UNIVERSITY OF LJUBLJANA
SCHOOL OF ECONOMICS AND BUSINESS

MASTER'S THESIS

AN ANALYSIS OF THE STATE OF INTERNAL BUSINESS PROCESS AUDITS AND DEVELOPING A PROPOSAL FOR IMPROVEMENT WITH MODERN APPROACHES TO INTERNAL AUDITING: A CASE STUDY

Ljubljana, January 2021   EVA MURKO

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LIST OF ABBREVIATIONS

5S – 5 steps of this methodology: Sort, Set in Order, Shine, Standardize, Sustain

BI – Business Intelligence

BPMN – Business process modeling notation

CRM – Customer relationship management

CS – CS company/Case study company = alias name of the selected organisation due to non-disclosure agreement

DMAIC – Define, Measure, Analyse, Improve, Control approach

ERP – Enterprise resource planning

FMEA – Failure Modes and Effects Analysis

GPMS – Global process management system

GPO – Global process owner

HR – Human resources

IAF – International Accreditation Forum

IMS – Integrated management system

ISA – National Standardizing Associations

ISO – International Organization for Standardization

IT – Information technology

OE – Operational excellence team

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PDCA – Plan-Do-Check-Act cycle

Q7 – Seven tools of quality management

QMS – Quality management system

R&D – Research and development

SAP – System Applications and Products in Data Processing

SCM – Supply chain management

SPC – Statistical Process Control

TQM – Total quality management

UNSCC – United Nations Standards Coordinating Committee

WTO – World Trade Organisation

INTRODUCTION

The first quality standards were evolved at the end of the 1950s in the military sector. Since then, during the years, several countries developed different quality standards, specific for various operations. As the trend continued with more and more sectorial standards emerging, it happened during the 1980s that the International Organization for Standardization (hereinafter ISO) decided to unify and harmonize the trend and in 1987 the ISO 9000 standards were published. They became the international benchmark for quality systems (Coletto & De Monte, 2019).

ISO 9001 places the criteria for a quality management system (hereinafter QMS). It is the only standard from the ISO 9000 family that organizations can be certified to, even though this is not a requirement. ISO 9001 can be used by any organization, regardless of the size or its field of activity. Certification is not provided directly by ISO as they are responsible for development of standards. Certification is performed by external certification bodies. (ISO, 2015).

QMS guides companies on how to control their business processes in order to maintain an efficient level of quality of their products and processes (Rusjan & Alič, 2010a). The pursuit of quality has been a strategic objective of many organizations as they realized quality will increase productivity and profitability and help them survive competition (Psomas & Fotopoulos, 2009).

ISO 9001 standard is based on seven quality management principles: customer focus, leadership[1], engagement of people, process approach, continuous improvement, evidence-based decision making and relationship management[2] (ISO, 2015). Business processes can be improved, if the company implements and adopts the standard in a proper way. This can further lead to a better working atmosphere and gradually results in improved products and services (Tomic & Brkic, 2019), which is a desired objective of most companies since customers expect to see improvements and demand ever higher standards (Fryer, Antony & Douglas, 2007). Quality products will increase customer satisfaction and consequently positively affect profit margin (Goetsch & Davis, 2016; Tarí, Pereira-Moliner, Pertusa-Ortega, López-Gamero & Molina-Azorín, 2017). Such benefits still dominate and are being reported by a majority of organizations (Tomic & Brkic, 2019).

What is the most important to stress and will also be the core of this thesis, is the fact that such benefits can only be achieved if the company is dedicated to maintaining the level such standard is requesting or suggesting. According to Jones (2000), companies that obtain the certification for external reasons, like marketing attraction or to satisfy certain partners and

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[1] Leaders establish direction and purpose, they engage people which enables alignment of their processes, policies and resources to achieve the objectives (ISO, 2015).
[2] Relationship with suppliers and partners is of particular importance as interested parties can influence the performance of the company (ISO, 2015).

customers, achieve less benefits than companies that obtain the certification for internal reasons (Santos, Costa & Leal, 2014).

Furthermore, improving and maintaining performance is a never-ending process and the proposed way of achieving that is by conducting internal audits. This is a vital part of ISO 9001. It is recommended to perform internal audits to check how its quality management system is working (ISO, 2015). There are two benefits to be gained by conducting internal process audits. Firstly, to retain the certification, to be further officially recognized as an ISO 9001 certified organization and secondly, to ensure the quality management system is working efficiently and striving to search for improvements.

Internal audits are one of the key activities required by the ISO 9000 standard to maintain efficient quality management system. "The general purpose of internal audits is to determine whether the established QMS conforms to the requirements of the ISO 9001 and to eliminate any detected non-conformities and their causes." (Rusjan & Alič, 2010b). There is a spectrum of expectations and interest regarding internal auditing, from companies that are merely interested in being certified, may only be focused on achieving minimal conformance to the requirements of the ISO standard; to companies striving for audits that will guide them towards effectiveness and improvements (Rusjan & Alič, 2010b).

Alič & Rusjan (2011) showed that internal audits can stimulate workers to work better with following the procedures and rules. Audits can influence exchange of knowledge and best practices, stimulate business improvements and help management achieve business objectives. Additionally, internal audits can reduce risk and point out to synergies (Rogala & Wereda, 2015).

To achieve the benefits, audits should be thoughtfully planned and performed. An effective audit needs to have a defined scope and objectives, a suitable plan and should demand for fitted resources, people and time. Auditors, conducting the internal audit should be competent, having the knowledge of the ISO standard and the business process they are about to audit. Moreover, audit needs to be performed in accordance with the ISO standard and the desired outcome are valid findings that can lead to improvements. In the end, an audit should improve working practice (Elliott, Dawson & Edwards, 2007).

The thesis will show a case study where internal auditing does not bring the potential benefits as it could because the beforementioned requirements are not fully in place. Similar situation is said to be common in practice, more common than internal audits being successfully implemented (Rogala & Wereda, 2015).

Today, being compliant with the standard is considered a minimum and for many is not enough anymore. Researchers and organizations are searching for different approaches, for a way of auditing that add value, is cost and time efficient and overall beneficial beyond just being compliant (Rusjan & Alič, 2010a).

One such technique that can contribute to internal auditing is process mining. Use of process mining techniques has been increasing as companies want a raw insight into the real world

of how their processes operate. Business process mining derived from the field of data mining. Data mining extracts the knowledge from large data sets with identifying patterns within the data. This practice has been adapted to create the business process mining techniques and they mine data logs that contain "process execution data to reconstruct actual business processes" (Tiwari, Turner & Majeed, 2008). Process mining extracts data and knowledge from the event logs that are stored and maintained in a company's Enterprise Resource Planning (ERP) system (Jans, Alles & Vasarhelyi, 2013). Auditors can use historic data to adjust the desired scope and remove unimportant situations and focus on specific ones. Such querying the specific events can be especially useful for auditing questions, as auditor could get some answers before the actual audit (van der Aalst, van Hee, van der Werf & Verdonk, 2010). Furthermore, process mining takes the entire population of data into consideration when analysing, not just a sample. Auditor can see the meta data, which is entered independently, not just by the auditee. Process mining allows the auditor to walk through the processes as they are and conduct analyses which are not possible with other audit tools (Jans, Alles & Vasarhelyi, 2013).

The main purpose of this master's thesis is to contribute to understanding of possible challenges and beneficial outcomes when it comes to internal process auditing and to understand what it takes for an organization in order to sustain an effective quality management system that can lead to growth and improvements. It will help us understand many different aspects that are preventing internal process auditing from delivering the added value and present different approaches to internal auditing.

The goals of the thesis therefore are:

− to conduct an analysis of the state of internal process auditing in a selected company,
− to discover the main issues responsible for internal audits not being beneficial,
− to provide practical recommendations to the organization on how to tackle such situation with the intention of having a successfully implemented internal audits,
− to suggest modern approaches to internal auditing, like remote audits and the usage of process mining and show their benefits.

Based on the written purpose and goals, this master thesis will try to answer the following research questions:

RQ1. What is the state of internal process auditing in a selected organisation?
RQ2. Based on the findings from the empirical research, what are the main factors responsible for such situation?
RQ3. What are the possible solutions, leading to successful and efficient internal audits?
RQ4. How can process mining and remote audits contribute to internal process auditing?

The methodology in the master's thesis is based on two types of data, primary and secondary data. Secondary data was used to obtain literature review on the topics of quality standards, ISO standards with the emphasis on the ISO 9001, internal process auditing and applications

of process mining for internal auditing in scientific articles and papers. This has helped obtain the theoretical framework and main concept definitions.

The secondary data was used in the combination with primary data. Main part of my work focuses on primary, qualitative data collection. The primary data was obtained with non-standardised, internet and intranet-mediated interviews that were conducted one to one. Interviews were held with 15 qualified internal process auditors, positioned globally at the selected case study organization and the second scope of interviews were conducted with 8 quality managers. Number of interviewees needed to be high enough to representatively cover the global scope. The interviews helped me gain an insight into the current state of internal process auditing and actual reasons for challenges and struggles with internal auditing at the selected case study organisation. Based on the received responses, I was able to study and analyse the situation to understand the problematics with internal process audits and to propose improvements that can be used by any organisation dealing with similar issues.

The thesis will first present necessary theoretical introduction based on the existing academic literature in order to build a foundation for the empirical part of the research. The first chapter describes the meaning of quality and how the quality management emerged. The second chapter highlights the ISO organisation, its purpose and structure, brief history of how ISO developed and overview of their last survey, showing statistics on the management system standards. The third chapter describes ISO 9001 quality management system standards, explaining motives for certification. Furthermore, it explains theoretical perspectives on certification motives and motives from empirical research. Lastly, it describes relationship between ISO 9001 certification and business performance. Chapter four presents fundamentals of internal process auditing and the fifth chapter describes introduction to process mining. The sixth chapter highlights the research structure and methodology of the thesis with the outline of the interview questions. Results of the current state of internal process audits in a selected organisation, collected through qualitative interviews, are presented in the seventh chapter. Chapter eight includes analysis of empirical research with recommendations for improvement of internal process audit situation, where I also suggest usage of process mining for value-added auditing. In the last part of the thesis, suggestions for future research are provided along with limitations of the thesis. This is followed by a brief conclusion.

1 QUALITY AND THE EMERGENCE OF QUALITY MANAGEMENT

The idea of quality has been around since the beginning of economic trading, as how to satisfy customers' expectations in order to maximize the profit (Weckenmann, Akkasoglu & Wener, 2015). Quality is most associated with production-oriented understanding in the business environment. It can represent conformity to a standard, specification or a result of a product (Culot, 2019), but the most general understanding is "the degree to which a set of

inherent characteristics fulfils requirements" (ISO, 2015) and does not necessarily include only product-related processes, but the whole system within a company, including third parties from supply-chain.

The general principles of quality are customer satisfaction, continuous improvement, empowerment, decision making based on facts and data, teamwork and problem solving. The quality management refers to a set of principles and ideas that are including the stated principles listed above and are incorporated in companies under many different names: business excellence, total quality management (hereinafter TQM), ISO 9000, Six Sigma, lean manufacturing etc. (Brown, 2013).

Quality is a complex concept that depends on the context (Reeves & Bednar, 1994). In its raw understanding, it can refer to two different dimensions when it comes to product and service quality, that is quality of the idea as design and technical quality as conformance (Culot, 2019). Further on, it can refer to the process generating that product in terms of process efficacy, as how to guarantee resulting quality (Reeves & Bednar, 1994). A different view focuses on process effectiveness on how to minimize costs and time (Culot, 2019). Process quality is relatable on the level of the company as it is also on the supply-chain level. The most outer layer includes all dimensions of quality on the company level which have an impact on the society (Culot, 2019).

Garvin (1984) presented several possible dimensions of quality and different approaches to how to define it, when it comes to product quality. Some of them are pointing toward objective and measurable technical quality. Such quality inspection came to use when the era of mass production started. Before that time, when the purchase process went from an individual, e.g. a craftsman, to the customer, the basic quality was legally enforced, and the provider of the product was personally responsible for the lack of quality (Weckenmann, Akkasoglu & Wener, 2015).

Individual fault tracking was no longer possible when manufacturers emerged with division of labour. The first quality management can be hence appointed to the period of mass production, of the so-called product quality check (Culot, 2019). Focus was on delivering products without errors to avoid complaints and returns. The main approach at the time was quality inspection, which means that products were inspected when finished. Since errors were addressed after the occurrence, there were huge losses of effectiveness. Costs were higher due to replacements of broken parts, repairment in the end and high number of scraps. This resulted in a limited product variety and higher volumes. Main focus, in terms of optimization, was on the quality, cost and time, as though all three were difficult to be reached together (Weckenmann, Akkasoglu & Wener, 2015).

A shift from focusing on product quality to process quality occurred due to higher customer demands, delivery requirements and the beforementioned costs. So far, processes were monitored in a way to observe the time spent for individual step along the working process. They began to understand that it would be much more efficient to find the cause of the error and remove the cause, than correcting the errors once they were already made. They were

no longer inspecting the quality but started to control it. At the time, a variety of methodologies were developed under the name of quality control, like seven tools of quality management (Q7), the Plan-Do-Check-Act cycle by W. Edwards Deming, the Five-Times-Why approach etc. Additionally, statistical methods started being used on practical problems, in particular Statistical Process Control (SPC) for reducing the waste in production (Culot, 2019; Weckenmann, Akkasoglu & Wener, 2015). It was still the final product that was being observed and if the desired standard was not achieved, input parameters were changed, and the process was corrected.

Process analysis was further developed in around 1960s to assure quality beforehand, to identify possible problems and risks prior to the start of the process and prevent them from occurring and not just act according to the results of a process. The thinking moved from the "reactive control" to the "preventive assurance" (Weckenmann, Akkasoglu & Wener, 2015) and with that, the need for numerical data from statistical methods perished. Softer, logical information became important for an a priori analysis. New methods came to use, based on logical reasoning, such as Event Tree Analysis or Failure mode and effects analysis (FMEA) (Culot, 2019).

The focus remained on the processes that were product related, other processes in the company were left out until the complexity of products rose due to competition and additional demands and new relationships with suppliers were not so easy to change anymore. Additionally, variety of products increased, so did the demand for flexibility and the need for information, since planning activities became more complex and customers got more involved in the process. All these changes led to the inclusion of all the other processes that were connected and interdepended with production processes. This led towards a system-oriented view and the so-called quality management (Culot, 2019; Weckenmann, Akkasoglu & Wener, 2015).

Progress with quality management did not occur due to new methodology, but because framework of harmonized and globally accepted standards was created. Complexity of companies' systems increased and so did the complex relationships with partners. The need for documentations and mutual trust between entities resulted in the start of using the ISO 9000 as basic requirements for quality management (Weckenmann, Akkasoglu & Wener, 2015).

The first quality standards were evolved at the end of the 1950s in the military sector. Since then, during the years, several countries developed different quality standards, specific for various operations. As the trend continued with more and more sectorial standards emerging, it happened during the 1980s that the International Organization for Standardization (ISO) decided to unify and harmonize the trend and in 1987 the ISO 9000 standards were published. They became the international benchmark for quality systems (Coletto & De Monte, 2019).

2 ISO ORGANIZATION

The term "standard" represents a document with guidelines and rules about certain activities. A standard is developed by acknowledged institution with the objective of providing the best practice of how to execute those activities and reach a certain level of the standard (Colleto & De Monte, 2019).

Standards in general can be generated in three ways. Firstly, a standard can be issued by a formal regulatory body, like most safety requirements are generated. Secondly, a standard can evolve from a de facto market process. This happens when a certain product specification gains leading market share. Example for this is the compatibility standard for computers generated by IBM. And lastly, a standard can be generated through a voluntary process based on a consensus. Such standard always evolves from organized efforts of coordinated parties of a specific sector. Technical experts are brought together and formed into an organisation, dedicated to development of standards (Braun, 2019). Example of such organisation is ISO.

2.1 Introduction of ISO organization

International Organization for Standardization or ISO in short, is the most important international standard organisation (Braun, 2019). It is an independent, non-governmental organization with its central secretariat located in Geneva, Switzerland (ISO, 2009). The name ISO is not an acronym but a derivative from "isos", a Greek word, meaning "equal", indicating that if two products are meeting the set standard, they should be equal (Latimer, 1997; Delmas, 2002). When ISO started operating in 1947 it had 26 member countries (Braun, 2019). Today there are 165 member countries, one national standard institute per country basis and each of them represents ISO in that country (ISO, n.d.; Morikawa & Morrison, 2004). Members fall into one of the three categories (ISO, n.d.):

- a full member is directing development of standards, voting on the policy and selling ISO standards nationally;
- a correspondent member is observing the development, can attend the technical meetings, but does not participate in the voting and is also selling ISO standard nationally, if it is a national entity; if it is not a national entity, it can sell the ISO standard in its territory;
- a subscriber member is staying informed about ISO's work but is not participating in the development and also cannot sell ISO standard nationally.

ISO's main objective is to promote the development of standardisation and correlated activities in order to promote and assist the international exchange of products and services. ISO strives towards developing cooperation in the scientific, intellectual, economic and technological activity areas. All 23.442 ISO standards are purely voluntary. Nevertheless, certain ISO standards have been adopted by governments as part of their legislation (Braun, 2019). Even though the secretariat is located in Switzerland, the overall structure is highly decentralised. The actual development of ISO standards is carried out by specialised

Technical Committees (TCs). They further on consist of Subcommittees and Working Groups. The result of standardisation process is a standard, normally in the form of codified technical or procedural rules, laid down in official documents. The documents are available for every interested organisation, sold by the designated standardisation organisations (ISO, n.d.).

Through all the member countries, experts come together to combine knowledge, evolve and develop international, voluntary standards relevant for the market to support global challenges, participate with innovative ideas and solutions to grow and connect (ISO, n.d.). Standards help facilitate trading around the world and are covering a huge range of activities, from managing a process, supplying materials, making a product to delivering a service; and a wide variety of sectors, from technology, manufacturing, to healthcare, agriculture and food safety (ISO, n.d.).

The summary of this year's statistics on the number of standards, active members and working committees, presented on the official website of ISO (ISO, n.d.), shows there are currently:

− 23.442 international standards, covering almost all aspects of technology and manufacturing;
− 165 members representing ISO in their country. There is only one member per country basis;
− 792 technical committees and subcommittees taking care of standards development.

The main objective of usage of the standards is to unify the safety, quality and reliability of products and services around the world and encourage fair competition. ISO standard ensures that products and services are conforming to the same standard set internationally and is increasing their productivity with minimum errors and wastage. Companies can enter new markets and trade globally under fair conditions, that are the same for everyone using that standard as products can be directly compared (ISO, n.d.; Morikawa & Morrison, 2004). Furthermore, international standards play a key role in flattening trade barriers. Hence, standardisation also caught attention of organisations like World Trade Organisation (WTO) and the European Union for promoting European integration (Braun, 2019).

2.2   A brief history of ISO organization

The organization began its work in 1926, at that time under a different name, as the International Federation of the National Standardizing Associations (ISA). They were focused on mechanical engineering. It was dispersed in 1942 during the second World War. In 1946 they were approached by United Nations Standards Coordinating Committee (UNSCC) with a suggestion to form a global standards organization. ISA was re-organized into ISO in 1946 and officially began its work in February 1947 (Latimer, 1997; Morikawa & Morrison, 2004).

Since the establishment of ISO, for the first forty years, they were focusing on specific technical standards for sizing systems, laser technology, screws etc. (Morikawa & Morrison, 2004). An important turning point happened in the 1980s when ISO focused on the development of the ISO 9000 Quality Management System standard. The idea was to create a generic standard, that would cover almost all industry sectors and it turned out to be the most successful (by sales) and most notable standard ever (ISO, n.d.). Next important shift came to place in 1993 with the emergence of ISO/TC 207 and the development of the ISO 14000 family of environmental management standards. They have extended their focus and influence beyond industry into general public problems (ISO, n.d.; Morikawa & Morrison, 2004). ISO continued into that direction further on with the development of standards that are directly supporting sustainable environment (ISO, n.d.).

2.3   ISO annual survey

Every year ISO publishes an annual survey, presenting the number of valid certificates worldwide, focused on ISO management system standards. Data are provided by the certification bodies accredited by the International Accreditation Forum's (IAF) multilateral recognition arrangements members (MLA).

Latest results have been published in September 2020, showing the data for 2019. The table is displaying the total number of valid certificates and the total number of sites for each standard included in the survey.

Presented are 12 ISO management system standards. A certificate is the document issued to the client by a certification body, after the client successfully conformed to the standard. A site is presenting a location where a client is carrying out work or service.

The survey comprises of these management system standards (ISO, 2020):

– ISO 9001 – Quality management
– ISO 14001 – Environmental management
– ISO 45001 – Occupational health and safety
– ISO/IEC 27001 – Information security management
– ISO 22000 – Food safety management
– ISO 13485 – Medical devices
– ISO 50001 – Energy management
– ISO/IEC 20000-1 – Information technology – service management
– ISO 28000 – Security management
– ISO 22301 – Business continuity
– ISO 37001 – Anti-bribery management systems
– ISO 39001 – Road traffic safety

Table 1 - ISO annual survey 2019 of certifications to management system standards

	Total valid certificates	**Total number of sites**
ISO 9001	883 521	1 217 972
ISO 14001	312 580	487 950
ISO 45001	38 654	62 889
ISO/IEC 27001	36 362	68 930
ISO 22000	33 502	39 651
ISO 13485	23 045	31 508
ISO 50001	18 227	42 215
ISO/IEC 20000-1	6 047	7 778
ISO 28000	1 874	2 403
ISO 22301	1 693	6 231
ISO 37001	872	4 096
ISO 39001	864	1 852

Source: ISO (2020).

Overall, there was an increase of 3.8 % from 2018 for the total number of certificates for the 12 ISO management system standards included in the survey. This is partly because of the increase of ISO 45001 certificates as it was published in 2018 and had limited number of certifications issued previously. For ISO 9001 there was an increase of 0.5 % and 2 % for ISO 14001 (ISO, 2020).

There is a bigger picture to the explanation of the data presented here, as we need to look further back to see clearer comparison. Detailed look will be focused on the ISO 9001 in the next chapter, as this is the standard in the focus for this master's thesis.

3   ISO 9001 QUALITY MANAGEMENT SYSTEM STANDARD

3.1   Introduction of ISO 9001

ISO published a set of quality standards, ISO 9000 family, as a model for quality assurance, involving production, development, design, service and installation. ISO 9000 family of standards is a group of guidelines, accepted internationally, on how to set up quality system in an organization (Psomas & Fotopoulos, 2009). The standards are intended to help an organization identify mistakes, streamline its processes and provide a consistent level of quality with focus on controls, procedures and documentation (Kartha, 2004). They are focused on the related processes, expanding the focal point to the entire network of interactions, not on the product or service quality. This extension appeared due to the awareness how strategically important is quality and how it needs to be managed through the whole value-chain (Romano & Vinelli, 2001). Being generic, they are not industry specific and can be used by any manufacturing and service organizations, regardless of their

size (Kartha, 2004), hence they are described as the "one size fits all" standards (Awan & Bhatti, 2003).

The first attempt to provide a list of guidelines for quality principles application in industrial divisions dates back into the fifties in America, specifically in the military sector, later also in the nuclear, automotive and pharmaceutical sectors. Original motive was to ensure that products complied with technical requirements provided by contracts (Franceschini, Galetto & Cecconi, 2006). Subsequently, these guidelines have been taken over by the British Standard Institution. They expanded the application of the standard to the whole organization system and introduced the BS 5750 quality management standard in 1979 (Psomas & Fotopoulos, 2009). At the beginning of the eighties most developed countries used their own internal standardization bodies, at least for certain specific areas. The need for a unifying and coherent international standardization for quality assurance, including accreditations and certifications, grew to be more and more important. ISO was at first mainly interested in regulating measurement activities in various industries, but later, originating from previous standards, presented the first edition of ISO 9000 family in 1987 by harmonizing terms and methodologies (Franceschini, Galetto & Cecconi, 2006). They became the leading reference and international benchmark for quality systems (Coletto & De Monte, 2019). The objective was to assist the global commerce and help improve European and North American organizations to compete in an increasingly selective market, strongly infiltrated with far-eastern products. To achieve this, organizations needed to acquire competitive advantage with customer satisfaction and reliable products (Withers & Ebrahimpour, 2000).

 ISO 9000 family standards provide requirements for the official evidence that an organization is capable of organizing processes and resources according to the regulations and customer requirements to ensure stakeholders' satisfaction (Franceschini, Galetto & Cecconi, 2006).

ISO 9000 family comprises of a group of quality management standards. ISO 9001 presents requirements, while other standards from 9000 family list guidelines and information.

– ISO 9000 contains fundamental concepts and principles with appropriate vocabulary that is used in all the standards, belonging to the ISO 9000 family. It provides basic understanding of quality management, described in the ISO standards and introduces the reader to the seven principles of quality management and how to use process approach for continual improvement (ISO, n.d.).
– ISO/TS 9002 has been developed to assist the organization on how to apply ISO 9001 with guidelines for the application (ISO, n.d.).
– ISO 9004 provides guidance to achieve sustained success. With the help of ISO 9004 organization can extend the benefits of ISO 9001 to all the interested parties, like employees, suppliers, owners, partners and the rest of society. It focuses on a wider scope of objectives towards achieving the long-term success. It is intended for those who wishes to pursuit continual improvement of the overall performance (ISO, n.d.).

- ISO 19011 provides guidelines for auditing of quality management systems (also environmental management systems). It describes how to conduct internal and external audits, how an audit process should operate and how audits should take place with information on auditor competence. Effective audits verify whether implemented quality management system is meeting the requirements of ISO 9001 (ISO, 2018).
- Lastly, ISO 9001 is used when an organization decides to establish quality management system in order to provide products that will meet customer expectations and needs. It provides requirements an organization must comply with to gain ISO 9001 certificate. This is the only standard from the ISO 9000 family that an organization can be certified to (ISO, 2015).

Criticisms of the first version of the standard, ISO 9000:1987 led to their revision in 1994 (Hanas & Luczak, 2002). Next revision occurred in December 2000, when ISO 9001:2000 was published, as the 1994 version was lacking the TQM characteristics, like continuous improvement, employee involvement, customer focus and empowerment (Sun, Li, Ho, Gersten, Hansen & Frick, 2004). ISO 9001:2008 was published in November 2008, replacing the 2000 version of the standard. The latest edition was issued in September 2015, called the ISO 9001:2015, bringing major benefits for quality management system with new approaches and less focus on documentation (Fonseca & Domingues, 2017).

Changes are meant to ensure that ISO 9001 can adapt to the changing market environment (Medić, Karlović & Cindrić, 2016). ISO 9001:2015 includes a new chapter, called the context of the organisation, underlining general requirements concerning the processes, organizational environment and the application of the QMS. Some of the information are restructured, risk-based thinking is emphasized to boost the application of the process approach with PDCA methodology (ISO, 2015). Performance evaluation is also meant to help with closer alignment and integration with other standards, like ISO 14001 and ISO 45001, providing a framework for concurrent application into integrated management systems (Coletto & De Monte, 2019; Medić, Karlović & Cindrić, 2016). Additional changes include upgraded applicability for services and more emphasis on leadership requirements.

ISO 9001 places the criteria for a quality management system. QMS is a framework, a set of policies, processes and objectives an organization uses to provide consistent results of products and services (ISO, 2015). It refers to the entire system and is a process-based approach, integrating internal processes that are enabling the organization to identify, measure, control and improve core business processes, leading them towards improved business performance and customer satisfaction (Watkins, 2017).

QMS seeks to recognize requirements of all interested parties, such as customer requirements, licenses to trade, guidelines, etc. and ensures all requirements are being met. Furthermore, it confirms that employees go through appropriate training, it determines the core business processes, their interactions and inputs and outputs. It suggests that organization keeps records and evidence of the requirements being met. Measuring,

monitoring and reporting the state of the QMS is highly suggested in order to address risks and opportunities and plan changes. For continual improvement internal audits need to be performed to analyse the system and correct nonconformities (Watkins, 2017).

For the organization to attain ISO 9001 certification, it must follow the requirements from the ISO 9001 standard. First of all, it needs to follow the steps for implementing an ISO 9001 QMS. A certification body will then audit the performance of the organization against the requirements from the latest version of ISO 9001. If the organization passes the audit, the registrar issues the ISO 9001 certificate for a three-year period. The organization must repeat the process of re-certification every three years to retain the certification status (ISO, 2015).

3.2   Certification motives

The implementation of ISO 9001 quality management system, and its certification, is a voluntary process, based on organisation's own motivations and goals. The diffusion of ISO 9001 certifications started mostly in Europe. European companies later put pressure on their suppliers from different areas around the world to also gain ISO 9001 certificate. Those suppliers attained the certificate as a protection mechanism against the threat of not having the certificate being an international trade barrier. Further on, domestic diffusion began to grow in non-European countries as well due to competitive reasons and pressure by customers through global supply chains (Sampaio, Saraiva & Rodrigues, 2009).

Figure 1 - ISO 9001 certificates through the years
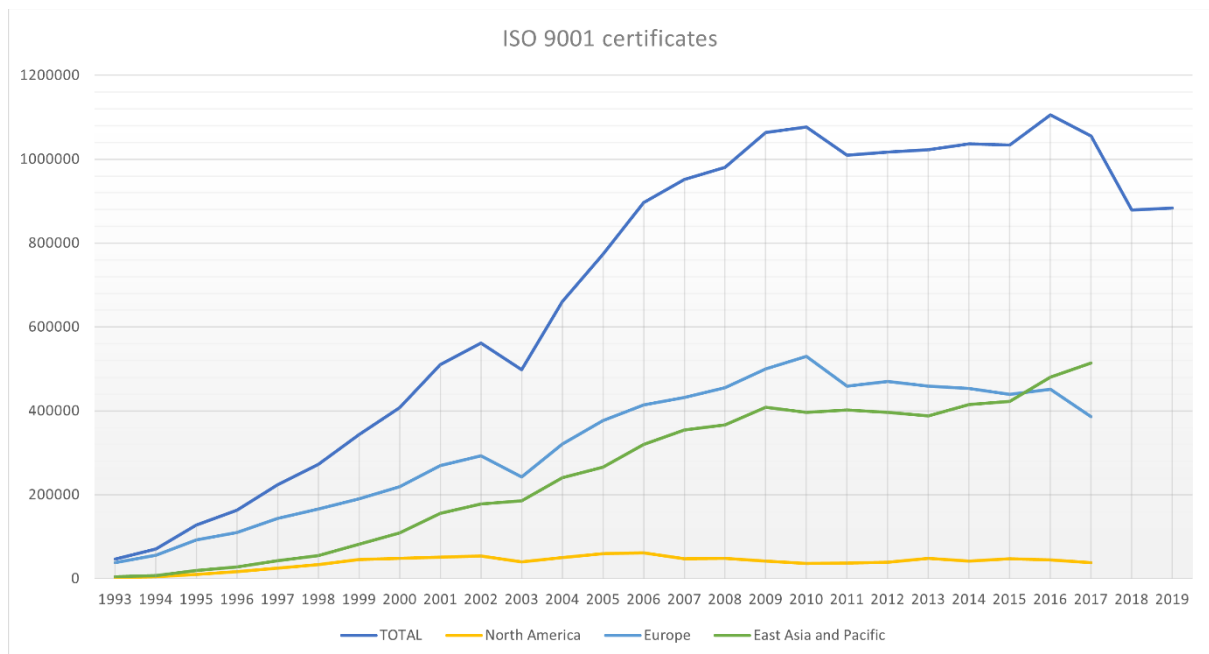
Source: ISO (2020).

By late 2019, 883.521 ISO 9001 certificates had been authorized in a total of 196 countries all over the world (ISO, 2020). China is leading with the largest number of certificates in the world (having a total of 280.386 by the end of 2019), followed by Italy (with 95.812),

Germany (47.868) and India (34.397). From the graph, we can see a decline in 2018, dropping from 1.055.028 certificates in 2017 to 878.664 in 2018. This represents a loss of 176.364 certificates, the lowest number since 2005.

The provider of the data is not ISO organization itself, but the official certification bodies and they participate voluntarily. Hence, ISO does not release the figures on the sold certificates of ISO 9001 and they too publish their annual insights entirely optional. Their disclaimer in the ISO survey points to the fact that the level of participation of the certification bodies varies from year to year and can impact the survey results. This was also included in their explanation on the decline in 2018, additionally explaining that in the past surveys, some certification bodies reported the number of certificates including the number of sites and that in the survey 2019, reporting for 2018, they separated the number of certificates from the sites hence leading to the huge reduction in the number of certificates. Furthermore, they stated that some important certification bodies from certain countries did not participate. These are also the reasons why they decided to publish the results for 2018 without including the past results and they also did not provide categorization according to the continents, but only the total number of certificates worldwide.

3.3 Theoretical perspectives on certification motives

There are two main theoretical perspectives on motivations for adopting ISO 9001 and metastandards in general. First point of view suggests that standards are implemented due to external pressures. The most eminent theory about defining external factors that influences companies into similar behaviour is perhaps the institutional and the neoinstitutional theory (Powell & Di Maggio, 1991; Scott, 1995). This theory is most often used in studies which investigate motivational drive for implementing the metastandards (Delmas, 2002; Heras-Saizarbitoria, Arana & Molina-Azorín, 2009).

Second theoretical perspective focuses on explaining that motivation for adopting metastandards comes from organisation's internal drive. The basis for this theory lies, among others, in the resource-based view of the organisation (Wernerfelt, 1984).

The institutional theory suggests that organisational action is shaped by external pressures, indicating that behaviour of organisation is not rational but grounded with conventions and rules and directed towards legitimacy in an uncertain environment (Braun, 2019). It further argues that organisational ideas are implemented through social and cultural context, different from technical context (Scott, 1995). According to this theory, organisations and individuals take certain things for granted without looking for alternatives, when searching for efficiency. When organisations conform to institutional norms, this creates structural similarities or isomorphism among them. Consequently, management practices can become standardized (Braun, 2019). Interconnectedness in organisations can lead to isomorphism, for example through supply chains or network relations, meaning it is deriving from relational embeddedness. Additionally, socio-cultural environment can also cause isomorphism, deriving from structural embeddedness of economic action (Dacin, 1997).

Typical example of institutional norm is ISO. Diffusion of standardised processes is seen as a proper example of institutional evolution (Meeus, Faber & Oerlemans, 2002). ISO emerged as a consensus-based management standard and reformed industrial coordination. It had an impact as a social form for coordinating weak and fragmented markets. Management standards enhance global transaction and are hence an important part of the institutional setting. ISO quality management especially was responsible for dramatic management changes in industrial companies (Braun, 2005).

According to Powell & DiMaggio (1991), Braun (2019) and other researchers, especially institutional sociologists, organisations become similar to each other through three specific mechanisms, three types of external pressure: coercive, mimetic and regulatory pressure. Some use different terms for this classification: coercive, normative and cognitive mechanisms (Scott, 1995).

Coercive pressure comes from actors that have the power to manipulate sanctions and establish rules. It refers to political influence, external formal and informal pressure, coming from the state, local public administration, suppliers and customers, or certain cultural and social expectations. Pressure coming from the government authorities and large multinationals is the most fundamental mechanism of institutional diffusion (Guler, Guillén & Macpherson, 2002). Organisations can feel pressured to follow the demands, coming from the powerful actors, since regulation or exchange push them to do so (Braun, 2019). The state's role can impose with regulatory systems, antitrust and tort laws or intellectual property rules while multinationals determine specific procedures and standards that suppliers should meet (Neumayer & Perkins, 2005). Microsoft or IBM are the examples of global players that possess the power to influence the institutional environment of the industries. According to Braun (2019), the success of ISO 9001 standard was highly influenced by including it in legal rules. European Union published "Global approach to conformity assessments" in 1989, advising organisations to implement ISO 9000 quality management standard. Legal guidelines turn into marketing requirements for suppliers, causing a diffusion through the supply chain. Adoption of ISO 9000 seemed to be more influenced by market requirements and customer pressure than by government rules. Large companies from the developed markets were especially powerful in global network of labour and production processes. ISO 9000 is a very visible tool, making it simple to differentiate between suppliers, their quality and reliability. It is also a promise for an organisation to be kept on a customer's bid list. This view definitely presents an important reason for the increase of ISO 9001 standards.

Mimetic isomorphism refers to organisations' copying others which they see as point of reference. Organisations imitate and copy processes and models of other organisations to cope with uncertainty (Braun, 2019). Competitive mimicry happens due to fear of losing competitive advantage. Organisations implement the same practices since not doing that would wear down their marketplace and disadvantage them in comparison to their competitors. Institutional mimicry follows a logic of appropriateness and is the result of the

fear of losing stakeholders' support and legitimacy (Vasconcelos & Vasconcelos, 2003). The amount of ISO 9001 certificates in a certain country or industry is appropriate for upcoming rates of implementation as the bandwagon effect occurs. Some organisations can follow formal management systems, since such preferences can be deeply rooted (Neumayer & Perkins, 2005). As said, organisations will more likely imitate the behaviour of those that are advanced and successful. Opinionated and prestige organisations will increase the rate of diffusion, although peripheral organisations might be the first ones to test unproven innovation. The same goes for countries. Those with economic and political core positions are seen as reference economies. Their organisational models are adopted by peripheral countries. Although, both of them engage in mimicry, the peripherals are doing so in order to catch up and the developed countries to maintain their position (Braun, 2019).

Normative or regulatory isomorphism arises when organisations follow social and moral obligations. Pressure is related to professionalism, originating from networks like industrial associations or training processes (Guler, Guillén & Macpherson, 2002). Normative isomorphism also comes from accreditation organisations which can inspect and evaluate other organisations, providing certificates, stating that a certain organisation is following the guidelines as prescribed by the authorizer. ISO 9001 is one of such cases. Regulatory pressure of ISO 9001 standards is hidden in responsible management, presented as a best practice (Braun, 2019). Multinational companies, regulatory agents and professional communities are important presenters of these norms. Government authorities do not influence only with coercive mechanism, but also with incentive programmes, grants and subsidies, promoting best practices etc. Governments in Japan and United Kingdom organized national campaigns for registering ISO 9001. It was central to industries in developing countries from Asia, to become competitive. (Braun, 2019). Scientific community accepted and circulated the metastandards which accelerated their diffusion. Other professional services and occupations appeared as the metastandards grew. They are directly related to certification activities and implementation of the standards, which resulted in, as Braun (2019) stated, diffusion of the management standard became increasingly self-supporting. Since multinational companies cross national borders, so do their management practices (Guler, Guillén & Macpherson, 2002).

Institutional theory is one perspective on motivation for the implementation of metastandards, which is criticized by scholars who argue that organisations also respond according to their capacities and resources as they are active and dynamic. Institutional theory considers organisations mostly as passive actors that act upon external pressures. It does not consider that organisations can use heterogeneous organisational behaviour when the isomorphic pressure occurs (Yin & Schmeidler, 2008).

Additional theory comes from resource-based view of the organisations, considering that motivation for the implementation of the standard can be led from internal perspective of the organisation (Wernerfelt, 1984). It focuses on how internal organization operates and suggests that the decision for implementation depends on a various organizational resources,

such as the organisation's internal skills that can be used as competitive advantage, or human resources, as management attitudes that can motivate the organisation towards the implementation of the standards. Organisations with the possibility for innovation and ability to accept new information with the help of an educated employees and their involvement are more likely to implement the standard, regardless of the external pressures (Heras-Saizarbitoria, Arana & San Miguel, 2010).

Some contributions in this line of research combine these two theoretical approaches, basing arguments of the institutional theory and the resource-based view. They present a combined view, stating that organisations under isomorphic pressure can adopt management standard in various ways, since they can implement it according to their own needs, internal norms and resources, which brings diversity to their implementation (Yin & Schmeidler, 2008).

3.4 Certification motives from empirical literature

When looking through empirical literature, there is no consensus among researchers on the main motivational drivers towards implementation of ISO 9001 (del Castillo-Peces, Mercado-Idoeta, Prado-Roman & del Castillo-Feito, 2018). The findings are of course in line with the theoretical perspectives presented above, being internal and external sources of motivation and empirical studies show organisations are reporting both.

Regarding the external factors, studies (Bhuiyan & Alam, 2005; Fonseca & Domingues, 2018a; Heras-Saizarbitoria, Arana & San Miguel, 2010; Inaki, Landín & Fa, 2006; Martínez-Costa, Martínez-Lorente & Choi, 2008; Sun, 2000; Terziovski, Power & Sohal, 2003) presented the following motives:

- regulations for market access,
- the influence of customer demands and pressure,
- pressure from public administration, including due to access to incentives (subsidies, aid, etc.),
- pressure from competitors,
- concerns regarding the external image of the organisation.

As for the factors of an internal nature, when organisations took the decision to implementation also considering their internal aspects, studies (del Castillo-Peces, Mercado-Idoeta, Prado-Roman & del Castillo-Feito, 2018; Chang & Lo, 2005; Heras-Saizarbitoria, Arana & Molina-Azorín, 2009; Heras-Saizarbitoria, Arana & San Miguel, 2010; Sampaio, Saraiva & Guimaraes Rodrigues, 2010) report the following factors:

- improvements in organizational processes,
- improvement of quality system,
- a way towards TQM,
- quality improvement,
- efficiency improvement,
- competitiveness improvement.

Internal motivations for implementation of ISO 9001 can lead to process improvements and organisational improvement in general. This can contribute to better quality and consequently to customer satisfaction, causing better financial performance and improved competitive stand. External motivations open new market possibilities and boost organisation's image, but if the organisation implements the standard without internal improvements, the external gains might not sustain (Boiral & Roy, 2007; Llopis & Tarí, 2003; Prajogo, 2011; Sampaio, Saraiva & Rodrigues, 2009).

Furthermore, there is an agreement on the fact that if the main factors for implementing the standard are improvements of the internal situation of the organisation and not only external pressures from the market or customer or expectation of image enhancement, the overall benefits after implementation are higher (Boiral & Roy, 2007; Feng, Terziovski & Samson, 2008; Gotzamani & Tsiotras, 2002; Jang & Lin, 2008; Llopis & Tarí, 2003; Prajogo, 2011; Sampaio, Saraiva & Rodrigues, 2009). According to these studies, if the only motivational factors for implementation are external, there is a high risk that the organisation will not achieve desired competitive advantage or gain new capacities, except if they remain included in the market due to being accordingly certified. However, when the motivational factors are internal, these can induce internal development of the ISO 9001 principles, causing organizational and operational improvements, leading to increased quality, customer satisfaction and financial improvements.

3.5   Relationship between ISO 9001 certification and business performance

Equally important aspect of research was to find empirical evidence of how adoption of ISO 9001 is related to business performance.

ISO certification alone does not contribute to a better performance of organisation (Singels, Ruël & Van De Water, 2001). A lot of research has been dedicated to finding out whether ISO 9001 standard impacts organisational performance. Majority of studies concluded there is a positive relationship between the ISO 9001 implementation and improvement of organisational performance (Adam et al., 1997; Claver, Tarí & Molina, 2002; Curkovic & Pagell, 1999; Fonseca & Domingues, 2018a; Mann & Kehoe, 1994; Santos, Costa & Leal, 2014; Tarí & Molina, 2002; Terziovski & Samson, 1999). On the other hand, there are also researches that did not find enough evidence to claim ISO 9001 standard implementation positively impacts performance of the organisation (Abraham, Crawford, Carter & Mazotta, 2000; Chow-Chua, Goh & Wan, 2003; Singels, Ruël & Van De Water, 2001; Terziovski & Samson, 1999).

Evidently, implementation of ISO 9001 standard does not automatically increase organisational performance or bring economic benefits. Certain conditions need to be met and if the standard is applied accordingly, an improvement to organisational performance can be expected (Singels, Ruël & Van De Water, 2001; Rusjan & Alič, 2010b). There seems to be a strong relationship between motivation for introducing ISO 9001 standard and the results obtained due to implementation. When organisations get certified simply because of

external pressures, they might register the standard as the main objective of itself, react minimalistically to achieve it and hence reach only limited improvements in performance (Carlsson & Carlsson, 1996; Jones, Arndt & Kustin, 1997; Buttle, 1997; van der Wiele, Williams, Brown & Dale, 2001; Llopis & Tarí, 2003).

When organisations decide to implement ISO 9001 based on internal motivations (improvement reasons), achieved benefits reach more global dimension and the impact of the standard on economic performance is bigger in comparison to when the standard is implemented mostly due to external motivations (marketing reasons), then achieved benefits are mainly external and the impact of the standard on the performance is smaller (Jones, Arndt & Kustin, 1997; Llopis & Tarí, 2003; Poksinska, Dahlgaard & Antoni, 2002; Gotzamani & Tsiotras, 2002; Williams, 2004; Rusjan & Alič, 2010b).

Organisations that decided to gain ISO 9001 certification for "developmental reasons" have experienced more internal benefits (Jones, Arndt & Kustin, 1997), such as:

− improvement in productivity, product quality, quality awareness, delivery times, internal organisation and communication and competitive advantage,
− decrease in product defect rate, nonconformities and customers' complaints,
− definition of the employees' responsibilities and obligations,
− employees' motivation.

Brown, van der Wiele & Loughton (1998) stated that organisations driven by internal motivations to certification have a more positive view and expectations about improvements achieved. Management support is of great importance as those that understand certification as an opportunity to improve quality system and internal process will gain wider positive results than those simply striving for a certificate on the wall (Sampaio, Saraiva & Rodrigues, 2009). According to Gotzamani & Tsiotras (2002), organisations adopting ISO 9001 mainly due to external motivations will also mainly gain external benefits, such as:

− access to new markets,
− improvement of corporate image, market share, customer relationship, customer satisfaction and communication,
− ISO 9001 certification as a marketing tool.

Organisations that seek certification due to true desire for quality improvement will get benefits in terms of internal operations improvement (Poksinska, Dahlgaard & Antoni, 2002; Williams, 2004; Sampaio, Saraiva & Rodrigues, 2009). Their goal is to achieve an efficient QMS and not only to obtain the certificate and are also not interested in merely formally meeting the requirements in order to receive a certificate, but also meeting recommendations addressed in ISO 9004.

Another important element impacting the organisational performance after ISO 9001 implementation is also the relationship between the strategic objectives of the organisation and quality objectives (Rusjan & Alič, 2010b). This relationship is stressed in ISO 9004 as

a foundation for performance improvement. Quality planning should consider the strategies and objectives of the organisation in order to be efficient and effective (ISO, 2015).

Rusjan & Alič (2010b) presented how the outcome of the implementation can significantly vary, depending on the external or internal motivations for implementation and on how QMS is related to strategic planning of the organisation. There are three possible variants presented:

- When the standard has been implemented due to external pressures, the organisation is formally meeting the requirements of the standard. In this case, the standard is an additional cost for the organisation and brings minimal positive effects.
- When the motivational factors for implementation have been internal and the management support and commitment is strong, organisations gain effective QMS. Standard requirements are met also from the content point of view, not only formally. Such situation leads to operational improvement and rationalisation and decreases the cost of quality.
- When the standard has been implemented due to internal motivations with strong management support and in line with organisation's strategic objectives, the standard will lead to quality strategy supported with the business strategy. Quality objectives are related to strategic objectives of the organisation. This results with efficient and effective QMS that enables improvements in organisational performance.

4   INTERNAL PROCESS AUDITING

It is important to stress that such benefits can be obtained if the company is dedicated to maintaining the level ISO 9001 standard is requesting or suggesting. Furthermore, improving and maintaining performance is a never-ending process and the proposed way of achieving that is by conducting internal audits. As was already mentioned, it is not a requirement to get certified to ISO 9001, but if an organization decides to do so, it is expected by a certain independent certification body to conduct (usually) annual external audit, to ensure the standard is being maintained, otherwise they might not extend the validation of the standard (SQS, n.d.).

Evidently, there are two benefits to be gained by conducting internal process audits. Firstly, to retain the certification, to be further officially recognized as an ISO 9001 certified organization and secondly, to ensure the quality management system is working efficiently and striving to search for improvements. Internal audits are one of the key activities required by the ISO 9000 standard to maintain efficient quality management system. "The general purpose of internal audits is to determine whether the established QMS conforms to the requirements of the ISO 9001 and to eliminate any detected non-conformities and their causes." (Rusjan & Alič, 2010b).

There is a spectrum of expectations and interest regarding internal auditing, from companies that are merely interested in being certified, may only be focused on achieving minimal

conformance to the requirements of the ISO standard; to companies striving for audits that will guide them towards effectiveness and improvements (Rusjan & Alič, 2010b). Alič & Rusjan (2011) showed that internal audits can stimulate workers to work better with following the procedures and rules. Audits can influence exchange of knowledge and best practices, stimulate business improvements and help management achieve business objectives. Additionally, internal audits can reduce risk and point out to synergies (Rogala & Wereda, 2015). To achieve the benefits, audits should be thoughtfully planned and performed. An effective audit needs to have defined scope and objectives, a suitable plan and should demand for fitted resources, people and time. Auditors, conducting the internal audit should be competent, having the knowledge of the ISO standard and the business process they are about to audit. Moreover, audit needs to be performed in accordance with the ISO standard and the desired outcome are valid findings that can lead to improvements. In the end, an audit should improve working practice (Elliott, Dawson & Edwards, 2007).

The standard ISO 19011 provides guidelines for auditing quality management systems. It describes how to conduct internal and external audits, what are the audit principles, how an audit process should operate and how audits should take place with information on auditor competence. It provides instructions on how to prepare and execute the audit. Effective audits verify whether implemented quality management system is meeting the requirements of ISO 9001 (ISO, 2018).

According to ISO 19011:2018 (ISO, 2018), an audit is a "systematic, independent and documented process for obtaining objective evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled". This process is performed by the auditor, who audits the defined area. According to ISO 9001:2015 (ISO, 2015), an auditor is the person who conducts an audit and his/her tasks include verifying conformity with the standard, additional laws and regulations and identify opportunities for improvement. Audits can be internal or external. Internal audits are first party audits, organized by the management of the certified organisation and the auditor is usually an employee of this organisation. External audits or second and third party audits are conducted by external providers, like supplier audits and audits by accreditation bodies who check the standard requirements in order to be able to extend the certificate or not.

Besides the process audit, which is the audit under consideration for this master's thesis, there are also additional classifications of audits according to the focus point and their objectives: System audit, Procedure audit, Product audit, Performance audit and Compliance audit.

An audit program needs to be created before the audits can be performed. It requires a plan in a form of a schedule for when and where which audit will be conducted for, usually, one year ahead. Then, for each individual audit, a plan must be created with the selected date of the audit, who will conduct this audit, which area will be audited according to which standard. The auditees are expected to be informed about the audit in a reasonable time frame and with an audit agenda. When the audit is concluded, the auditor needs to prepare an audit

report, including the evaluation of the audit. The report should outline the audit procedure and most importantly non-conformances and deviations need to be described in detailed with suggestions for improvement.

ISO standard provides clear and straightforward recommendations on internal auditing: "Organisation shall plan, establish, implement and maintain an audit programme including the frequency, methods, responsibilities, planning requirements and reporting which shall take into consideration the importance of the processes concerned, changes affecting the organisation and the results of previous audits. It should define the audit criteria and scope for each audit, select auditors and conduct audits to ensure objectivity and the impartiality of the audit process, ensure that the results of the audits are reported to relevant management, take appropriate correction and corrective actions without undue delay, retain documented information as evidence of the implementation of the audit programme and the audit results."

For internal audits to be effective, they should be conducted in a consistent manner, in accordance with the proposed audit program and by competent people, who are not part of the process being audited to provide objectivity and reliability.

Figure 2 - Steps in the internal audit

| Planning the audit schedule | Plannig the process audit | Conducting the audit | Reporting on the audit | Follow up |
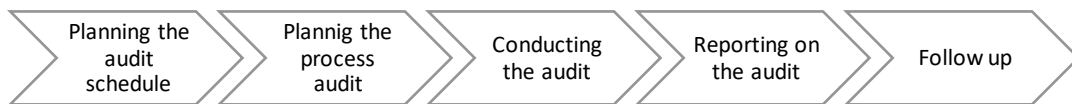
Source: ISO (2015); ISO (2018).

5   PROCESS MINING FOR INTERNAL PROCESS AUDITING

Today, being compliant with the standard is considered a minimum and for many organisations is not enough anymore. Researchers and organizations are searching for different approaches, for a way of auditing that add value, is cost and time efficient and overall beneficial beyond just being compliant (Rusjan & Alič, 2010b). One such technique that can contribute to the internal auditing is process mining.

Process mining presents a bridge between the data science and process science (van der Aalst & Damiani, 2015), more particularly, it is a discipline positioned on one hand between data mining and machine learning and on the other hand, between process modelling and analysis (van der Aalst, Van Hee, Van Werf & Verdonk, 2010). It is a new type of Big Data Analytics (Çelik & Akçetin, 2018). Use of process mining techniques has been increasing as companies want a raw insight into the real world of how their processes operate. Business process mining derived from the field of data mining. Data mining extracts the knowledge from large data sets with identifying patterns within the data. This practice has been adapted to create the business process mining techniques and they mine data logs that contain "process execution data to reconstruct actual business processes" (Tiwari, Turner & Majeed, 2008). Process mining is highly promising in systematically extracting and analysing data

and knowledge from the event logs stored by the organisation's ERP system. ERP systems are today pervasive in many large organisations and process mining can exploit those large amounts of data that are being stored in ERPs daily. It can show unique insights to how business processes are actually being undertaken (Jans, Alles & Vasarhelyi, 2013).

Auditors can use historic data to adjust the desired scope and remove unimportant situations or focus on specific ones. Such querying the specific events can be especially useful for auditing questions, as auditor could get some answers before the actual audit (van der Aalst, Van Hee, Van Werf & Verdonk, 2010). Furthermore, process mining takes the entire population of data into consideration when analysing, not just a sample. Auditor can see the meta data, which is entered independently, not just by the auditee. Process mining allows the auditor to walk through the processes as they are and conduct analyses which are not possible with other audit tools (Jans, Alles & Vasarhelyi, 2013).

Since process auditing is effort consuming to auditors, it can be smart to support the audit with process mining. It provides the opportunity to check the conformance of actual processes against a predefined model (Srivastava, Srivastava & Bhatnagar, 2019). Auditors can save their time by putting more focus on analysing conformance instead of gathering data in the field, conducting interviews and taking samples. Process mining should present a new way of conducting audit, or at least additional view on the audit, while minimizing the effort of the current methods and not being used simply for statistical analysis. It needs to be placed within the context of audit practice so the auditors will be reassured that using process mining meets professional standards (Jans, Alles & Vasarhelyi, 2013).

The focus of process mining is a business process. Actual business processes are extremely complex. There are countless interactions across different processes, either concurrent or happening with lags and often, they have little relation with the ideal process model designed with BPMN (Kogan, Alles, Vasarhelyi & Wu, 2010). That is why process mining brings high value to auditing, since it enables a comparison between how processes are supposed to operate as design and how they take place in practice (van der Aalst, Van Hee, Van Werf & Verdonk, 2010).

According to Jans, Alles & Vasarhelyi (2013), the value-added sources of process mining when it is applied to internal auditing are:

− Process mining does not analyse only a sample of data, but the entire population of data.
− Additionally, that data consists of meta-data, meaning data entered independently of the actions of auditee and not just data specifically entered by the auditee.
− Process mining effectively provides walkthroughs of processes for conducting analysis, which enables the auditor a more effective way of implementing the audit risk model.
− Process mining allows discovering ways how business processes are actually happening in practice and identifying relationships between employees, so the auditor can conduct analyses not possible with existing audit tools.

The center of process mining and the source of data is an event log. It is defined as "a chronological record of computer system activities which are saved to a file on the system. The file can later be reviewed by the system administrator to identify users' actions on the system or processes which occurred on the system." (FAS, 1996). Process mining can offer consideration of the population of data, stored in the ERP system to the auditor and makes it possible to the auditor to give up the standard audit approach, that relies on samples.

Event log contains log entries of events that were captured by the ERP system. Each log entry is an event and consists of at least the following information: activity label, time stamp and case designation/identifier for the employee making the entries, or additional information, like performer, resource, product description, tracking change entries, etc. Event logs can be viewed as a trace of all events of all possible cases of a certain process within a particular time interval. Every case is sequence of events (Roubtsova & Wiersma, 2018).

Event log is far more than a chronological record of system activities. That would be more of a paper ledger. Event log additionally includes automatically recorded data that are independent of the employee. When looking at the event logs, auditor can also see contextual, independent meta data, showing circumstances of the employees' entries. The scope of the event log is the result of how much information is recorded when making an entry. The more information is complete, the more closely will the actual business model conform to the discovered process (Jans, Alles & Vasarhelyi, 2013).

Figure 3 - Structure of an event log
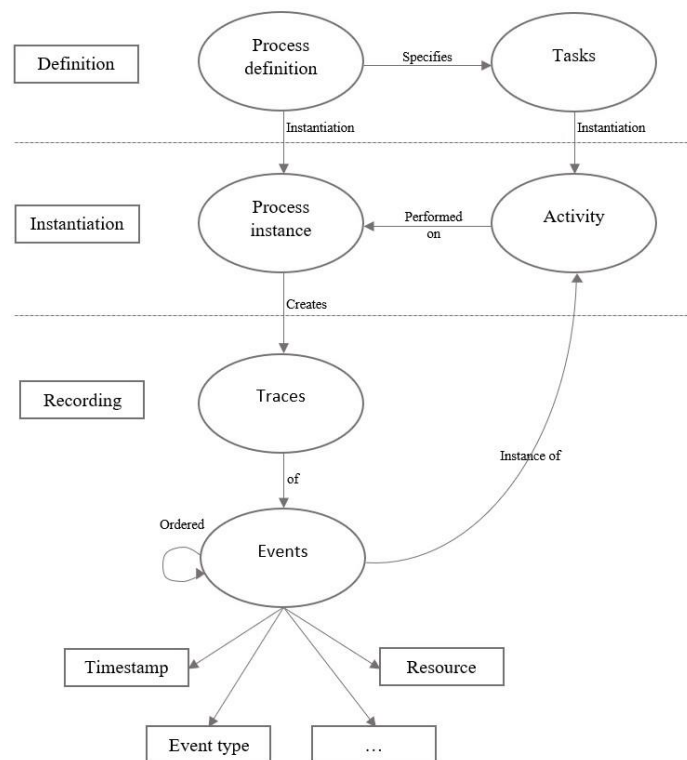
Source: Kumaraguru & Rajagopalan (2013).

An event originates from a case/process instance (for example downloading a process model from the database) which consists of an activity (e.g. login to the database) within a timestamp (e.g. the duration of database site usage from login to logout) by an originator (an employee who initiate the task) (van der Aalst, De Beer & van Dongen, 2005a). Process mining is used to discover a model by constructing a Petri net (Petri & Reisig, 2008) from observed process after collecting all event logs (van der Aalst, De Medeiros & Weijters, 2005b). Furthermore, it runs a conformance checking to proof that observed model is in compliance with the modelled process (van der Aalst et al., 2007). Finally, it extends the model to new initial model. These stages were presented by Günther (2009):

Figure 4 - Process mining stages
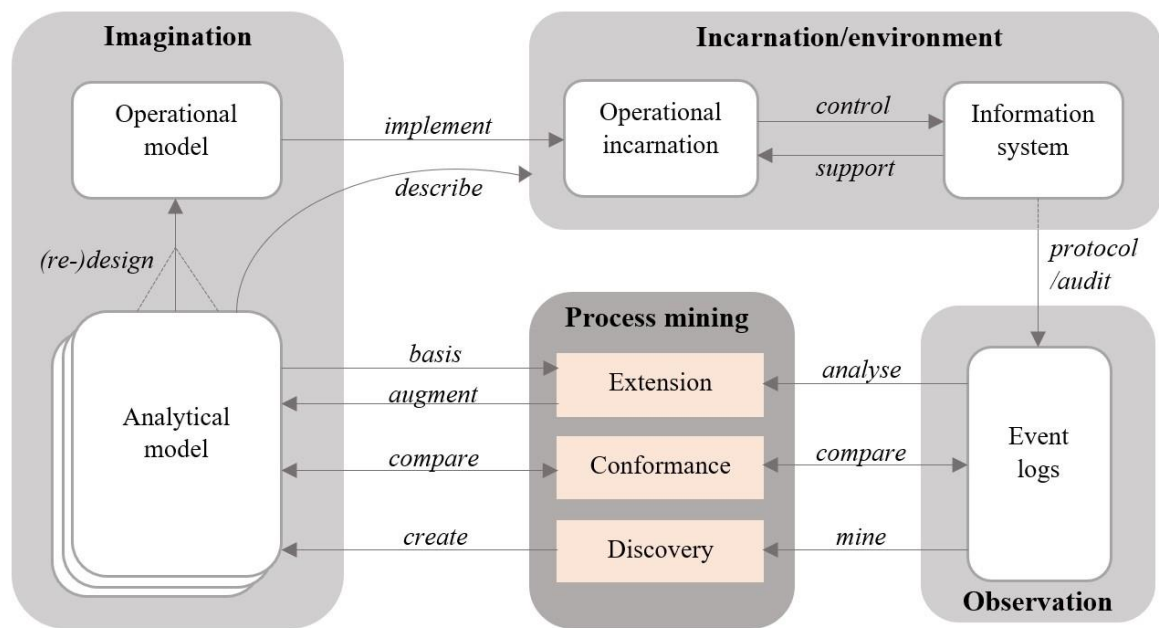
Source: Günther (2009).

Process mining can be focused on process discovery from event log. Algorithms like the Alpha algorithm can extract a Petri net, providing a very detailed model of the behaviour from the log. It gives an unbiased view on the real situation, but can be too detailed for the auditor's needs (van der Aalst, Van Hee, Van Werf & Verdonk, 2010).

Second type of process mining can be organized as conformance checking, using a predefined model, which is a prerequisite, and comparing it with the data from the event log. This can provide answers to auditing questions regarding how real-world process from the event log is aligned with the process as it should be (Roubtsova & Wiersma, 2018).

Process mining can also validate the compliance of regulations, laws and standards with a logged process. The compliance can be examined either at the design time or at run-time (Awad, Weidlich & Weske, 2009; Barnawi, Awad, Elgammal, Elshawi, Almalaise & Sakr, 2016).

6 RESEARCH FRAMEWORK AND METHODOLOGY

First part of the thesis presented a theoretical overview of the conceptual framework. In the second part, this thesis turns to the empirical part of the study, where also additional literature will be included. In order to highlight the purpose of this thesis, in the sixth chapter, first a brief introduction of the company selected as a case study will be presented, followed by the research objectives and thesis goals. Next, the research questions will be outlined and afterwards, the methods used for the collection of the primary data will be explained.

This thesis adopted a case study strategy of qualitatively analysing the state of internal business process audit. Due to non-disclosure agreement the name of the selected organisation for a case study cannot be fully disclosed. Here forth it will be named as CS (case study) company and CS in short. This, however, will not affect the successful presentation of primary data obtained and recommendations for improvements can be undisturbingly outlined.

Context of CS company

CS company is a multinational manufacturing company. Its headquarters are located in central Europe with subsidiaries operating all over the world. As many others, CS is also certified by ISO 9001 standard. The first part of this thesis explained that internal auditing of business processes is highly recommended or suggested in ISO guidelines and secondly, every certified company gets externally audited by a certification body every three years in order to retain the certificate. During the last external audit in 2019 the certification body came across two important non-conformities. The audit sessions discovered that, firstly, currently no centralized internal audit program has been put into place. Not all global process owners (GPOs) perform process audits or equivalent assessments. And secondly, there are different ways of conducting internal audits. The audit session found that there are currently several ways in which audits can be performed, deviations measured and evaluated, due dates set, and results compared. Due to the explained situation, CS company was a good candidate for this thesis, taken as an example of an organisation struggling with internal auditing. The research will show the reasons for this situation and present suggestions for improvements. Every organisation having similar issues with internal process audits, can benefit from the findings presented in the upcoming chapters.

6.1 Research design and objectives

The purpose of the qualitative research is to understand the current standing on internal process auditing. The initial knowledge of the situation in the beginning of February 2020, just before I started my qualitative research in the CS company, was that there is no centralized internal audit programme. This means that the responsible team governing the internal auditing did not have an overview on this issue. Processes were being audited, but the responsible team was lacking knowledge on where are the internal audits being carried out, who are the auditors, how do they audit, where are the gaps, where is the documentation

on past audits stored etc. The main driver for noticing the problem in their situation was the external audit and the finding of previously described non-conformities. Consequently, the CS company had no choice but to start solving this issue, otherwise their ISO 9001 certificate cannot be extended.

The goal is to understand the reasons behind the current situation. To understand the needs and expectations of interested parties and to find external and internal issues and requirements of relevant interested parties. My thesis also aims to see what kind of obstacles there are currently in the initiative of internal process auditing in order to provide relevant solutions for successful organization of internal auditing.

6.1.1 Research objectives

The main purpose of this master's thesis is to contribute to understanding of possible challenges and beneficial outcomes when it comes to internal process auditing and to understand what it takes for an organization in order to sustain an effective quality management system that can lead to growth and improvements. It will help us understand many different aspects that are preventing internal process auditing from delivering the added value and present successful approach to internal auditing.

The goals of the thesis therefore are:

− to conduct an analysis of the state of internal process auditing in CS company,
− to discover the main issues responsible for internal audits not being beneficial,
− to provide practical recommendations for the organization on how to tackle such situation with the intention of having a successfully implemented internal audits,
− to suggest modern approaches to internal auditing, like remote audits and the usage of process mining and show their benefits.

Based on the written purpose and goals, this master thesis will try to answer the following research questions:

RQ1. What is the state of internal process auditing in a selected organisation?
RQ2. Based on the findings from the empirical research, what are the main factors responsible for such situation?
RQ3. What are the possible solutions, leading to successful and efficient internal audits?
RQ4. How can process mining and remote audits contribute to internal process auditing?

6.1.2 Methodology

This master's thesis has two parts and uses multiple types of data. Before the start of the empirical part, the secondary data were used to conduct a literature review on quality and quality management presented in chapter one, ISO organisation in chapter two and ISO 9001 standard in particular in chapter three, followed by the fourth chapter on internal process auditing and process mining presented in chapter five. Secondary sources as the domestic

and foreign research were obtained from online databases, including various academic journals, scientific articles, literature and statistical data.

Primary data were used for the second, empirical part of the thesis. Data were collected with qualitative research. A case study strategy was used with one large organisation within which I collected my data using unstructured interviews. Saunders, Thornhill & Lewis (2009) define case study as "a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence". The case study strategy also can provide answers to the question "why?" as well as the "what?" and "how?" questions (Saunders, Thornhill & Lewis, 2009). With case study strategy, the data collection techniques used can be various and often used in combination. It is very likely the multiple sources of data need to be triangulated. Triangulation means using different data collection techniques within one study to ensure the data are telling what we think they are telling (Saunders, Thornhill & Lewis, 2009).

Therefore, my first step was documentary analysis. CS company owns a rich database, storing all the company's documents as they are otherwise operating paper-free, everything is digitized. Relevant findings from the documentary analysis will be presented in the seventh chapter.

Qualitative data collected using documentary analysis were later triangulated with qualitative data collected using unstructured interviews in two parts. Firstly, the in-depth interviews were conducted among the sample of company's registered internal auditors. Sampling provided a valid alternative to a census in my case because it would be impracticable for me to interview the entire population of internal auditors and my time constraints prevented me from doing that. The deadline was the ending of my internship in the company at the end of June 2020 (beginning was in February 2020) and also company's tight schedule as new external audit was approaching.

The interviews were non-standardised, internet and intranet-mediated, conducted through Skype application, one-to-one, due to the fact that interviewees were located in various subsidiaries all over the world. The target was to include all the existing locations as my objective was to find out the situation on internal process auditing in every possible country and unit of the CS company. That included all the corporate units, divisions with business units, R&D, supply chain, plants, all the regions with market reach and overlapping common procedures like global logistics, repair services and HR.

Due to the insufficient results, which will be presented in the seventh chapter, I conducted second round of non-standardised in-depth interviews on a different sample of quality managers from all the plants worldwide.

6.1.3   Interview questions

Prior planning prevents poor performance, hence documentary analysis was very important for me to gain knowledge on the organisational context, internal policy and practices of the

CS company in general and more specifically, their data on ISO 9001 and approach to internal process auditing.

Every interviewee was supplied with sufficient information before the interview via e-mail. E-mail contained invitation to the online interview together with a list of the interview themes to promote validity and reliability. Interview themes were derived with the help of the literature, company's documentation from their database and discussions with co-workers and mentors from the company. Explanation of the research was provided to the participants as part of a pre-prepared participant information sheet together with the consent form and assurance that the information will remain confidential to establish the credibility and gain the interviewee's confidence. Invitation to the interview with all the stated information included can be found in Appendices.

The first part of the interview included most important question: whether they do or do not conduct internal process audits or equivalent process assessments in their unit. If the answer was affirmative, we focused on these themes:

- How and when are the audits being conducted, how often? Is there a plan?
- Which tools and methodology are they using?
- Who is conducting the audits?
- Where are audit results being stored? In what form and for how long?
- What is the aftermath of the audit?
- Etc.

If the interviewee could not answer affirmatively to the first question, there was a second set of themes:

- What is the main reason?
- Are there specific requirements?
- When is the last time audit was conducted?
- How do you check the process efficiency?
- How can you assure alignment with requirements?
- Etc.

7 RESULTS FROM EMPIRICAL RESEARCH

This chapter will present the results from the qualitative empirical research. The outcomes are gathered from documentary analysis, in-depth interviews conducted with internal process auditors and in-depth interviews with quality managers from the plants. This chapter also provides answers to the first two research questions:

RQ1. What is the state of internal process auditing like in a selected organisation?

RQ2. Based on the findings from the empirical research, what are the main factors responsible for such situation?

7.1 CS company's business model: relevant findings

CS company is a global corporation, one of the leaders in the construction and building maintenance industry. It provides products, tools, systems and services to professional customers worldwide. In 2019 sales grew by 4.3 percent to 5.5 billion euros. CS posted an operating result of 752 million euros in 2019 (+7.4 %). They employ around 30,000 employees around the globe of which around two-thirds work directly for the customers in sales and engineering. CS has subsidiaries in more than 120 countries, where its direct distribution model is applied. They have their own eight production plants, as well as research and development centres in Asia and Europe. Vertical span of manufacture is high. From starting research, product development, manufacturing to distribution of the products directly to the customers. CS company is hence targeting sustained customer satisfaction. They pay special attention to product and service quality, direct customer relations and continuous innovation. Their mission is to "passionately create enthusiastic customers and build a better future". Customers rank as their most important competency, as their requirements drive CS company's actions. It is also one of the three C's as the main strategic drivers in their business strategy, named Champion 3C strategy. Besides the Customer, it also includes Concentration on products and markets, where they achieve leadership positions and Competence, as they are committed to constant innovation, effective marketing, total quality and direct customer relationships. CS employees and motivating culture are the main drivers for business and customer value. At the same time, customers are considered as business drivers. CS company's business is process oriented. Customers represent beginning as well as the end of the business process.

Their business model is designed from two elements: (1) customer value and sustainable profitable growth, and (2) people sharing a motivating culture as the essential drivers for business. The model shows that business is driven by "Purposes and Values" that are shared by the employees. CS company is using strong process-oriented structure.

There are four main process areas defined on the corporate level. Each of them is further developed on lower, more specific levels.

- Product Portfolio Management covers the design of new products, from the management of the entire portfolio of products through the whole life cycle on the top level, to research and design on the detailed level.
- Market Reach covers several sales channels, from their centres, sectional sales, to online shops and customer service.
- Supply Chain Management deals with the warehouse management and logistics. CS company purchases vast amounts of material on a daily basis and delivers same amount of its products to customers. It also covers relations with supply chain partners.
- Professional Services include processes of delivering services after sales, such as repair services and fleet management, where customer is paying monthly fee for the usage of products and receives value-added services.

In addition to the core business processes, there is also a process area for management and support. Specifically, IT services are located there, supporting all four process areas.

In general, company is stating that all processes are measured in terms of outcomes to manage their contribution to their purposes and values. Due to the highly successful financial reports every year and general reputation of the company known for very satisfying, effective and efficient products and services, there is no doubt that process performance and quality check is under control.

However, my findings show that internal process auditing recommended by ISO 9001 is still not covered properly in all areas necessary. Factors, pointing to the reason for a situation where the company is highly mature in quality and at the same time does not properly follow internal auditing, are such:

7.2   Several tools for quality check in use

Certain areas are undertaking different tools and measures for quality and performance check. Some units, for example global logistics and warehouses are using lean management, governed by the Global lean logistics department, located in the Headquarters. There are also Kaizen and Six Sigma tools in use in other units.

7.3   Gaps in internal process audits

Internal audit programs in general, not just ISO 9001, are being successfully conducted in certain parts of the CS company. Corporate audit team have a central system, taking internal control for finance, Health and safety team is taking care of ISO 14001 audits. What is taken care of under the scope of ISO 9001 audits are all eight plants, located in Austria, Germany, Hungary, Mexico and China, which are audited regularly, globally governed by a designated Head of quality manager, as well as supplier's audits, covered by a different department. There is no overview and jointly steering of all internal audit programs at CS company. After the interviews with listed internal auditors it became clear that, besides the areas listed above, internal audits are not being conducted. There are incomplete data on the Market reach area and Professional services, globally. All four main process areas listed previously, are audited on the corporate level, but global overview of the detailed processes worldwide is unknown. The exception in every continent and region are audits of suppliers and audits in plants. Auditors from North and South America, Asia, Middle East, some parts of Europe, reported that they are not aware of process audits being done as many of them also did not prolong their auditors' licence. Overall, some processes are audited regularly, others just once in a while and some are not being audited at all and this is the situation for all of the business units, except for plants and beforementioned departments where audits are under control. This complicates an overarching analysis and comparison of all audit results centrally.

The CS company is otherwise quality mature, they are aware of the importance of ISO standard and it is evident that their implementation of the ISO 9001 standard was not due to external pressures only, but in some ways their attention is too focused on having the

certificate as they only started to worry about the improper situation when the danger of losing the certificate arose and not only from the awareness that their internal auditing is not as put together as it should have been, or at least it is not documented properly. Their attention to the ISO 9001 situation might not have been so focused due to the fact that quality measurements are done by other tools as well. The management is also very supportive of the QMS, but their knowledge of the situation is not complete. Internal audits and quality management in general are highly mature in some units, like corporate audits, financial audits, plants, but minimum in majority of others.

7.4   Changes in management

Interview with internal auditor from North America showed that internal auditing used to be in place there around 10 years ago, but after certain changes in management, internal auditing gradually suffered a severe setback as other methods might have been suggested by new managers. Evidently, internal audits were simply a method pushed by the manager at the time and not something employees would perceive as being part of their jobs, required for a possible improvement. As the management changed, so did the "pressure" or request to apply and maintain internal auditing. The journey with internal auditing started off great, but it lost momentum after a certain period of time, due to the change in management or adoption of other quality check tools. After regular internal auditing stopped, they were presenting other documentation to external auditors, like corporate financial audits, reviews of business processes and monthly reviews in form of self-reviews. They were able to explain, with the help of the internal control system, what they are doing and up to some point it was sufficient to external auditors, until last year.

7.5   Lacking single management system and centralized internal audit program

A centralized audit program assuring a regular audit of all parts of the managements system in all sites of the CS company is not established. The existing internal audit programs are not compliant with the centralized internal audit program dedicatedly required by the standard, which is a requirement for the audit of a management system operated by a multi-site organisation. ISO 14001 is guided separately and is not aligned with ISO 9001 as the latter is not jointly governed by any team at this point. As was already stated, internal audit programs are currently fragmented, which is directly related to dispersed governance.

7.6   Highly dispersed governance of internal audits

Due to the fact that centralized internal audit is not in place, consequently each internal audit program has its own governance. Corporate audit team has a central system, taking internal control for finance, Health and safety team is taking care of ISO 14001 audits, Global logistics department is covering audits in logistics and warehouses. Internal process audits in the plants are governed by a certain Head of quality manager, more specifically by a Lead quality manager in every plant. They follow their own system and are not in touch with suppliers' audit or any other audit program. The OE (operational excellence) team, which

should be officially in charge of the overall internal process auditing, is only receiving quarterly or yearly reports from the plants and is otherwise not aware of the overall situation on internal auditing for ISO 9001 or for any other audit program.

7.7 List of qualified internal auditors is outdated

The list of qualified internal auditors was provided by a Head quality manager from the Product Portfolio Management department. It was supposed to present Lead auditors, Supplier auditors and Process auditors, those that are qualified as well as those in training. The list included 180 auditors worldwide. This same list was used for the interviews, as I selected 23 auditors from it for the interviews, according to their location and business unit, so that each of them was covered by one auditor. Besides wanting to know the scope of audits, I was also interested in who are current qualified auditors, what are their qualifications, what is the situation with their trainings and levels, what is the frequency of audits, in order to be able to use already qualified auditors to cover the current gaps. It turned out that the list has not been updated for many years. Some auditors from the list were not employed at CS company anymore, some of them lost their licence years ago, some did not perform any audit in a while, others were wrongly listed, for example as Process auditor when they were really auditing suppliers. List of auditors is out of date and there is currently no overview of current qualified auditors, their skills and trainings. Plants have their own list of auditors, as well as Health and safety department for ISO 14001 audits, Logistics department has it for logistics and warehouses audit and Corporate audit team for financial audit.

7.8 Several ways of doing internal audits and storing audit reports

CS company's IT department is highly developed and innovation driven. They transformed the data and process structure from local data and process silos to global standard busines processes and standardized data structures. The central IT function became responsible for the IT infrastructure worldwide and it got aligned with the company's business processes. They implemented global SAP system solution with ERP, BI, CRM and SCM, centrally managed from the Headquarters and now being used by 30.000 employees. Furthermore, they were one of the first companies using SAP HANA databases in productive environments. With this in-memory technology, there is a way to exploit the potential of their data. The real value is in the analysis and simulation of large data sets and based on that, possible optimization and transformation of business processes.

In the scope of QMS and based on the requirements by ISO 9001, they have implemented GPMS (global process management system), a rich database that is covering all core aspects of the company, including quality and environmental management. All documents about business processes are stored in GPMS. It provides all the necessary information about every process, including process description, process owner, process indicators, flow charts and records. It is meant to store up-to-date information on every process that requires an audit. Auditor should be able to find all the relevant information prior to audit for his/her

preparation for audit. Eventually, GPMS itself became outdated. Interviewees reported GPMS being too complicated to use, too slow, unclear when searching for documents. It contains too many documents already, which are not systematically stored or are even misplaced. Due to these problems, employees do not update process documents regularly. It became difficult for auditors to find process documentation when it was needed for audit preparation.

This led auditors to start using different tools and storing them in different databases than GPMS. The responsibility for internal audits lies in several organizational areas within CS company, as was explained in previous chapters. Therefore, deviations with regards to categorization, measure tracking or due date setting appeared. There are various audit management solutions in use, although GPMS stores prescribed templates to be used for internal audits and it was recommended to upload audit reports back to the GPMS. Even though, quality managers from plants explained that there are several platforms or solutions where audit reports are being stored. A lot of them are even storing updated process descriptions on site for their own use. Some plants are using Excel sheets for audits, storing them on their local drive. Others are storing printed versions in their desks, or scanned PDFs in personal drives. Some plants are using Jira software, project management tool for audit tracking. It offers scrum and Kanban boards, roadmaps and agile reporting. Few auditors reported that Jira can be connected to GPMS, hence some updated process documents get transferred to the main database. There is also SharePoint in use, a web-based collaborative platform that integrates with Microsoft Office. Both Jira and SharePoint are used throughout the CS organisation, but access to Jira of other teams is not possible without being a member of that unit, which is a huge disadvantage for not being able to share best practices, see the update on the audit situation or check for available auditors.

Furthermore, internal audit approach does not follow a specific standard. Some business units are using suggested audit templates, stored in GPMS, which are prepared according to ISO 9001 recommendations, but others follow their own system, using different approach.

At the same time, OE team, located in the Headquarters, that oversees GPMS as well as ISO 9001 internal auditing, also decided to transfer all the data from GPMS to the upgraded solution, with the intention to align internal auditing with improved GPMS database.

8 RECOMMENDATIONS FOR IMPROVEMENT OF INTERNAL PROCESS AUDITING SITUATION

CS company is highly successful and is providing exquisite products and services to thousands of customers everyday worldwide. Nevertheless, for the sake of keeping their ISO 9001 standard, which is crucial for their business agreement with suppliers and customers, both of whom find confirmation of sufficient quality in the standard, CS company needs to bring their situation on internal process auditing to the level ISO is recommending. Besides retaining the ISO 9001 standard, improved solution will help the company see the overview

on auditing status, providing the possibility of having processes under control in such a way, it enables them to strive for improvements.

Recommendations are based on the findings from empirical research and on the literature review, which helped me find best practices on similar issues other companies had with regards to internal process auditing. This chapter will also try to provide an answer to the third research question:

RQ3. What are the possible solutions, leading to successful and efficient internal audits?

8.1 Filling the gaps

In my opinion, CS company needs to first, fill the gaps in all the units that are currently not conducting internal process auditing. Employees should be introduced closely to the meaning and the effect of performing internal auditing as it is outlined in ISO 9001 standard and other belonging documents. Effective leadership will play crucial role with introducing this change successfully; change in a sense that employees will accept internal auditing as a part of everyday business. It needs to become embedded in their workday. According to a survey by American Management Association (1994), the key factors to successfully introduce a change are most importantly leadership, corporate values and communication.

Table 2 - Keys to successful change

	% mentioning this as important
Leadership	92
Corporate values	84
Communication	75
Teambuilding	69
Education and training	64

Source: Gill (2002).

Leadership is all about showing the way. Management should use personal power to win the minds of employees to strive towards a common goal (Gill, 2001). The leadership of change is a process of "emotional alignment". Management develops a vision for the future this change will bring, crafts the strategies on how to bring this vision to reality and ensures that all employees channel their energies towards the same goal (Gill, 2002). Leaders' certain strategic choices in times of change have a positive impact and a potential to increase the chances of successful implementation, like communicating new plans, implementing targets and schedules, focusing on learning. There are key functions in leaders' behaviours that can shape employees' response to change. Effective communication, being supportive and aware of employees' concerns and involving employees will influence how employees will feel about new implementation (positive emotions will be more common than negative ones), how they will comprehend it and how well their performance will correspond with defined goals (Oreg & Berson, 2019). Study by Furst & Cable (2008) showed that softer tactics, like

consultation and involvement of employees will less likely cause resistance to change than hard tactics, like legitimation. Management commitment to this initiative needs to be evident in several ways. They should be eagerly involved, willing to invest resources and take tough decisions when needed, should be aware of the influence of their behaviour, provide a consistent message and regularly review the progress (Gill, 2002). Management should present the need for internal auditing as the regular activity leading towards continuous improvement and not something that needs to be done to obtain the standard.

8.1.1 Implementing regular internal auditing culture

Implementation of audit culture should evolve without major issues since CS company's employees share strong corporate values: integrity, courage, teamwork and commitment. Sharing a common goal, using synergies, identifying with the company, being committed and inwardly engaged will help them integrate the culture of internal auditing with greater ease.

Employees and every current and future internal auditor need to be aware that internal auditor does not play a role of an inspector, but the role of a facilitator of continuous improvement who contributes to the overall business performance (Power & Terziovski, 2007). Employees should not perceive the internal audit as a tool for recording and reporting negative observations. Such attitude can lead to a rejection by employees, hence it needs to be communicated that internal audit can only be beneficial for the company as a whole and does not present inspection of employees.

8.1.2 Spreading the awareness on internal auditing

CS company can easily use its internal social networking site for spreading awareness of importance of internal auditing. Their medium as interactive web tool offers possible engagement with employees, providing wide scale and speed of communication. Every employee, regardless of the position and unit, has an active profile with specific personal and work information. Everyone is automatically a member of its own team and additionally receiving general important updates from the Headquarters. For example, in the beginning of the Corona virus pandemic, this tool was used to provide information on updated situation regarding the virus, visible to everyone on the main feed of the website. If you are an employee in the department of Global logistics, for example, you are a member of your team's site/profile and additionally, you can subscribe to any other department you like. This employee can also follow main profile of Global logistics and will receive news and uploaded documents from the Global logistics profile. The same employee can follow the profile of Corporate audit or even a profile of production plant in Mexico.

Team lead of OE team from Global IT which is responsible for taking over and start managing the internal process audits, should reach out to the chief executive and firstly clearly explain the need to spread the message of internal audit awareness. Chief executive could post the news with explanation to the main feed of their social networking site where it is visible to every employee. Furthermore, team lead should also reach out to all the Global

process owners and Global process managers, encouraging them to repeat the news on their units' profiles. Message should be cascaded downward, from chief executive to the various levels of middle and front-line managers and get posted in every units' profile on their networking site.

Spreading the awareness on internal process auditing to employees should be the first step, to create the right atmosphere and let all units know internal auditors will start conducting regular internal audits, especially those units that did not have internal auditing performed systematically so far.

8.1.3   Establishing the team of qualified internal auditors

Internal social networking site should as well be used for qualification of internal audit team and first of all, up-to-date list of currently qualified internal auditors. OE team should first start with gathering information on currently active internal auditors. Empirical research showed they are active in all eight production plants, in Corporate audit department and in Health and safety department. The latter are covering audits in the scope of ISO 14001, but in order to fill the current gaps and since internal auditors are scarce at this point, they could be trained for ISO 9001 and take over some of the un-audited units. This could be a possible solution until additional employees will be recruited into bigger internal audit team, once the auditing programmes decide on the structure and further governance of internal audits.

8.1.4   Using remote audit for covering critical areas

At this point, current qualified internal auditors could cover critical areas by conducting remote audits. The traditional methodology used for internal auditing involved physical assessments on site. There are growing reasons, needs and capabilities though that are challenging the effectiveness of the traditional methodology. The global scale of sites needed to be audited in the case of CS company caused high travel expenses and a lot of time needed for auditors to arrive at the designated location, since internal auditors are primarily the employees and they are advised by the ISO rules not to audit "their own" processes (ISO, 2018). Furthermore, year 2020 has been influenced by the Covid-19 crisis, causing risk and difficulties on travelling and in-person work. And lastly, some parts of an audit process have already taken place without an on-site appointment, like the preparation and follow-up. The required documentation was found in the GPMS database or sent by an email and agreements between two parties have been established by means of video conference. The execution of the audit was nevertheless physically on site by default.

CS company is already getting familiar with a remote service platform called Oculavis Share. It has been tested by the plant in Germany so far and could be used for regular practice of internal auditing and especially at this point, to cover the current gaps as soon as possible.

Service technicians, quality managers and know-how carriers of producing companies travel every day all over the world to support clients right at the point of action. That is time consuming, expensive and inefficient. Oculavis enables virtual connection between an

auditor and auditee and provides a look at the process through the eyes of an auditee on site while staying in his/her office. Auditors can connect live to their auditees and conduct an audit remotely worldwide, as auditee is guiding the auditor through the process. Bind directional video and audio streams allow for users to see and share exactly the same things. Oculavis can integrate into company processes ideally with smart glasses but also with all tablets and smartphones. While using the Oculavis, contact persons, documents and checklists can be shared across all participants. User can also create and share screenshots for documentation purposes (Oculavis, 2019).

Oculavis is the innovative remote service platform (Software-as-a-Service or SaaS) for the industry, offering customizable service apps, ready-to-use augmented reality and artificial intelligence applications for service processes. It allows to connect an auditor and an auditee, for example, remotely and avoiding travel costs and CO_2 emissions. This software is modular[3], extendable and allows scalability while meeting individual demands at the same time by means of configuration (Oculavis, 2019). The basic platform consists of the following parts:

– web-application for users and administration,
– mobile apps for tablets, smartphones and smart glasses,
– functions to provide technical or other documentation of products and processes,
– functions to support technicians and customer with an AR remote support,
– chat system for an exchange between back-office and on-site employee,
– an API to interface systems like ERP, CRM, PDM/PLM and others,
– modules to interface machines and tools (e.g. via MT connect or OPC-UA).

Oculavis is available for notebooks and desktops (Windows, Mac and Linux), for smartphones, tablets and smart glasses, which can be additionally bought at Oculavis. All applications can be provided as white-labelled applications. The main application fields of the software platform are service and maintenance support as well as customer service. Secondary application fields are remote training, remote audits and remote quality inspections (Oculavis, 2019).

Remote audit with Oculavis can provide many benefits. Most important, it allows for one person to be on-site and can be supported by experts remotely, which leads to less travelling and consequently to possible savings on travel expenses. It allows hands-free interaction when using smart glasses. The auditor can see through auditees eyes and can point or mark what auditee should look at closely. It provides instant reaction through real-time data and live visual sharing. Documentation or case reports can be directly created. It is easy to use for world-wide collaboration. It enables more efficient and productive work of employees and faster machine repair (as it is not intended only for internal auditing). It has secured

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[3] Software modularity is the decomposition of a program into smaller programs with standardized interfaces (Bråtegren, n.d.).

connection via EU Azure server and provides face anonymization for recorded videos based on secured AI algorithm (Oculavis, 2019).

Figure 5 - Screenshot of Web-Application (Remote Support Videocall)
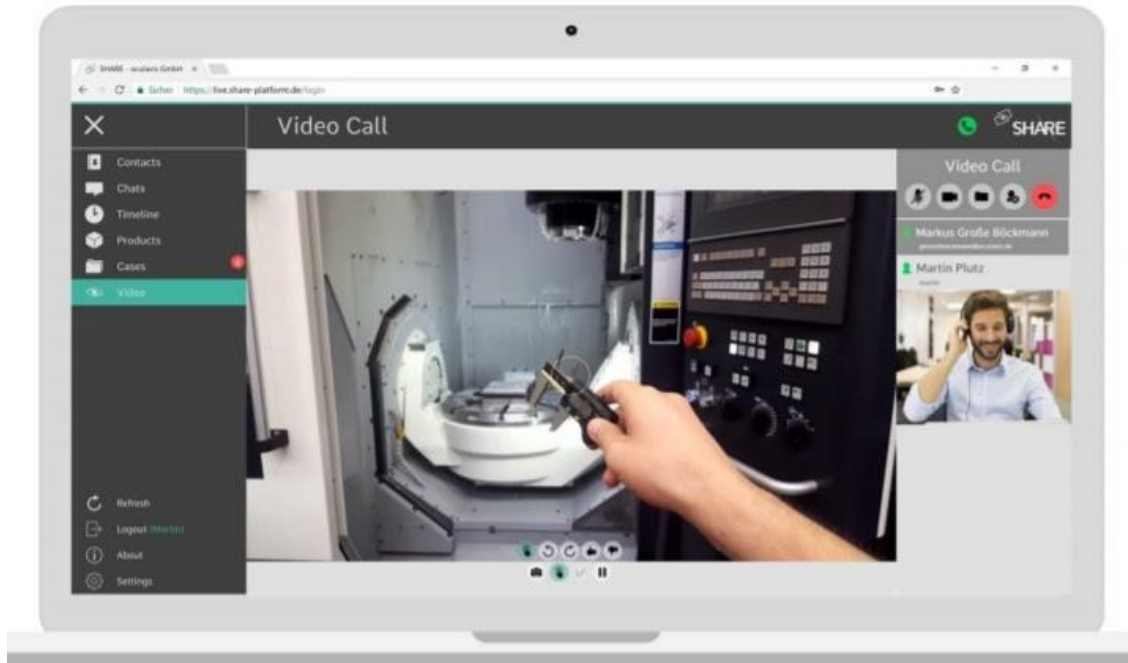
Source: Oculavis (2019).

Figure 6 - Screenshot of Smart Glasses App

Source: Oculavis (2019).

With its flexible documentation system Oculavis can be adapted to several use-cases. In addition, it allows to provide technical documentation before a remote call or to use instructions or documents outside a remote call.

Use-case of regular exchange with colleagues, customers or suppliers in ramp-up phases:

In ramp-up phases of new plants, machinery, products or processes with regular exchanges and inspections, customers, plants and suppliers can connect to each other. The mode 'Contacts' allows the external user to see and call all users of the team he is participant of directly. Calls can be planned in the timeline, started and documented. Cases are defined as 'inspections' with special data request. Within the cases, checklists can be filled with information and assigned to responsible persons to document the progress.

Use-case of remote audit:

Before acceptance tests take place, the audited person can provide technical documentation of processes to the auditor via 'Products'. The auditor and the auditee plan a call and document it as an 'audit' case. If the auditor is an external, he/she accesses the audit documentation via the mode 'Products'.

Figure 4 shows the system architecture of the Oculavis software platform. In general, Oculavis is based on three components (Oculavis, 2019):

– the Oculavis server with all static data (user data, databases with media data such as screenshots, videos, reports, etc.). All databases are encrypted and protected from external access. A user authentication is necessary for access. Infrastructure is provided by T-Systems, Microsoft Azure or Amazon Web Services, as well as any other (on-premises setup is also possible).
– the STUN/TURN server network: STUN tries to establish a direct connection for clients in different networks. TURN is a relay server for video streams (if STUN does not work). It enables easy forwarding of network data and/or encrypted streams and key exchange for encryption via Oculavis server.
– the client devices, as smart glasses (optional), smartphones, tablets, web browser, desktop application.

All connections between the components are encrypted and protected from external access. The main protocol for communication between clients and Oculavis is TCP443 (SSL/TLS encrypted), only for video calls other ports are used, too. To establish a video call between two or more participants the software allows a stepwise approach starting with high-performance UDP-ports and, in case these ports are blocked, having a TCP443 connection as fallback. All video and audio connections are encrypted safely (DTLS/SRTP) (Oculavis, 2019).

Figure 7 - Server and client architeture of Oculavis
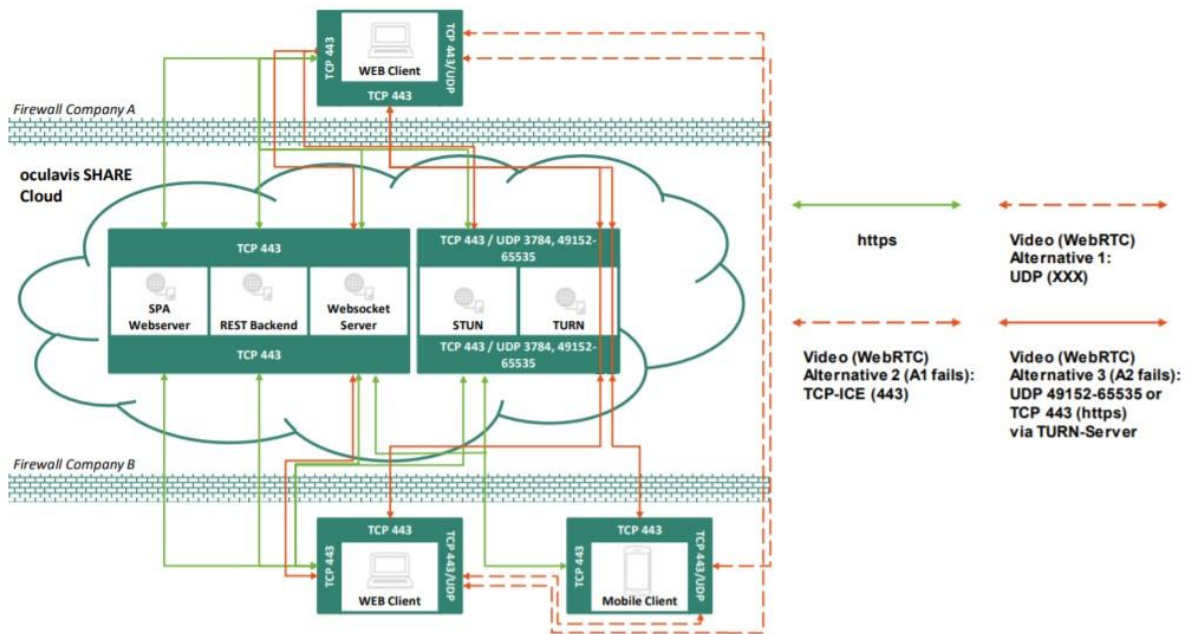
Source: Oculavis (2019).

Remote audit with Oculavis can be the fastest and most convenient solution to cover all the departments that need to be audited according to the ISO standard. Regardless, OE team needs to organize bigger qualified internal auditor team for ISO 9001 audits. According to Arena & Azzone (2009) there needs to be a sufficiently large number of qualified auditors available for efficiently doing the duties of internal auditing. The size of an internal audit team is one of the key criteria for evaluating its quality (Al-Twaijry, Brierley & Gwilliam, 2004). It determines the amount of time internal auditors are able to dedicate to auditing, besides their regular jobs (Mat Zain, Subramaniam & Stewart, 2006).

Additionally, when the audit team is large enough, it enables higher rotation of internal auditors, which leads to more objectivity, as there is evidence when auditor and auditee are more acquainted, auditors get less objective (Arena & Azzone, 2009).

Auditors' competencies are also relevant for the reliance on audit work (Al-Twaijry, Brierley & Gwilliam, 2004), hence OE team should provide effective training for all new internal auditors and also for the current ones to renew the knowledge. Skilled auditors are more likely to provide advice for improvement (Mat Zain, Subramaniam & Stewart, 2006). They are also more able to complete audits, find solutions due to previous audit experiences and deal with complex situations. Furthermore, auditing is effective when following through on the outcomes. It has been advised to internal auditors to be actively involved in the implementation of corrective actions. Business performance can increase only if the found non-compliances are later corrected (Power & Terziovski, 2007).

8.2   Integrating ISO 9001 with ISO 14001, deciding on the governance, unified approach to auditing and one tool for documentation

CS company is certified to ISO 9001 and to ISO 14001 (Environmental management standard), but the two management systems are currently not integrated nor aligned. The external audit found lacking centralized audit program which means there is no comprehensive overview and steering of all internal audit programs.

Integrated management system (IMS) merges business components into one system, so it implements ISO 9001 with ISO 14001, but it is not limited to just these two standards. This process consolidates internal management practices into one system, to form one integral part of the management system (Muzaimi, Chew & Hamid, 2017).

Integration will also impact their current dispersed governance of internal auditing in the scope of ISO 9001. Furthermore, they can use the opportunity of integration to decide on the unified approach to internal auditing, since integrated system will provide jointly auditing of ISO 9001 and ISO 14001 together, when appropriate. Finally, during this process, they should also decide on one tool for documenting and storing audit reports.

8.2.1   Integrating and unifying

Integration would provide many benefits to the CS company and solutions for current problems. Resulting benefits from the implementation of integrated management system would be improving business focus, gaining a holistic approach to managing risk, minimize bureaucracy and duplication, reduce the clash between the two management systems, achieve more efficient and effective audits, internal and external. Integration can also save human resources, clarify the certification process, decrease time and costs and complexity of internal managements (Zeng, Tam & Khoa, 2015).

It would help towards lean management as both standards have the internal audit program and management review. Instead of always leading two different internal audits, one session would be enough after integration (Muzaimi, Chew & Hamid, 2017). External certification costs would get reduced due to integrated and single certification audits (Čekanová, 2015). It would allow for clearer and more effective internal and external audits (Raišienė, 2011), as integration would result in a one-time audit instead of two separated.

It further saves time and gets easier to manage as it simplifies the two systems into a single system. Certain audit can be performed in one session for both systems which would reduce the cost for the audit.

For making these benefits possible, internal auditors should be trained for both standards, ISO 9001 and 14001. Since additional internal auditors need to be recruited anyway, to suffice the number for effective auditing, they can receive two trainings at once.

8.2.2 Adopting one audit approach

I would also suggest adopting a unified approach to auditing and the safest one would be the one recommended by ISO itself. The guidelines are already available in the GPMS, hence the future responsible team for IMS could highlight them and provide the documentation on the trainings. ISO guidelines can later be adapted to specific needs according to the specification of the audited process.

Additional important benefit CS company would gain from emerging the two standards/management systems, is the ISO 9001 would adopt best practices from the current organization of ISO 14001, since the latter is more advanced in CS company than the ISO 9001.

8.2.3 Deciding on the governing department

Furthermore, they would be reducing the clash between the two management systems. Integration would lead to a more effective resource management by giving the responsibility of the management of IMS to one governing team instead of having separate leaders for every management system, as CS company has now. They would need to decide on which team would take over the integrated system, as OE team is now supposed to govern ISO 9001 scope and ISO 14001 is taken care of by Health and safety department.

I would suggest renaming and reshaping the context of Health and Safety department into a name that would suggest bigger, overall scope of the two management systems. OE team already takes care of several other important areas, such as GPMS database, providing help to the employees with a software that enables recording the instruction for every computer program they use in the organisation and additionally, they are also dealing with process mining. Taking care of ISO 9001 is the fourth area this team is supposed to govern, but as the empirical research showed, ISO 9001 is scattered among several other teams.

When the coverage of ISO 9001 will be in order, it would be additional wide program OE team should be taking care of. And since the goal is to integrate both management systems, I believe the overall IMS would demand more time and energy that OE team is capable of providing at this number of employees they now have. Hence, restructuring the Health and safety department into overall Integrated management system department would be the best solution at this point.

In the scope of governance, the position of internal audit should not be bounded. It should be given a large amount of independence and autonomy to be able to perform its activities as it is expected. Its relationship with the audit committee is very important (Arena & Azzone, 2009). They are two different bodies – internal audit is operating within the company and audit committee consists of members of the Board of Directors. According to the CS company, the audit committee assists the Board of Directors to supervise the accounting and financial reporting, compliance with regulatory and legal requirements, overview of the risk management and as well as internal and external audit processes.

Responsibilities for the tasks given to the audit committee belong to the Board of Directors. Current internal audit department that is communicating with the audit committee is Corporate audit. They are focused on audits of major transaction cycles and management processes of selected corporate risks. After the integration of the two management systems, internal audit of the IMS should also communicate with the audit committee, since the two bodies have certain common purposes, to check and evaluate the internal system (Goodwin, 2003). The interaction between them makes data availability and information exchange easier (Mat Zain, Subramaniam & Stewart, 2006). Internal audit team itself could improve if audit committee is monitoring and helping identify problems. If internal audit is reporting to the audit committee, the managerial problems get easily communicated to the top level of the organisation (Goodwin & Yeo, 2001).

8.2.4 Deciding on one audit tool

Another advantage of integration would be reduced bureaucracy and elimination of duplications among processes in the system. The extent of documentation can be decreased, as now is created separately for the two standards (Raišienė, 2011). After the integration, documentation tends to get more structured and well organized. Duplication and bureaucracy problems can be prevented.

What is important for the CS company is deciding on one tool, that will be used by every auditor and storing the audits' documentation in a single, designated database, available to everyone inside the CS company. I would suggest using Jira software, project management tool for audit tracking. It offers scrum and Kanban boards, roadmaps and agile reporting. Plants that are already using Jira for their internal auditing reported being very satisfied with the easy approach it provides. It also offers storing the documentation, and can additionally be connected to GPMS, hence some updated process documents get transferred to the main database. If the OE team will go through with updating the GPMS to a newer, better version, then all the documentation from Jira can be transferred into GPMS. Otherwise, if the documents will be stored in Jira, every team needs to unlock their platform and provide access to their Jira documentation so other auditors and interested employees can see the update on the audit situation, check for available auditors and look for best practices. The objective is to make documentation on internal auditing structured, unified in one common database and make it available to everyone.

8.2.5 Suggestion for implementation of IMS

Implementation of integrated management system can follow four steps of PDCA - Plan, Do, Check and Act cycle. ISO 9001 and ISO 14001 have a common principle for continuous improvement based on PDCA.

Figure 8 - The structure of PDCA cycle
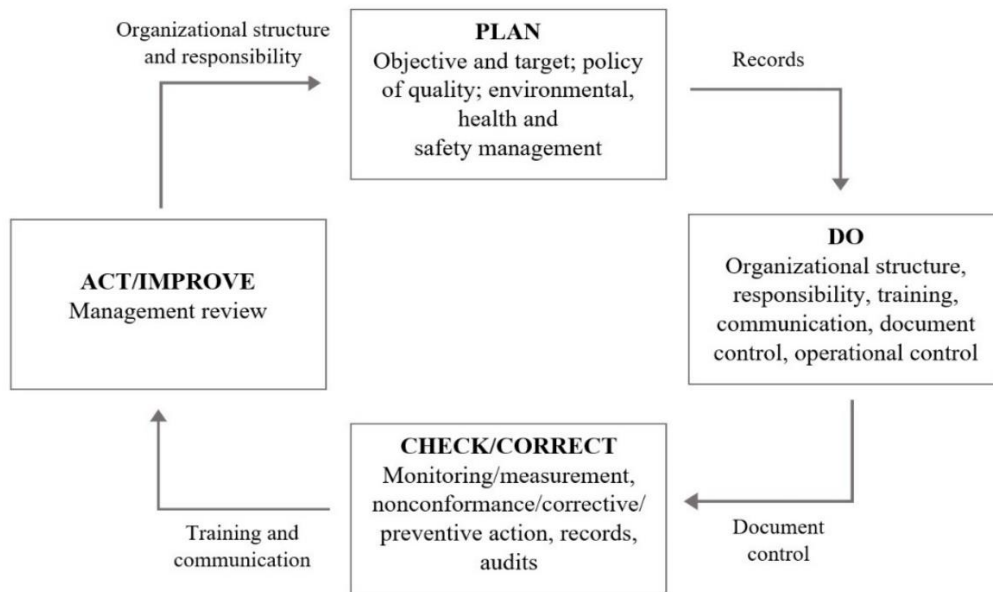
Source: Muzaimi, Chew & Hamid (2017).

This cycle is the base for continuous improvement and can be used for implementing the integrated management system.

− First step is to set the milestones for the integration.
− Second step is the execution after the organisation provides the trainings, inspection by the audit committee and security is reviewed and the process can be complete.
− The "check" phase is giving feedback to the audit committee and top management on the possible problems or uncertainties. Gap analysis can be used for this follow up, followed by the internal audit.
− In the final step, the management should decide on the possible improvements according to the audit and after this step, the management system is ready for certification. This approach is recommended for the integrated management system implementation since it follows the process from the start until the end of implementation.

Furthermore, ISO 9001 and ISO 14001 share many common components and requirements, plus the continuous improvement objective. They are compatible in terminology, content and many of the requirements (Muzaimi, Chew & Hamid, 2017). Components, that can be integrated, are: management review, the manual, resources management, document control and record. Manufacturing process and monitoring and measuring processes can also be integrated, as well as audit approach and legal requirements. Furthermore, also resources, roles, trainings and responsibility; and operational control of ISO 14001 and safety management system procedure, as well as monitoring process and performance measurement.

According to Muzaimi, Chew & Hamid (2017), all components from the two standards can be integrated, based on the requirements of the organisation. If the organisation is able to

make use of a certain component, it can be easily integrated together. The list of components that share the same criteria and can be integrated is presented in the Table 3.

Table 3 - Integrable components from ISO 9001 and ISO 14001

ISO 9001	ISO 14001
Scope (clause 1, 4.3)	Scope (clause 1, 4.3)
General requirements (clause 4.1, 4.2, 4.4, 4.4.1, 4.4.2, 5.1, 5.1.1)	General requirements (clause 4.1, 4.2, 4.4, 5, 5.1)
Management system policy (clause 5.2, 5.2.1, 5.2.2)	Management system policy (clause 5.2)
Planning (clause 6, 6.2, 6.2.1, 6.2.2, 6.3)	Planning (clause 6, 6.1.2, 6.1.3, 6.1.4)
Planning Risk (clause 6.1, 6.1.1., 6.1.2)	Planning Risk (clause 6.1, 6.1.1)
Objectives (clause 6.2, 6.2.1, 6.2.2)	Objectives (clause 6.2, 6.2.1, 6.2.2)
Organizational structure, roles, responsibilities and authorities (clause 5.3)	Organizational structure, roles, responsibilities and authorities (clause 5.3)
Operational control (clause 7.1.4, 8, 8.1)	Operational control (clause 8, 8.1, 8.2)
Management of resources (clause 7.1, 7.1.1, 7.1.2, 7.1.3, 7.2, 7.3)	Management of resources (clause 7.1, 7.2, 7.3)
Documentation requirement (clause 7.5, 7.5.1, 7.5.2, 7.5.3, 7.5.3.1, 7.5.3.2)	Documentation requirement (clause 7.5, 7.5.1, 7.5.2, 7.5.3)
Communication (clause 7.4, 8.2.1)	Communication (clause 7.4, 7.4.2, 7.4.2, 7.4.3)
Monitoring and measurement (clause 7.1.5, 7.1.5.1, 7.1.5.2, 9.1, 9.1.1)	Monitoring and measurement (clause 9, 9.1, 9.1.1)
Evaluation and compliance (clause 9, 9.1.2, 9.1.3)	Evaluation and compliance (clause 6.1.3, 9.1.2)
Internal audit (clause 9.2, 9.2.1, 9.2.2)	Internal audit (clause 9.2, 9.2.1, 9.2.2)
Handling of nonconformities (clause 8.7, 8.7.1, 8.7.2)	Handling of nonconformities (clause 10.2)
Improvement (clause 10, 10.1, 10.3)	Improvement (clause 10, 10.1, 10.3)
Management review (clause 9.3.1)	Management review (clause 9.3)

Source: ISO (2015); Muzaimi, Chew & Hamid (2017).

8.3   Integrating lean six sigma and ISO 9001

From 1980s forward, there have been several methodologies adopted by organisations, like TQM, agile, quality control, Six Sigma, lean etc. Organisations mostly apply quality tools, associated with stated methodologies, individually and the results are varied (Thomas, 2018). SC company as well uses lean and six sigma methodologies separately from ISO 9001. The number of models for continuous improvement has been growing for decades now, with the intention of improving quality and processes, simplifying the production and

reducing waste (Costa, Barbosa, Santos & Alves, 2019; Ribeiro et al., 2019). However, without the right knowledge and approach to implementation of all these quality improvements methods and tools, it can turn out that ISO 9001 does not have the desired impact on the organisation (Moosa & Sajid, 2010). In order to solve this, companies started adopting hybrid approaches like Lean six sigma (Bhuiyan & Baghel, 2005). Very commonly, modern manufacturing systems decide on implementing lean and sustainable manufacturing to develop eco-friendly products and processes and ensure waste elimination (Ben Ruben, Vinodh & Asokan, 2019).

Sá et al. (2020) reported about a study by Margaça (2013) of 231 companies in Portugal, that were certified to ISO 9001, showed that only 13,4 % of them implemented lean tools. Another study by Fonseca, Lima & Silva (2015) of 202 companies, also certified to ISO 9001, found that only 39 % of them are using advanced quality tools. The question arises, why organisations do not use quality improvement tools in their quality management systems more often, which could improve overall performance. CS company is also among them.

Sousa, Aspinwall, Sampaio & Rodrigues (2005) reported that employees are sometimes not competent enough to select tools for continuous improvement. Furthermore, the problem also lies in ISO 9001 guidelines, as they only define requirements for a QMS but do not mention which type of method or tool to choose in order to achieve those requirements (ISO, 2015; Chinvigai, Dafaoui, Mhamedi & Paris, 2010; Doiro, Fernández, Félix & Santos, 2020; Marques, Lopes, Santos, Delgado & Delgado, 2018). Integrating lean methodologies with the requirements of ISO 9001 can be a valuable solution to optimise processes, eliminating waste, creating value and achieving continuous improvement (Santos, Gomes, Braga, Braga, Lima & Teixeira, 2019).

Lean approach seeks to do more with less time and effort, less equipment and less space while delivering at the right time (Sá et al., 2020). It is placed in a sequence, based on a set of practical and simple principles. They are a roadmap to implementing the lean with a set of methodologies and tools where people play the crucial role (Vaz, 2017). Seven types of manufacturing waste have been identified in order to speed the flow and improve processes: overproduction, extra processing steps, inventory, defects, motion, waiting and transportation (Chiarini, 2011). Furthermore, there are five principles of the Lean philosophy, according to Womack & Jones (1996):

− Creating value is a starting point, defined as the provided capacity to the customer on time and at an appropriate price;
− Defining the value chain;
− Optimising flow, which can refer to the flow of people, information, material or capital. They all should travel through the value chain continuously, without stoppages;
− Pull refers to the production, that needs to be initiated only on the customers' requests;
− And perfection strives for constant effort and elimination of waste.

Later, two more principles were added by the Lean thinking community:

− Be aware of the stakeholders and continuously innovate.

While Lean focuses more on efficiency with speed and waste elimination, Six Sigma does on effectiveness through defect reduction and process improvement and variation (Fonseca & Domingues, 2018b) by applying Six Sigma frameworks, like DMAIC (Define, Measure, Analyse, Improve, Control) for example. Lean Six Sigma approach integrates lean principles to reduce waste with Six Sigma techniques to achieve zero variation (Sá et al., 2020).

Lean and a QMS based on ISO 9001 can be integrated, since there is no conflict between them, according to Micklewright (2010). They are complementary, if the organisation develops them with knowledge and the outcome results with significant gains for the company.

Chiarini (2011) proposed an integration model between Lean thinking and ISO 9001 requirements. According to his study, principles such as lean metrics, value stream mapping, 5S and takt time are the most used in the European companies. Table below presents link between PDCA cycle from ISO 9001 and lean tools:

Table 4 - Link between PDCA, ISO 9001 and lean tools/principles

PDCA stage	ISO 9001 explanation	Lean tool
PLAN	Establish the objectives and processes necessary to deliver results in accordance with customer requirements and the organisation's policies	Hoshin Kanri
DO	Implement the processes	Kaizen events and all the tool
CHECK	Monitor and measure processes and products against policies, objectives and requirements for the product and report the results	Lean metrics, visual control and management
ACT	Take actions to continually improve process performance	Hoshin Kanri, Kaizen events

Source: Chiarini (2011).

Based on a broad literature review by Sá et al. (2020), they observed the most used and implemented Lean Six Sigma tools in the surveyed organisations:

- PDCA (76,6 %)
- 5S (75,3 %)
- FMEA (45,2 %)
- Kanban (44,2 %)
- Daily Kaizen (33,8 %)

There is a high number of available Lean Six Sigma tools and methodologies that can support quality management. CS company should think about the simplicity and possible adaptability and consider which tools and methodologies are already used by Global lean department, since their performance is successful.

When it comes to internal auditing in particular, it is known that each internal audit differs from the other and has its own twist. Hence, certain principles of Lean Six Sigma approach cannot be generally applied to all processes of internal audit. Nevertheless, basic principles, like continuous monitoring and eliminating errors, can definitely be applied to internal audit, possibly with DMAIC methodology, as it is shown in the table below:

Table 5 - Lean Six Sigma integration with internal auditing using DMAIC approach

Lean Six Sigma	Internal audit
Define	Planning
Measure	Performance
Analyse	Analysis
Improve	Recommendations
Control	Follow-up

Source: Aghili (2009).

The first step of Lean Six Sigma approach is to define the problematic process and all the factors that need to be addressed. The first step of internal audit should be approached similarly, since appropriate planning should lead to the right decision on how to implement the priorities of an audit and determine desired goals to be achieved.

Second step, measurement, includes operational analyses to quantify deviations between standard and process performance. For example, when assessing effectiveness of a process and which metrics to apply, internal audit can direct the values for possible risks. Even though the risk can rarely be reduced to zero, the set standard is risk value corresponding to zero. If the risk deviates a lot from zero, it shows the non-compliances that need improvement.

The analysis step is the study of the obtained results. The objective is to find the sources of deviations and evaluate the impact on the process performance. The internal auditor identifies which parts of the process are not functioning as planned according to prescribed procedures and regulations. He/she also determines the impact of the process not properly projected to the qualitative output. For data presentation and analysis instruments in the

context of Lean Six sigma can be used, like the 5 Why technique, cause and effect diagram or the Pareto principle.

In the fourth step, internal auditor should identify opportunities for improvements and recommend how to correct deviations, based on the obtained results. Steps to improvement can show general course of action. Recommendations should also be ranked according to their importance. This will enable the manager, responsible for corrective actions, to identify most crucial recommendations. Lean Six Sigma approach will lead the auditor to such recommendations that include minimum cost for the implementation. Furthermore, auditor's recommendations will focus on possibly eliminating certain steps in a process, but still preserve its integrity.

The objective of the last step, control, is to maintain input changes of the process in order to monitor the outputs achieved. Parallel step of internal audit is the follow up. Internal auditors evaluate effectiveness of actions taken based on recommendations. Auditors can collect and analyse the data about the implementation of corrective actions by interviewing the employees who were part of implementation, conducting tests or reviewing the documentation (Aghili, 2009; Djordjević & Čečević, 2015).

Integrating Lean Six Sigma principles with internal audit process can unquestionably raise its effectiveness. Integrated approach can obtain better insight into processes and identify possible improvement spots. Djordjević & Čečević (2015) report about the importance of this integration being recognized by the international association - Institute of Internal Auditors. They have organized various trainings and courses about Lean Six Sigma methodology and how this approach can be integrated to conducting internal process audits. The objective of the trainings is to present the relationship between the two approaches, to explain how DMAIC is connected with five steps of internal auditing and highlight the purpose of applying various instruments of analysis.

8.4   Upgrading the internal process audit with process mining

Once the CS company reaches the level of implementing all the proposed recommendations for improvements, their integrated management system will be in place as it should have been according to the requirements. Consequently, also internal process auditing program will be managed effectively, being able to monitor, find non-conformities and possibilities for improving the efficiency and effectiveness of business processes and aid to the overall improvement of the company.

However, being compliant with the standard is for some already considered a minimum and not enough anymore. For the CS company on the other hand is the current challenge to even reach being compliant with the standard. Even though, they are trying to go beyond that and simplify their way of work constantly. Researchers and organizations are searching for different approaches, for a way of auditing that add value, is cost and time efficient and overall beneficial beyond just being compliant (Alič & Rusjan, 2010b). One such technique that can contribute to the internal auditing is process mining.

This chapter will also try to provide an answer to the fourth research question:

RQ4. How can process mining and remote audits contribute to internal process auditing? This research question was partly already answered in the chapter 8.1.4 with regards to remote auditing.

Use of process mining techniques has been increasing as companies want a raw insight into the real world of how their processes operate. Process mining is highly promising in systematically extracting and analysing data and knowledge from the event logs stored by the organisation's ERP system (Jans, Alles & Vasarhelyi, 2013). CS company has SAP implemented throughout their business and process mining can exploit the vast amount of data gathered and stored in their SAP system and show unique insights into how their processes are actually unwinding in real situation.

Auditors can use historic data to adjust the desired scope and remove unimportant situations or focus on specific ones. Such querying the specific events can be especially useful for auditing questions, as auditor could get some answers before the actual audit (van der Aalst, van Hee, van Werf & Verdonk, 2010). Furthermore, process mining takes the entire population of data into consideration when analysing, not just a sample. Auditor can see the meta data, which is entered independently, not just by the auditee. Process mining allows the auditor to walk through the processes as they are and conduct analyses which are not possible with other audit tools (Jans, Alles & Vasarhelyi, 2013).

Since process auditing is effort consuming to auditors, it can be smart to support the audit with process mining. It provides the opportunity to check the conformance of actual processes against a predefined model (Srivastava, Srivastava & Bhatnagar, 2019). Auditors can save their time by putting more focus on analysing conformance instead of gathering data in the field, conducting interviews and taking samples. It is not always possible to completely leave out the current internal audit methods, but they can get adapted and simplified, for example interviews do not have to be as long as before, since some questions can be answered by studying the process mining model.

Process mining should present a new way of conducting audit, or at least additional view on the audit, while minimizing the effort of the current methods and not being used simply for statistical analysis. Since there are some barriers to its use, auditors would need to receive additional training to familiarize with process mining approach, as most of them might not possess the skills needed to implementing process mining. It needs to be placed within the context of audit practice so the auditors will be reassured that using process mining meets professional standards (Jans, Alles & Vasarhelyi, 2013). Since auditors will be required to gain new skills and use a different effort for using process mining, it needs to reduce their workload elsewhere. It should replace some of the current audit practice and not add to it, but still keep the procedure in compliance with the audit standard.

The focus of process mining is a business process. Actual business processes are extremely complex. There are countless interactions across different processes, either concurrent or

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happening with lags and often, they have little relation with the ideal process model designed with BPMN (Kogan, Alles, Vasarhelyi & Wu, 2010). That is why process mining brings high value to auditing, since it enables a comparison between how processes are supposed to operate as design and how they take place in practice (van der Aalst, 2010).

When looking at a specific process, for example purchase-to-pay over a period of one year, we are talking about big data. In order to examine such volume of data, specific programs need to be used.

ProM is the most frequently mentioned software when it comes to process mining. It is an open source software maintained with Java and it has independent platform. It was developed by Will van der Aalst and his research group at Eindhoven University of Technology. Another one is Disco, a commercial tool developed by Fluxicon. It provides an academic license option with full support (Celik & Akçetin, 2018).

CS company has decided to use Celonis, also a commercial tool with an academic license option. It enables automated integration of source data, surveillance of real-time process transactions, performance of process analyses and various process reporting with filtering mechanisms. Celonis offers real-time process discovery technique, supporting SAP databases. Data source connection needs to be established with the dedicated PostgreSQL in order to import event logs. Celonis intakes a time stamp and calculates it. Once the log is imported, a document is created, configured as a database table, where component functions can be applied. The most frequent process discovery path can be expanded or narrowed (Kebede & Dumas, 2015).

To provide an example of a process path from Celonis, I was not allowed to access the data in Celonis when working in CS company. Hence, I will provide an example of a production process offered by the Celonis and try to illustrate how an internal auditor can come to useful insights for internal audit process. First of all, a part of questions that process audit is asking and could be answered by the means of process mining are:

– How do you measure the effectiveness of your process?
– Are targets for the process KPI's defined?
– How do you manage your process? Dashboards, KPIs, …
– How do you identify process weaknesses?
– How do you drive and track process improvements?
– How do you measure process compliance (with regards to standards)?

 Example of production process refers to the whole process behind making goods and services combining various material inputs, technologies and knowledge. The production process shown here is part of an exemplary large medium-sized company. The volume of sales per year is around four hundred million dollars and the company has about six hundred employees. Celonis algorithms uncover the real process in the raw system data shown in the figure below.

Figure 9 - Celonis process mining 1
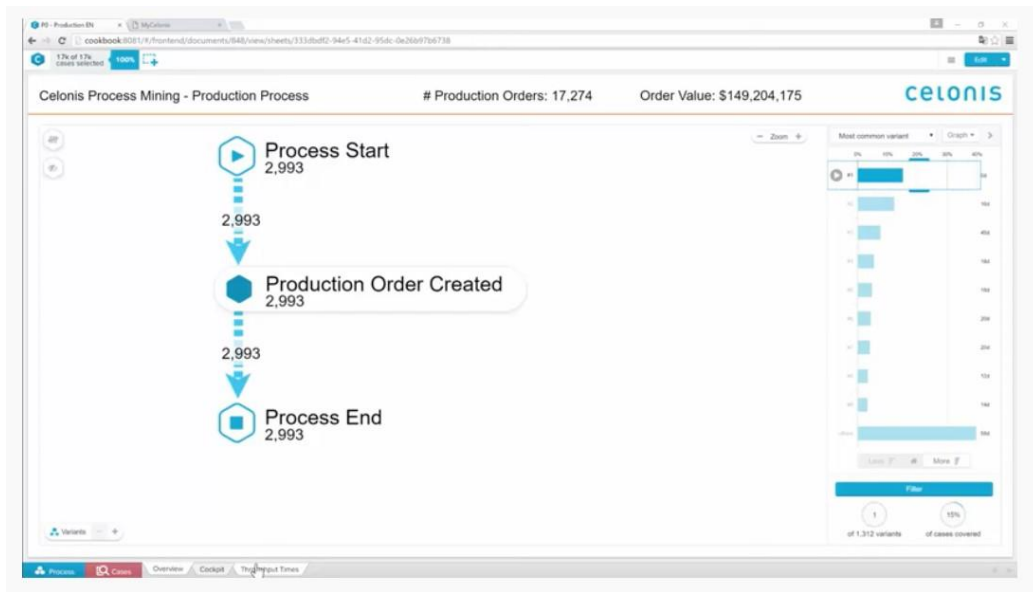
Source: Celonis (2018).

The internal auditor could shorten the interviews with employees or leave out reality assessment projects if looking at this process path. The first figure presents the process explorer, one of the core functionalities inside Celonis. The process explorer shows different activities which are part of the production process. Currently we can see the most common process variant with all its activities. This leads to the total amount of cases shown while we have about 17.000 production orders all in all. Only 15 % of cases are currently shown. We can dynamically change to the next most common process variant.

Figure 10 – Celonis process mining 2
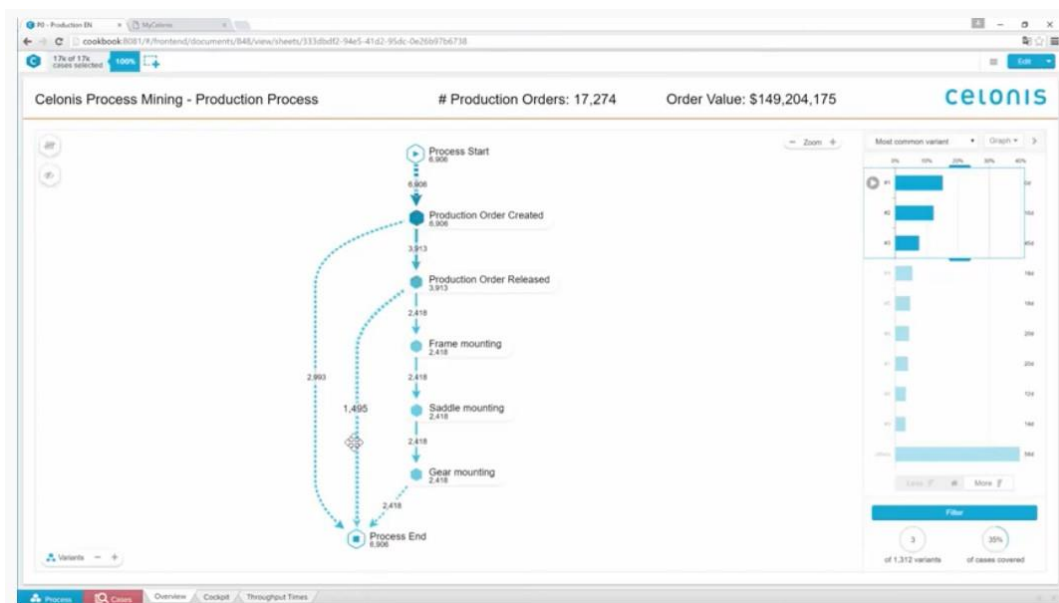
Source: Celonis (2018).

To keep track of all different paths, Celonis also provides the opportunity to highlight each process flow by clicking the play button. Now we can see almost 3.000 cases in which the process ends directly after the production order was created. The internal auditor could question why was the order created at all? There could have been an information gap or communication problem, wrong planning or a non-stringent maintenance of master data. It can direct the auditor to this exact problem. We can dig deeper into productive process data and move on to the next variant and visualize its process.

In around 1500 cases the process ended after the production order was released. The auditor would perhaps like to know how much time was lost in this process step. Celonis provides a functionality that can show throughput time so the auditor can see exactly how much time is spent on each step.

Figure 11 - Celonis process mining 3
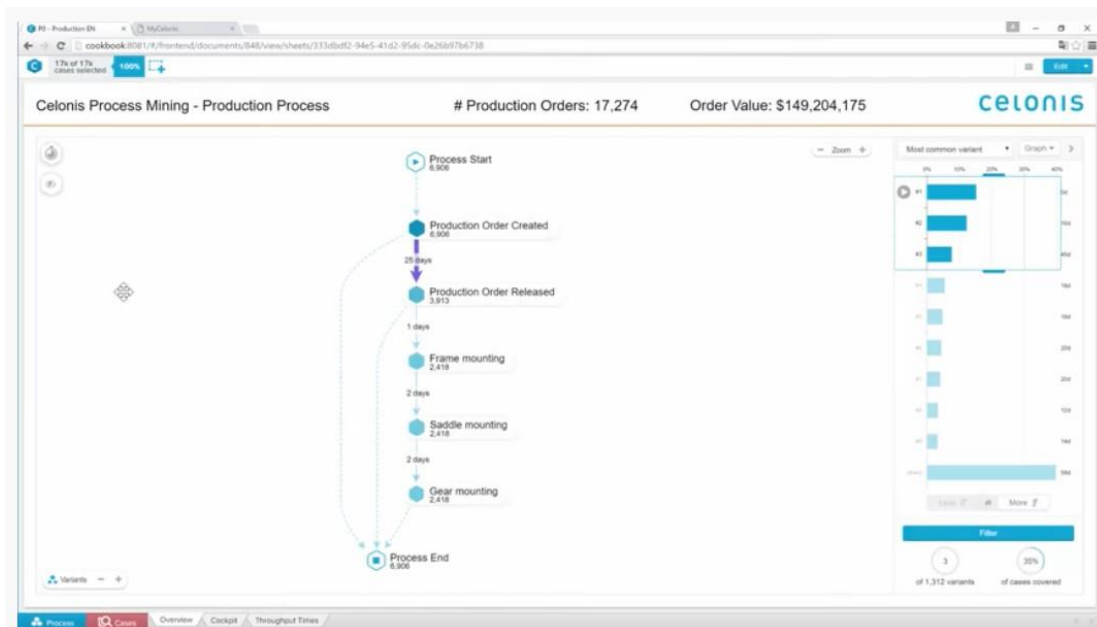
Source: Celonis (2018).

It shows 25 days are spent on average before the process ends, when this step usually takes only 11 days. The difference in the throughput time could be the result of out-of-stock materials or again, information and communication mismanagement. Auditor can later investigate deeper on this issue. It is difficult, time-consuming or even impossible to detect problems like this in the ERP system, but Celonis can show the affected process and root causes in a matter of seconds. Process weaknesses hide in the small details, but with the process explorer an auditor can see all of them at once. If we increase the percentage of the cases to 100 %, we will see how the actual process looks like.

Figure 12 - Celonis process mining 4
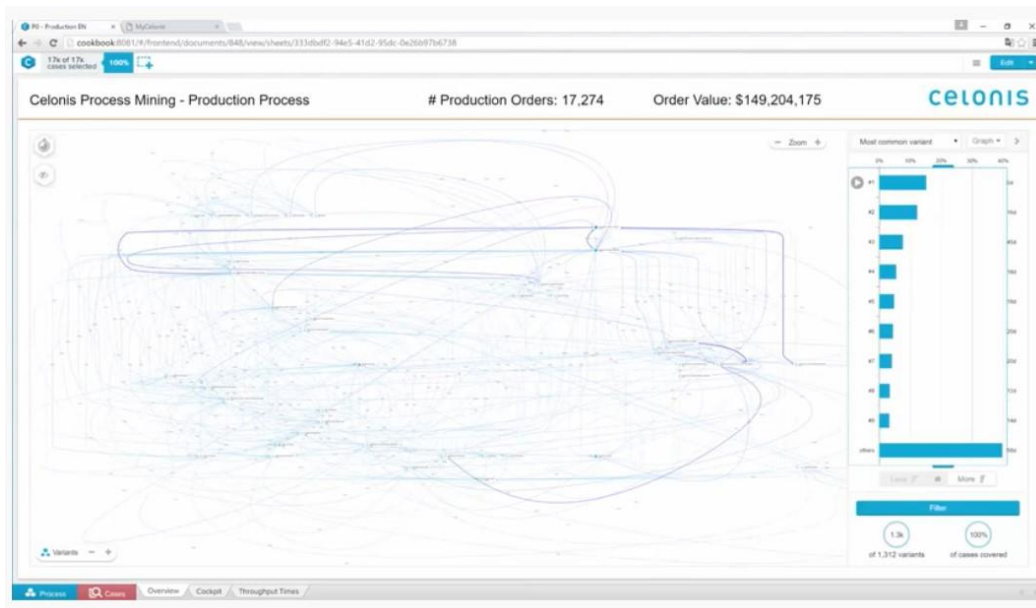
Source: Celonis (2018).

The full view reveals all inefficiencies and the complexity in the as-is processes, where the company is losing time, money, margins and customer satisfaction. We just discovered several process inefficiencies and weaknesses. Celonis additionally enables a lot of different functions. Auditor can click on a specific type of case and for example see the different automation rates or all of the production order cases in a specific work area. Different filters can be combined to analyse details like the material involved in a specific process variant. If necessary, the auditor can switch to the cases table and check all information in the source data set at any time.

9   DISCUSSION

This chapter will summarise the results from the previous chapter and provide concise answers to the research questions. In the second part of the chapter, some practical implications will be discussed. Lastly, limitations and suggestions for future research will be outlined.

9.1 Summary of main findings

The main objective of the thesis was the analysis of the internal process auditing situation in a selected case study organisation, to find out possible challenges organisations face with internal auditing and propose recommendations for improvement.

RQ1. What is the state of internal process auditing in a selected organisation?

Overall, CS company is highly mature in quality and successful worldwide with strong reputation of effective and efficient products and services. However, the state of internal

process auditing recommended by ISO 9001 does not meet the requirements. Internal process auditing is not properly covered in all areas necessary with scattered governance and with no communication among them. Some parts, such as production plants, global logistics, warehouses, suppliers, are taken care of, each of them by a different department. Additionally, Corporate audit team is taking care of internal control for finance and Health and safety department for ISO 14001 audits.

Overall, some processes are audited regularly, others just once in a while and some are not being audited at all and this is the situation for all of the business units, except for plants and beforementioned departments where audits are under control. This complicates an overarching analysis and comparison of all audit results centrally.

RQ2. Based on the findings from the empirical research, what are the main factors responsible for such situation?

Internal auditing was not yet fully accepted to the company's culture and perceived as being part of everyone's jobs, required for finding possible improvements. When changes in management happened, some areas gave up on internal auditing and adopted several others quality check tools. This caused ever deeper gaps in internal process audits without overview and jointly steering of all audit programs. Consequently, there is no centralized internal audit program which would cover all the areas and lead regular audits. There is also ISO 14001 guided completely separately from ISO 9001 and not being aligned with each other. Since centralized audit program is not in place, consequently there are different governing bodies, when there should be one for all the stated areas. Every audit department has their own system, not cooperating with other audit programs. There is insufficient knowledge on current qualified internal auditors since the existing list is outdated. Each audit program currently operating has their own list of auditors, not available to other departments in the company. Approach to internal auditing does not follow a specific standard. Some departments adopted their own system for compliance check. Lastly, since their internal database GPMS became terribly slow, complicated and impractical for storing and searching for documents, employees stop updating process documentation and started using different tools and storing the data in local databases.

RQ3. What are the possible solutions leading to successful and efficient internal audits?

First of all, CS company needs to fill the gaps in all the units that are currently not conducting internal process auditing. Employees should be introduced closely to the meaning and the effect of performing internal auditing as it is outlined in ISO 9001 standard and other belonging documents. Effective leadership will play crucial role with introducing this change successfully, to make it easier for the employees to accept internal auditing as a part of everyday business and embed it in their workday and in their working culture. The awareness about internal auditing can be spread around the organisation using the company's internal social networking site. The message should be cascaded downward, from chief executive to all levels of middle and front-line managers and get posted in every unit's online profile page. The same communication approach can be used for establishing qualified

internal audit team, to update the list with currently qualified auditors and recruit additional employees to form a bigger internal audit team. Remote auditing can be used to cover the critical areas as soon as possible, using Oculavis software, already tested by the plants and the outcome was satisfying. Remote audit can remain a common practice even after the gaps are closed since the global scale of sites is causing high travel expenses and a lot of time needed for auditors to arrive to the designated location. Furthermore, ISO 9001 and ISO 14001 management systems should be integrated into one management system. That would lead to reducing the clash between the two systems, less documentation, clearer and more effective internal and external audits, since one session would be enough instead of now leading two different internal audits for the same area. They should also decide on unified approach to auditing and I would recommend the approach suggested by the ISO 9001. The guidelines are already available in their GPMS database. One department should overtake the steering of integrated management system and internal audit program and I would suggest restructuring the Health and Safety department to cover overall scope of the IMS. Integration would lead to reduced bureaucracy and the company should decide on the tool for conducting and storing the audit's documentation. My suggestion would be to use Jira software as some plants already reported being highly satisfied with it and it additionally offers storing the documentation in a transparent way to make documentation available to everyone. Implementation of IMS can follow four step cycle of PDCA for successful integration. Table 3 is also presenting components from ISO 9001 and ISO 14001 that can be integrated. Lastly, CS company should also integrate ISO 9001 with lean six sigma, possibly using DMAIC approach.

RQ4. How can process mining and remote audits contribute to internal process auditing?

Benefits of using remote audit have been outlined under RQ3. Process mining can provide additional value to auditing, but only when the CS company corrects ongoing situation and implements suggested improvements. Then, the internal auditing will be reaching the required level of ISO guidelines. Process mining can offer an approach for a way of auditing that add value, is cost and time efficient and overall beneficial beyond just being compliant. Auditors can use process mining to adjust the desired scope, remove unimportant situations and focus on specific ones. They would be provided with answers before the actual audit and could walk through the processes as they are in real life and conduct analyses not possible with regular audit tools. Auditors could save the time by focusing on analysing conformance between the actual process and a predefined model, instead of gathering data in the field, conducting interviews and taking samples. It is not possible to completely leave out the current internal audit methods, but they could get adapted and simplified.

9.2 Practical implications

The findings from the research point to the possible problems when it comes to internal process auditing and factors responsible for them. Suggestions for improvements outlined possible measures a company should consider bringing internal process auditing to the level required by the ISO standard. For all companies experiencing similar issues or thinking

about implementing ISO 9001, those suggestions could be helpful. ISO 9001 and internal process auditing should be carefully planned from the start. It is important to create a culture where internal process auditing is considered helpful and crucial for future improvements. Employees need to be aware that auditing does not only present searching for the flaws in the system with the intention to finding out responsible employee, but an approach that is helpful for the auditor and the auditee. Employees might not notice the mistakes they are making or cannot see a more efficient way to the process. Auditor is there to objectively examine the process and try to recommend improvements if necessary. Furthermore, a responsible department must be assigned to guide central audit program with prepared plan and scope. If the company is already certified to a certain standard, they should consider integrating it with ISO 9001 and join the internal audits, if the nature of the primary standard allows it. Effective, qualified team of auditors needs to be recruited prior to the first audit session. They need to decide on the unified approach to internal auditing and store the audit documentation in one database, available to the entire organisation.

9.3 Limitations and future research

This research has some limitations that should be mentioned before studying and presenting the results. The situation on internal process auditing is unique to this organisation. Findings cannot be generalised beyond the selected sampling frame, since the studied entity was a case study. I cannot claim that what I have found will also occur in similar organisations. There was a possible bias with sampling frame since the auditor's list was not accurate and there were limitations to approaching the needed documentation stored in GPMS. Additional information needed for my research, that could further highlight the situation, might not have been found due to problems with GPMS. My time frame was too limited to discover if and how will my recommendations for improvement affect the state of internal process auditing. There were limitations when conducting interviews as some interviewees did not understand why am I questioning them about internal process auditing. They felt investigated and were hesitating with sharing the results, even though every interviewee was supplied with sufficient information before the interview via e-mail. E-mail contained invitation to the online interview together with a list of the interview themes to promote validity and reliability. Explanation of the research was provided to the participants as part of a pre-prepared participant information sheet together with the consent form and assurance that the information will remain confidential to establish the credibility and gain the interviewee's confidence. Despite that, some interviewees did not feel comfortable with me asking questions about internal process auditing. Due to dispersed governance, an incident happened with the Lead quality manager, responsible for the audits in the production plants. Upon discovering about my initiative, he was displeased with my research, stating there is no need to "investigate" the areas he is covering, as the situation is under control. It indicates some departments are being too independent and not feeling connected with the rest of the organisation. My mentor, the lead of the OE team, needed to take over and only his explanation sufficed for me to be able to continue the research.

There is a lot of capacity for further future analysis. There is limited research and data available on process mining for internal process auditing. Majority of research on process mining is technical in character, discovering various algorithms for extracting event logs. There are some papers, discussing process mining for financial audits and even those are more focused on the methodology of process mining than on its application to accounting. Papers about application of process mining to internal process auditing are very limited. It might also be interesting to remove the limitation of a case study and explore the state of situation on internal process auditing on a broader sample of organisations. It might also be useful to research organisations already using remote audit and process mining for internal auditing routinely.

CONCLUSION

ISO 9001 standard is highly pervasive today, adopted by thousands of organisations around the world. It places the criteria for a quality management system that is guiding companies on how to control their business processes in order to maintain an efficient level of quality of their products, processes and services. The overall system can be improved, if the organisation implements and adopts the standard in a proper way. Benefits from being certified to ISO 9001 can only be obtained if the organisation is dedicated to maintaining the level this standard is suggesting. Companies that obtain the certificate mainly due to external reasons achieve less improvements than companies that obtain the certificate due to internal reasons. Improving and maintaining performance is a never-ending process and the proposed way to achieve this is by conducting internal audits. Empirical research highlighted the situation on internal process audits where the requirements of ISO 9001 were not being followed. This resulted in many areas not being internally audited, no central audit program that would steer all internal audits and no overview on where, how and by who internal audits are being conducted. Furthermore, this led to the complex, inefficient governing of audit programs, several tools and approaches in use to conduct internal audits and several locations where audit reports and process documentation is being stored. The management of the CS company and the designated department, responsible for internal process audit program, were not aware of the state of the situation. The need for correction only arose when the external audit by the SQS came across some of the stated non-conformities and urged the organisation into searching for appropriate solutions, otherwise the ISO 9001 certification would be withdrawn. Organisation could follow the recommendations for improvements to reach the required level of internal process auditing. They should integrate the ISO 9001 and ISO 14001 standards and achieve centralized internal audit program for all the areas. They should decide on the one department, taking over the steering of IMS and audit program, organize a qualified internal audit team, decide on one approach to auditing and store the documentation in a designated database. CS company could later upgrade the internal auditing by using process mining, which would bring additional value. In conclusion, this thesis brings different practical implications on how to bring internal process auditing to the required level and can be used as a base for more detailed studies on this topic in the future.

It only represents a case study, but still captures some key problems and proposed solutions that can be used by the organisations struggling with internal process auditing.

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APPENDICES

Appendix 1: Povzetek (Summary in Slovene language)

ISO 9001 standard je danes en izmed najbolj razširjenih standardov za kakovost. Implementiralo ga je že na tisoče organizacij po vsem svetu. Predstavlja vodnik in merila za sistem vodenja kakovosti, ki podjetje usmeri v uspešno vodenje poslovnih procesov, ki rezultirajo v učinkoviti, kakovostni ravni izdelkov, procesov in storitev. Celoten sistem v podjetju je mogoče izboljšati, če organizacija pravilno in dosledno sledi navodilom standarda. Prednosti od certificiranja po standardu ISO 9001 je mogoče doseči le, če organizacija namenja dovolj pozornosti vzdrževanju ravni, ki jo predlaga standard. Podjetja, ki certifikat pridobijo predvsem zaradi zunanjih razlogov, dosežejo manj prednosti in izboljšav kot podjetja, ki certifikat pridobijo zaradi notranjih razlogov. Izboljšanje in vzdrževanje uspešnosti je konstanten proces in predlagani način za dosego tega je izvajanje notranjih revizij. Empirična raziskava te naloge je izpostavila razmere notranjih revizij procesov, kjer zahteve ISO standarda niso bile upoštevane. Posledica tega je, da številna področja v izbrani organizaciji niso notranje revidirana. Manjka jim centralni program za vodenje revizij, ki bi usmerjal vse notranje revizije in nobenega pregleda ni o tem, kje, kako in kdo izvaja notranje revizije. Poleg tega je takšno stanje privedlo do zapletenega in neučinkovitega upravljanja revizijskih programov, v uporabi je več orodij in pristopov za izvajanje notranjih revizij, in več lokacij, kjer se hranijo revizijska poročila in procesna dokumentacija. Vodstvo družbe CS in oddelek, pristojen za program notranje revizije procesov, se niso zavedali takšnega stanja. Potreba po popravkih se je pojavila šele, ko je zunanja revizija s strani SQS naletela na nekatere od navedenih neskladnosti in pozvala organizacijo k iskanju ustreznih rešitev, sicer bi jim certifikat ISO 9001 bil odvzet. Organizacija bi lahko sledila priporočilom za izboljšave, ki so navedeni v osmem poglavju, da bi dosegla zahtevano raven notranjega revidiranja procesov. Organizacija bi morala integrirati standarda ISO 9001 in ISO 14001 in doseči centraliziran program notranje revizije za vsa področja. Odločiti bi se morali za oddelek, ki bo prevzel vodenje integriranega sistema in revizijskega programa, organizirati usposobljeno notranjo revizijsko skupino, se odločiti za en pristop k revidiranju in začeti shranjevati dokumentacijo v določeno bazo podatkov. Družba CS bi lahko kasneje nadgradila notranjo revizijo z uporabo procesnega rudarjenja, kar bi prineslo dodatno vrednost. Magistrska naloga ponuja različne praktične rešitve, kako notranje revidiranje procesov spraviti na zahtevano raven in so lahko uporabljene kot podlaga za podrobnejše raziskave o tej temi v prihodnosti. Naloga predstavlja le študijo primera, vendar kljub temu zajema nekatere ključne težave in predlagane rešitve, primerne za organizacije, ki si prizadevajo izboljšati notranjo revizijo procesov.

Appendix 2: Invitation and questions for the interview

Dear CS company colleague,

Do you know what being certified by ISO 9001 standard means for CS company and for all its employees, partners and customers?

It is not only showing we are a reliable, trustworthy company... it means our system is workable to the extend where we can focus on important areas of business and provides us with the possibility of improving them, of improving customers' relationships. System that lives in compliance with the standard can increase its efficiency and productivity. In that way it is the most sustainable and beneficial for the employees.

What is the purpose of this attempt?

The last ISO 9001/14001 recertification audits in 2019 discovered some non-conformities, which are affecting the successfulness of our business. These are three we are going to take care of in the next three to five months:

- **Centralized internal audit programme is missing.**
- **Not all organisational units are performing process audits or equivalent assessments.**
- **There are different ways of conducting internal audits.**

Who is undertaking this?

Operational excellence team (xx, the Head of the team, xx, business process expert, Eva Murko, intern) oversees this initiative with the help of Corporate audit. If you reach any confusion or think of an additional insight that could help us, please contact any of the three from the OE team.

Who is being asked to participate?

We are trying to reach a representative sample size, randomly picked globally, big enough for the answers to be generalized throughout CS organisation.

What type of data will be required from those who agree to take part?

At the bottom of this document you can find framework of questions we want to ask you through a short (approximately 20 minutes) skype interview in the following days/weeks, according to your availability.

About the implications of taking part and participants' rights

We would like to let you know that participation is voluntary and you have the right to decline to answer a question or set of questions. You have control over the right to record any of your responses where a voice recorder is used. You may withdraw at any time.

Consequences of participating can only be beneficial for helping everyone at CS company reach the highest level of operational excellence.

Data will be gathered confidentially and will only be used for reaching an overview of the current state when it comes to internal process auditing to help us establish a standardized way of conducting it in the future.

Framework of questions for the upcoming interview

Are you conducting internal process audits or equivalent process assessments?

Yes:

- How are you conducting it?
- Which tool are you using?
- What methodology – observations, questionnaires, combination?
- Are you following audit templates stored in GPMS?
- How often are you conducting it?
- Do you have a three-year plan/one-year plan?

- Is audit direction defined in advance? Audit strategy/approach: efficiency, internal control, compliance
- Who is conducting the audits/assessments? Is there a special person assigned for this? Licensed CS company auditor?
- What are her/his trainings for conducting the audits?
- What do you do with results?
- Is there a follow up audit?
- Where are you storing audit results, in what form and for how long?

- Can you give me description of your approach, examples?
- Is there a custom of improving/changing along the way, as you observe a potential correction? Do you change the process documentation accordingly?

No:

- What is the main reason?
- Do you have some specific requirements?
- When is the last time audit was conducted?
- What is your way of checking the process efficiency?
- How can you assure alignment with requirements?
- What is your way of monitoring and measuring? Frequency?

- When was your last external ISO audit? What were the results?
- When was the last time your process has been updated/improved?

- Is there usually only one licensed CS auditor or an audit team; who is a part of the team?
- Are there many processes audited together, e.g. more than one process at a time, those that fit together?
- Is your process documented? Is documentation still up to date?
- Are you aware of requirements of different parties? CS requirements vs. ISO requirements
- Are you also following environmental standard?

Questions for the internal auditors:

- Did you get basic ISO 9001 training?
- If yes, internal or external?
- When did you have training the last time?
- Did you get "Internal Auditor" training?
- How many audits have you conducted (in the lead) in the last 12 months?