanfeld, Walton, Sroufe & Melnyck (2002) p. 71

¹⁹³ See Poksinska, Jörn Dahlgaard & Eklund (2003) p. 603; Koc (2017) p.211; Shih, Huarng & Lin (1996) p. 689; Sampaio, Saraiva & Guimaraes Rodrigues, (2010) p. 1281; Sıtkı İlkay & Aslan (2012) p. 764; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Ai Chin, Hon Tat & Sulaiman (2015) p. 696

¹⁹⁴ See Kafetzopoulos et al. (2015) p. 393; Gilbert & Sia (2001) p. 228-229; Brown, Van Der Wiele & Loughton, (1998) p 279; Tarí, Molina-Azorín & Heras Saizarbitoria (2012) p. 303; Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2; Romano (2002) retrieved via Okay & Semiz (2010) p. 2922

¹⁹⁵ See Dowlatshahi & Hooshangi (2010) p. 981; Dellana & Kros (2015) p. 312; Simoens & Erlacher (2018) p. 87; Nawrocka, Brorson, Lindhqvist (2009) p. 1442

¹⁹⁶ See Handfeld, Walton, Sroufe & Melnyk (2002)

also recognized that a supplier with ISO 9001 and ISO 14001 certification contributes to a better buyer-supplier relationship. However, they indicated that the ISO 9001 and/or ISO 14001 obligation to suppliers did not make the purchasing process more difficult. They noted that an enormous number of companies are ISO 9001 and/or ISO 14001 certified, which means that certified suppliers are always available.

3. Which factors are necessary to successfully implement an ISO 9001 and/or ISO 14001 obligation to suppliers?

As described in section 3.3, the purchaser can use the Kraljic Matrix and associated strategies to determine whether it is wise to impose an obligation on the supplier. The strategies include the use of purchasing power by the buyer in a way that depends on the product to be purchased. If this purchasing power can be used, the buyer can oblige suppliers to obtain ISO 9001 or ISO 14001 certification. When the buyer sets this requirement, it is very important that the supplier implements the ISO 9001 and/or ISO 14001 with the right intention. This correct intention is characterized by an implementation that is only aimed at improving internal processes within the company. In addition, it is also important that management and staff are actively involved in the implementation and that the company is prepared to invest in staff training.

4. Should Ovimex implement ISO 9001 and ISO 14001 requirements for their suppliers and how can they implement a possible ISO 9001 and ISO 14001 requirement in the future?

The Kraljic matrix, its associated strategies, and the profile of the suppliers of Ovimex indicate that it is not feasible to impose strict certification requirements on all suppliers. However, Ovimex can impose such an obligation on the majority of suppliers because much use is made of leverage suppliers. Since the results from both, the benchmark and the literature study, have demonstrated that ISO 9001 certification for suppliers has positive effects on delivery reliability, product quality, and the buyer-supplier relationship, making ISO 9001 certification mandatory for suppliers would be highly beneficial. It is therefore advised, if possible, to make an ISO 9001 mandatory for suppliers.

In contrast to the ISO 9001, a mandatory ISO 14001 appears to have fewer benefits. Working with an ISO 14001 certified supplier only has the advantage that this supplier maintains a better relationship with the buying firm. A supplier with an ISO 14001 certificate does not appear to

have a positive influence on delivery reliability or product quality, while these are important criteria for Ovimex. For these reasons, it is recommended that Ovimex only make ISO 9001 mandatory to its suppliers.

The answers to the detailed sub-questions lead to the following answer to the main question of “*Would requiring ISO 9001 and 14001 certification for suppliers add value for Ovimex, and how can that be implemented?*”:

Mandating ISO 9001 would have positive effects for Ovimex in terms of delivery reliability, product quality, and the buyer-supplier relationship. The ISO 14001 has less added value and would only contribute to an improved buyer-supplier relationship.

Before the purchaser decides to make ISO 9001 and/or ISO 14001 mandatory, the purchaser must first examine the type of product that the supplier supplies and the power relationships between the supplier and the purchaser. The purchaser may wish to consult the Kraljic matrix and its associated strategies. When it appears that the purchasing power can be used, the purchaser can implement ISO 9001 or ISO 14001 obligations. When introducing these obligations, it is very important for the supplier to correctly implement the certifications by intending to improve internal business processes, ensuring that the management and staff are dedicated, and making sure that there is the willingness to invest when necessary.

6.2 Managerial and theoretical implications

This study gives a number of interesting results for purchasers who are considering implementing an ISO 9001 and/or ISO 14001 obligation. The managerial implications that are particularly important for Ovimex are shown in chapter 5.

It appears that working with ISO 9001 certified suppliers has a positive influence on product quality and delivery reliability. In addition, it appears that both suppliers with an ISO 9001 and suppliers with an ISO 14001 often maintain a better buyer-supplier relationship. From this it can be seen that an ISO 9001 supplier obligation in particular yields benefits for the purchasing company. It is therefore, if possible, advisable for the purchasing manager to impose an ISO 9001 obligation on the supplier. To see whether it is possible to impose this obligation, use can be made of the Kraljic matrix and the corresponding purchasing strategies. This shows that in a number of cases the purchasing power can be used whereby an ISO can be made mandatory. It can be seen that when leverage suppliers or strategic suppliers with buyer's dominance are used, it is advised to use the purchasing power. This purchasing power can be

used by negotiating aggressively. During these negotiations it will be possible for the purchaser to make an ISO 9001 mandatory to the supplier.

Not every buyer can make an ISO 9001 or an ISO 14001 mandatory for his entire supply chain. If this buyer wants to implement the obligation throughout the entire chain, this buyer will first have to look critically at his own company. This is necessary because only a so-called lead firm can implement an obligation in the chain¹⁹⁷. A lead firm distinguishes itself by having access to major researches that lead to the most profitable returns in the chain¹⁹⁸. This lead firm has no fixed place in the chain. When the lead firm chooses to set an ISO 9001 in the chain, this results in an increased degree of supply chain efficiency.¹⁹⁹ This efficiency can take the form of improvements of the material and cash flows in the manufacturing supply chain.²⁰⁰ As a result of this increased supply chain efficiency, the chain can compete better with other chains or even have a lead over competing supply chains. In short, when a lead firm aims for better supply chain efficiency, it can make ISO 9001 mandatory.

When an ISO 9001 and/or ISO 14001 is mandatory, it appears that correct implementation of this certificate is of crucial importance to actually realize the aforementioned benefits. Both certificates have no added value for the buyer and for the supplier if they are only implemented for marketing purposes. The supplier will also experience fewer benefits in this case, as there will be no internal benefits other than a positive marketing impact. For buyers who already have an ISO 9001 and/or ISO 14001 obligation, it may therefore be advisable to enter into a dialogue with the supplier in order to find why the supplier has implemented the ISO certificate. To convince the supplier of the importance of ISO 9001, reference can be made to this study. In this study, chapter 3.1 is particularly important for the supplier because this chapter describes the advantages and disadvantages of ISO 9001 and ISO 14001.

In addition to having the right intention, it is important that staff and management work according to ISO. It is also important that staff are given the opportunity to undergo additional training if this proves necessary. In such a case, the company that wants to obtain the ISO certificate must be prepared to invest in these training courses.

¹⁹⁷ See Petkova (2006) p. 321-328; Gereffi, Humphrey & Sturgeon (2005) p. 84-88

¹⁹⁸ See Gereffi (2001) p. 1622

¹⁹⁹ See Savic, Djordjevic, Milosevic, Mihajlovic & Zickovic (2016) p. 2

²⁰⁰ See Lo, Yeung & Cheng (2009) retrieved via Savic, Djordjevic, Milosevic, Mihajlovic & Zickovic (2016) p.

In addition to the managerial implications mentioned, this research also has a theoretical implication. It has been found that one of the statements in research by Handfeld et al., (2002) no longer seems relevant. This research suggested that an ISO 9001 and ISO 14001 obligation to suppliers would make the procurement process more complex²⁰¹. However, the results of the benchmark showed that this is no longer relevant because nowadays many companies are ISO 9001 and ISO 14001 certified. This high range of ISO 9001 and/or ISO 14001 certified companies ensures that there are many alternatives for buyers if a company does not have an ISO 9001 and/or ISO 14001 certificate. Due to these alternatives the ISO 9001 and/or ISO 14001 criteria do not complicate the procurement process. In addition to this conclusion, the benchmark has shown in that much of the literature used is still relevant. To be more specific, the benchmark indicates in accordance with the literature that an ISO 9001 obligation to suppliers has a positive influence on delivery reliability and product quality. In addition, both the benchmark and the literature indicate that the ISO 9001 as well as the ISO 14001 obligation has a positive influence on the buyer-supplier relationship. Furthermore, both the benchmark and the literature indicate that making the ISO 9001 and/or ISO 14001 mandatory does not affect the supplier's price. By confirming this literature, the benchmark has shown that this literature can be applied to Dutch firms.

6.3 *Research limitations*

One of the limitations of this research is the small population. All persons in this population were approached, which led to a total of seven interviews. Due to this small amount of respondents there is a chance that the formulated conclusions are not entirely representative of the broader population. Therefore, some caution is required when considering the conclusions of this paper.

Another limitation of this research is that the only companies that approached were those that were established in the Netherlands and stated on their website, in their purchase conditions, or in a tender process, that they work with ISO 9001 or ISO 14001 certified suppliers. Because only companies based in the Netherlands were approached, the results cannot be generalized to other countries. Especially with the increasing degree of internationalization and the increasing export in the print sector, the same study about a larger

²⁰¹ See Handfeld, Walton, Sroufe & Melnyk (2002)

number of countries may be desirable. A follow-up study may, for example, cover the whole of Europe.

A third limitation of this study is that none of the respondents were involved in an ISO 9001 or ISO 14001 certified supply chain. Because none of these respondents has such a supply chain obligation, the data from the literature study could not be confirmed or invalidated during the benchmark. The respondents also did not know any suppliers or customers who used a chain obligation, potentially because that obligation is virtually non-existent in the Netherlands. However, further research must be carried out to confirm that. This follow-up research can be approached from a supply chain perspective, or the research can be based on chain obligations outside ISO 9001 and ISO 14001.

One theory-related limitation is that the literature search only covered sources that could be retrieved free of charge. Thus, some articles could not be read, which means that information may be missing. With more financial resources, the literature search may be better structured, and paid articles could also be incorporated into the literature study.

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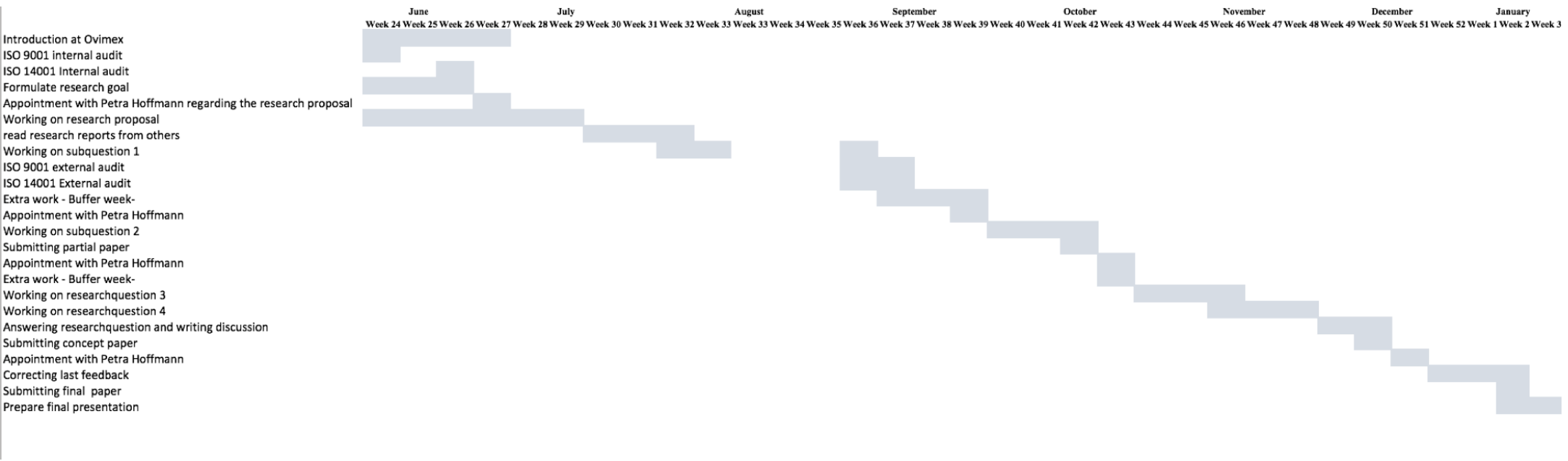
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Appendix I: Original Planning



Appendix II: Rolling Planning

[illegible]

Appendix III: Interview questions

Interview with regard to the obligatory ISO 9001 and/or ISO 14001 for suppliers.

Dear ...,

First of all, I will briefly introduce myself, I am Jordy Pasman, 24 years old and a student Business Administration at the University of Twente. In this course I opted for the specialization in purchasing and supplier management, where I am currently working on my graduation thesis. In addition to this graduation thesis, I work as a quality, health and safety and environment coordinator at Ovimex in Deventer. I combine this job with my graduation, in which I do research into the consequences of a mandatory ISO 9001 and ISO 14001 for suppliers.

All data that I collect during the interview will be treated strictly confidentially. The data will therefore not be shared outside the relevant teachers (unless permission is given). Furthermore, all regulations of the University of Twente will be complied with, which can be consulted via: <https://www.utwente.nl/en/bms/research/ethics/>.

If there are any questions or ambiguities before, during or after the interview, you are kindly requested to report this immediately. In this way misinterpretations can be prevented.

Name:

Position:

Organization:

Typology of the organization:

Date:

Time:

Location:

Purpose of the interview:

The interview will be semi-structured in nature, this means that the questionnaire below serves as a guideline, but are not strict.

- Can you give a brief description of your organization?
- How does the purchasing process work in your organization?
- What certificates does your company have?
- Which certificates do you impose on a supplier?
 - Why do you require these certificates?
- Can suppliers always hand over these certificates?
 - What do you do if suppliers cannot hand over these certificates?
 - Can you give an example of a situation in which you had to take such an action?
- Do you prefer suppliers with additional certifications, outside the ISO 9001 and/or ISO 14001, with regard to suppliers with only these certifications?
- What was the reason for making an ISO 9001 and/or ISO 14001 certification obligatory for suppliers?

- What were the consequences of these mandatory certifications on general business operations?
- What were the consequences of these mandatory certifications on the purchasing process?
 - Did you have to say goodbye to suppliers?
 - If so, how many suppliers and for what reasons?
 - Has this introduction had an influence on the relationships with the customer?
 - If so, how worked it out?
- Did you notice that the purchasing process was more complicated or more flexible after this mandatory requirement?
 - If so, where do you notice this, can you give some examples?
- Does the ISO 9001 and/or ISO 14001 obligation affect the price of the supplier?
 - If so, has this affected your company positively or negatively?
 - If negative, what were the negative consequences?
 - If positive, what were the positive consequences?
- Can you give examples of situations that have changed with regard to purchasing after the mandatory purchase?
 - How did the purchasing employees view this obligation?
 - Did you convince the buyers of the interests of these certificates?
 - If so, how did you do that?
 - If not, why did not you do this?
- What were the consequences of these mandatory certifications on product quality?
 - How do you notice these consequences?
 - (If applicable) Can you see that the quality of your own product is improving because the products of suppliers are of better quality?
- What were the consequences of these mandatory certifications on delivery reliability?
 - How do you notice these consequences in the delivery reliability?
 - Does this improvement in delivery reliability offer new opportunities for your company?
 - Does the ISO 9001 and/or ISO 14001 obligation also offer advantages in terms of communication with the supplier?
- How did you introduce such an obligation in the purchasing process?
 - What were the biggest complications here?
 - What would you have done differently if you could do it?
 - What would you have done the same if you could do it?
 - What was the first reaction from the existing suppliers who did not yet meet this requirement?
 - Did you convince these suppliers of the importance of certification?
 - How much time did you give these suppliers to still meet this requirement?
 - Could all companies that wanted to comply with this requirement manage to complete the required certifications within this period?
- Is your company still planning to impose other certifications on suppliers in the future?
 - If so, which certifications and why?
- Do you have any additions that might be useful in the context of this research?

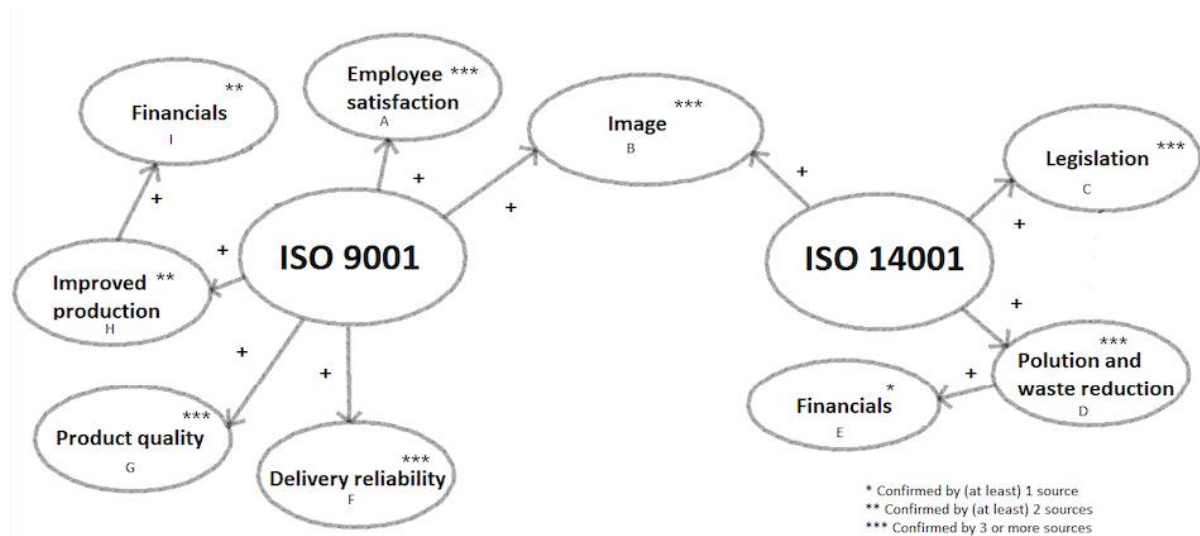
Thank you very much for participating in this study, if you want to be kept informed of the results, please let me know!

Appendix IV: Search terms benchmark

| Browser | Search machine | Search terms | Hits |
|---------|----------------|--|--------|
| Safari | Google | "iso 9001 gecertificeerde leveranciers" | 10 |
| Safari | Google | "iso 14001 gecertificeerde leveranciers" | 10 |
| Safari | Google | "iso 9001 en 14001 gecertificeerde leveranciers" | 0 |
| Safari | Google | "dient te beschikken over ISO 9001" | 4 |
| Safari | Google | "leveranciersvoorwaarden" "9001" | 74 |
| Safari | Google | "iso 9001 en iso 14001 zijn verplicht" | 0 |
| Safari | Google | leveranciers verplicht ISO 9001 | 143 |
| Safari | Google | "leveranciers voldoen" "iso 9001" | 90 |
| Safari | Google | "leveranciers zijn verplicht" "iso 9001" | 18 |
| Safari | Google | "gedragscode voor toeleveranciers" "ISO 9001" | 10 |
| Safari | Google | "verplicht een iso 9001 en 14001" | 0 |
| Safari | Google | "leveranciers" "iso 9001" | 230 |
| Safari | Google | "leveranciersvoorwaarden" "14001" | 15 |
| Safari | Google | "iso 14001" inkoopvoorwaarden | 140 |
| Safari | Google | "iso 14001 gecertificeerde leveranciers" | 10 |
| Safari | Tenderned | iso 9001 en 14001 | 24.828 |
| Safari | Tenderned | Iso 9001 | 10.360 |
| Safari | Tenderned | ISO 14001 | 10.137 |

Tenderned is a Dutch public sector platform where municipalities and other government institutions publish assignments on which suppliers can register to take the assignment.

Appendix V: Framework ISO 9001 and ISO 14001 for the implementing company

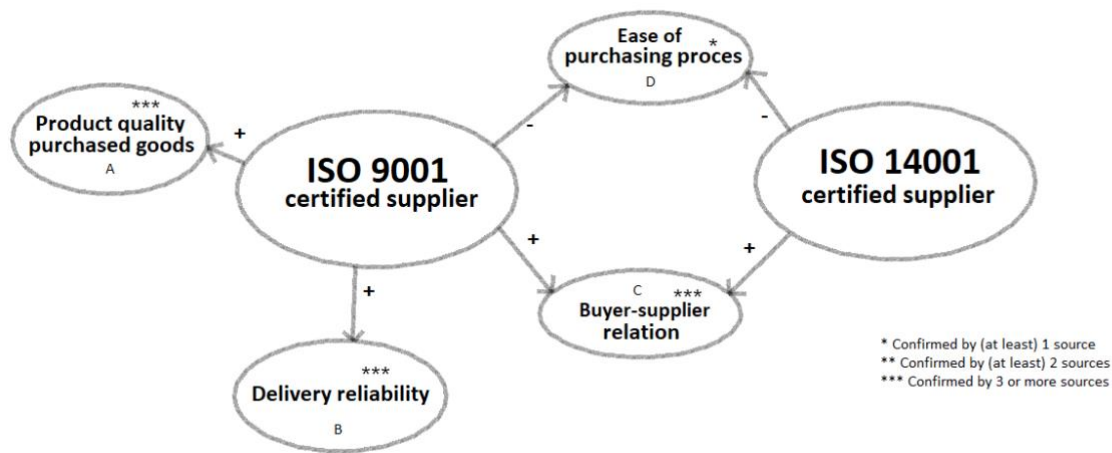


Associated sources:

| Number | Source(s) |
|----------|---|
| A | Rusjan & Alič (2009) p. 763; Pan (2003) p. 570; Piskar (2007) p. 58; Casadesus, Giménez & Heras (2001) p. 330 Jang & Lin (2008) p. 211 Magd & Curry (2003) p. 252-253 Mondel & Rondinelli (2002) p. 159 Yin & Schmeidler (2009) p. 470 Krause (1996) p. 1564 |
| B | Rusjan & Alič (2009) p. 763; Pan (2003) p. 570 Piskar (2007) p. 58 Casadesus, Giménez & Heras (2001) p. 330 Jang & Lin (2008) p. 211 Santos & Escanciano (2001) p. 331-340 |
| C | Prakash & Potoski (2006) p. 351-352 Heras-Saizarbitoria, Arana Landín & Molina-Azorín (2011) p. 201 Gomez & Rodriguez (2011) p. 1092 |
| D | Prakash & Potoski (2006) p. 351-352 Heras-Saizarbitoria, Arana Landín & Molina-Azorín (2011) p. 201 Gomez & Rodriguez (2011) p. 1092 Zeng, Tam, Tam and Deng (2005) |
| E | Handfeld, Walton, Sroufe and Melnyk (2002) p. 71 |
| F | Poksinska, B., Jörn Dahlggaard, J., & Eklund, J. A. (2003) p. 603 Koc (2017) p.211 Shih, Huarng & Lin (1996) p. 689 Sampaio, Saraiva & Guimaraes Rodrigues, (2010) p. 1281 Sitki İlkay & Aslan (2012) p. 764 Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2 |

| | |
|----------|---|
| | Ai Chin, Hon Tat & Sulaiman (2015) p. 696 |
| G | Kafetzopoulos et al. (2015) p. 393 Gilbert & Sia (2001) p. 228-229 Brown, Van Der Wiele & Loughton, (1998) p 279 Tari, Molina-Azorín & Heras Saizarbitoria (2012) p. 303 Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2 Romano (2002) retrieved via Okay & Semiz (2010) p. 2922 |
| H | Corbett, Montes-Sancho & Kirsch (2005) p. 1056 Hendricks and Singhal (1997), retrieved via Corbett, Montes-Sancho & Kirsch (2005) p. 1056 |
| I | Corbett, Montes-Sancho & Kirsch (2005) p. 1056 Hendricks and Singhal (1997), retrieved via Corbett, Montes-Sancho & Kirsch (2005) p. 1056 |

Appendix VI: Framework obligation ISO 9001 and ISO 14001 (Theory)



Associated sources:

| Number | Source(s) |
|----------|---|
| A | Kafetzopoulos et al. (2015) p. 393 Gilbert & Sia (2001) p. 228-229 Brown, Van Der Wiele & Loughton, (1998) p 279 Tari, Molina-Azorin & Heras Saizarbitoria (2012) p. 303 Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2 Romano (2002) retrieved via Okay & Semiz (2010) p. 2922 |
| B | Poksinska, B., Jörn Dahlgaard, J., & Eklund, J. A. (2003) p. 603 Koc (2017) p.211 Shih, Huarng & Lin (1996) p. 689 Sampaio, Saraiva & Guimaraes Rodrigues, (2010) p. 1281 Sitki İlkay & Aslan (2012) p. 764 Savic, Djordjevic, Milosevic, Mihajlovic & Sivkovic (2016) p. 2 Ai Chin, Hon Tat & Sulaiman (2015) p. 696 |
| C | Dowlatsahi & Hooshangi (2010) p. 981 Dellana & Kros (2015) p. 312 Simoens & Erlacher (2018) p. 87 Nawrocka, Brorson, Lindhqvist (2009) p. 1442 |
| D | Handfeld, Walton, Sroufe & Melnyk (2002) |

Appendix VII: Clear and relevant quotes used in the benchmark

| Subject: | Quotations: |
|---|--|
| Influence on purchasing process | <p>"I never had a supplier who did not have an ISO 9001 certificate."</p> <p>"It does not make the purchasing process more difficult. Because suppliers that do not have such a certificate are not eligible. So you automatically have a selection."</p> <p>"Before we select a supplier, we check their website. Most suppliers have their ISO 9001 and ISO 14001 certificates linked to the website. If this is not the case, we will call the potential supplier to ask if he is ISO 9001 and ISO 14001 certified. However, almost all suppliers and potential suppliers are ISO 9001 and ISO 14001 certified, because nowadays an ISO 9001 and ISO 14001 certificate is a kind of standard."</p> <p>"It does not change the purchasing process, because most suppliers have an ISO 9001 and ISO 14001."</p> <p>"When I am abroad, for example in Poland, I see that firms are very proud of their ISO 9001 and ISO 14001 certificate. All their certificates are hanging in the directors' room. This is something we do not have at our own office, just because the ISO 9001 and ISO 14001 certificates are almost standard in the Netherlands."</p> <p>"...the ISO 9001 is a minimum requirement..."</p> <p>"There was actually no influence on the procurement process after the introduction of the mandatory ISO 9001 and ISO 14001."</p> |
| Influence on price | <p>"when every supplier has the ISO 9001 and ISO 14001, suppliers cannot ask for a higher price."</p> <p>"It has no influence on the price, because if the entire market has these certificates, suppliers cannot compete on price."</p> <p>"When every supplier has ISO 9001 and ISO 14001, one single supplier cannot ask for a higher price because of they have the ISO 9001 and 14001 certificate."</p> <p>"The suppliers know that when an ISO 9001 and ISO 14001 is mandatory, every competing supplier will also have this ISO 9001 and ISO 14001 certificate. That is why they will still want to compete on price and quality."</p> <p>"...achieving ISO 14001 has not affected our own price."</p> <p>"Suppliers do not raise the price because the obligation applies to all companies and not to a specific company."</p> |
| Influence on buyer-supplier relation | <p>"It is an advantage if someone has a quality certificate, because they have thought about the quality policy. But it does not mean that if you have a certificate, it also works in practice."</p> <p>"It is more pleasant to work with a certified supplier, because you know that the supplier must monitor its quality. This leads to a better relationship with this supplier."</p> <p>"You speak the same compliance language."</p> <p>"Sometimes it can just improve communication."</p> |
| Influence on delivery reliability | <p>"The operational person responsible for the delivery tries to achieve this delivery within the agreed time, but mostly without the help of ISO 9001. This because he is often not aware of the processes as they should be</p> |

| | |
|-------------------------------------|--|
| | <p>according to ISO 9001. However, if the products are delivered multiple times too late, management will also be informed of this. This happens because, according to ISO 9001, all data related to customer satisfaction have to be monitored. When senior management encounters a declining delivery, actions will be taken. Results will therefore not be immediately visible after a wrong delivery, but after several wrong deliveries, action will be taken to increase delivery reliability.”</p> <p>“An ISO 9001 certified company delivers more reliable.”</p> <p>“It is noticeable when a company has quality management and they work with it for a longer period. Namely, ISO 9001 certified companies are much more structured. For example, if you ask for analysis reports, these companies simply stick to the agreements.”</p> <p>“ISO 9001 certified suppliers are often less able to respond to an extra order. I notice that at our company too. We deliver our items varnished, while we have them unpainted in stock. When a customer calls with an urgent order, this customer does not understand that I cannot quickly paint the items so that they are ready in the afternoon. But this is simply not possible with an ISO 9001. A buyer cannot make a sales order, because these are separate processes. And the painter cannot start without having a purchase order. With a company that is not ISO 9001 certified, that may be possible, but with certified companies that is not possible.”</p> <p>“Normally, ISO 9001 certified firms deliver more reliable if they are also working according to this ISO 9001. However, delivery problems are often caused by external influences. Examples of this are an explosion at the production location or due to extreme weather influences. When these suppliers have an ISO 9001, communication is often better and they often propose alternative solutions. However, this does depend on the extent to which ISO 9001 has been implemented.”</p> |
| Influence on product quality | <p>“The ISO 9001 is a great system if you do not want to monitor your supplier. However, it cannot be said that with ISO 9001 certified suppliers, quality no longer needs to be checked. That is why we still test the quality, but the ISO 9001 gives a certain guarantee that this quality is good.”</p> <p>“You can notice the differences between ISO 9001 certified and non-certified companies. Because certified companies have thought about their quality policy and how they should deal with quality. But if they do not use this quality policy, you will not notice any results.”</p> <p>“If the quality system of the supplier is properly implemented, this can save us a lot of work with regard to the inspection of this supplier. For example, we perform fewer entry controls at suppliers with a well-guaranteed quality system.”</p> <p>“There are less quality checks at certified suppliers. Although a certified supplier normally delivers better quality, there may also be quality problems with this supplier. When this happens, we request the ISO 9001 quality plan and an action with regard to improvements. In this case, the quality plan is one of the advantages when you work with ISO 9001 certified suppliers. All suppliers will have this at their disposal.”</p> <p>“If the quality system is properly assured at the supplier, it can save work with regard to the inspection. For example, we only check half of the incoming shipments coming from certified suppliers.”</p> |