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**THE DYNAMICS OF
PERSPECTIVE/PERCEPTION IN QUALITY
MANAGEMENT: THE CASE OF A CHEMICAL
COMPANY**

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Dissertação apresentada à Faculdade de Ciências Sociais e Tecnologia da Universidade Europeia, para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Gestão realizada sob a orientação científica do Doutor Luís Pedro Vilela Pimentel, Professor Associado da Universidade Europeia.

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I thank the One who sustains me and always gives me strength and vision to continue. Without Him nothing would be possible.

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Palavras-chave: Gestão da qualidade, Gestão da Qualidade Total, ISOs, Modelo de Oakland Revisado, Estudo de caso.

Resumo

Objetivo: O objetivo do presente documento é avaliar a perceção/perspetiva da qualidade pelos trabalhadores de uma indústria química e os fatores que podem afetar essa perceção. Além disso, é também analisar quais os fatores chave de sucesso que asseguram uma implementação bem-sucedida da gestão da qualidade, através do modelo de Oakland revisado.

Metodologia: O presente inquérito abrange uma indústria química em Portugal. Esta indústria opera no setor da produção de surfactantes para diferentes fins. Para a realização da investigação foi desenvolvida uma metodologia qualitativa, apoiada num estudo de caso. Os dados foram recolhidos a partir de entrevistas gravadas e de documentação escrita fornecida pela empresa.

Conclusões: Conclui-se que, para a implementação de uma cultura de qualidade dentro de uma organização, não são suficientes apenas os chamados aspetos formais, como normas e regulamentos. É necessário que os colaboradores estejam imbuídos da importância da cultura da qualidade, o que muitas vezes é feito de forma informal, no envolvimento diário com as atividades da empresa, na troca de experiências e nas conversas cotidianas. Conclui-se também que os fatores: (i) idade do funcionário e o tempo de trabalho na empresa; (ii) o departamento a que pertencem; (iii) senioridade do cargo, afetam a perceção/perspetiva da qualidade.

Implicações na Investigação: Este trabalho apresenta implicações teóricas ao mostrar que num processo de implementação da qualidade numa organização não são suficientes normas, regulamentos e manuais, mas a vertente informal do dia-a-dia da empresa. Por exemplo, o envolvimento entre os colaboradores e ações de formação que são cruciais para a construção de uma cultura da qualidade numa empresa. Esta conclusão é muito importante e gera implicações práticas para empresas que possuem normas ISO e têm uma preocupação na sua gestão para uma melhora na cultura da qualidade.

Originalidade/Valor: Existe uma lacuna na literatura, no que toca à perceção/perspetiva da qualidade pelos colaboradores em empresas que possuem as normas ISO. Este trabalho faz um levantamento dos fatores que afetam a perspetiva da qualidade e que, para uma implementação de cultura da qualidade de forma excelente, são necessários fatores chamados formais e informais.

Keywords: Quality Management, Total Quality Management, ISO's, Oakland Revised Model, Case study.

Abstract

Purpose: The purpose of this paper is to assess the perception/perspective of quality by the employees in a chemical industry and what factors can affect this perception/perspective. Also, to examine what are the key success factors that assure a successful quality management implementation. An evaluation based on the Oakland Revised model.

Methodology: This investigation covers one chemical industry in Portugal. It operates in the sector of production of surfactants for different purposes. A qualitative methodology was developed to conduct the research, supported on a case study. Data was collected from recorded interviews and from written documentation provided by the company.

Findings: It is concluded that for the implementation of a quality culture within an organization not only the so-called formal aspects, such as rules and regulations, are sufficient. It is necessary that employees are imbued with the importance of quality culture, which is often done informally. In conclusion, formal and informal factors (just as conversations, manuals parallel to formal rules and the exchange of experiences) are crucial for the implementation of a successful quality culture. It was also concluded that the factors: (i) the age of the employee, how long they have worked in the company; (ii) the department they belong to, (iii) seniority in the job, affect the perception/perspective of quality.

Research Implication: This work has theoretical implications by showing that in the process of implementing quality in an organization, standards, regulations, and manuals are not enough. However, the rather informal side of day-to-day business is also important. For example, employee involvement and training are crucial to building a quality culture in a company. This conclusion has practical implications for companies that have ISO standards and are concerned about improving their quality culture.

Originality/Value: There is a gap in the literature regarding the perception/perspective of quality by employees in companies that have ISO standards. This paper surveys the factors that affect the perception/perspective of quality and what are the formal and informal factors that are necessary for an excellent implementation of a quality culture.

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List of abbreviations

ISO – International Organization for Standardization

SAP – Systems, Applications & Products in Data Processing

TQM – Total Quality Management

Chapter 1 – Introduction

1.1 Purpose of the investigation and research questions

In an era of constant transformation and innovation, it is important to understand factors that are within our control in order to improve productive performance. Analyzing the factors that affect a company's quality culture and evaluating employees' perceptions of its quality can lead to an even more excellent quality culture, resulting in greater productivity.

It is clear that today, that the financial performance does not capture all the outcomes and results of organizations (e.g., customer, quality or innovation demands marked by technological, and organizations changes in the environment) (Johnson & Kaplan, 1991).

When I decided my master thesis subject, the interest in Total Quality Management (TQM) originated from my contact with management methodologies during my bachelor's degree in chemical engineering. When I took the Green-Belt and Six-sigma courses, I was able to learn and see for myself how much the implementation of a well-designed quality culture impacts a company.

There are different definitions of TQM. One of them translates TQM as the culture of an organization committed to total customer satisfaction through continuous improvement that must be aligned with a strategic plan (Rad, 2006). And the mindset of continuous improvement linked with innovation has been considered by the researchers a critical success factor for quality management implementation (Bessant, 1998; Bessant & Caffyn, 1997; Bessant, Caffyn & Gallagher, 2001).

This master's thesis concerns an investigation about the dynamics of quality culture, i.e., the employees' perception of it and an analysis of the factors that can affect this perception. It also analyzed the key success factors that ensure successful implementation of quality management, evaluating them using the Oakland revised model. This model is based on the idea that TQM is key to achieve excellence. Accordingly, for organizations to perform in a more effective way, they need to be aware of structural factors which are described in the model (Pimentel & Major, 2016).

There is a gap in the literature regarding the perception of quality management by employees in companies that have ISO standards. Marde (2015), has a work that addresses the theme of

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perception, but in a limited way, not providing sufficient support to cover all the issues that this topic involves.

The present study surveys the factors that affect the perception of quality management and what are the formal and informal factors that are necessary for an excellent implementation of a quality culture.

This study is a journey through the history of the chemical company INCHEMICA, analyzing the factors that have contributed to building the quality culture that they have today. The cultural aspects of an organization are crucial and impact on a TQM initiative (Green, 2012).

To accomplish the research objectives, a case-study was conducted in a Portuguese chemical industry. INCHEMICA has as its core business the production of surfactants for detergent, personal care, and cosmetic industries. The company was selected because it already has a reputation for establishing methods and standards that make up a quality culture. It is currently undergoing a transition which focuses on improving its quality management, always aiming for the standard set by TQM.

INCHEMICA was founded and started its activities in 1986. In 1993 started implementation of ISO regulation, namely ISO 9001. Presently the company is ISO 9001, ISO 14001 and ISO 45001 certified. The quality culture in the company is not only established in a normative way, by the ISOs and the quality manual, but is constantly reinforced by informal practices that will be explored in this study.

Moreover, three research questions were posed which upholds the thesis main purpose: (i) How INCHEMICA developed its quality management process? (ii) What is the perception/perspective of the quality of the employees? (iii) What are the key factors to assure a successful quality management implementation?

From one standpoint this paper demonstrates importance on an academic level, mainly in management and quality, as explores the importance of employee perceptions/perspectives in establishing a quality culture. Alternatively, it serves as a model for other companies that share similar traits and operate within the same sector, or even for different cases, as long as the underlying principles and methods are adapted accordingly.

1.2 Methodology Adopted

A qualitative and longitudinal study was conducted out in a chemical industry in Portugal to understand the dynamics of the quality culture and the perspectives of the employees, evaluating the key success factors of a successful quality management implementation by using the Oakland revised model.

The company where the study was undertaken, is a chemical industry based in Portugal, the core business is the production of surfactants for detergent, personal care, and cosmetic industries. INCHEMICA belongs to a group called RNE, which encompasses a group of 8 companies in the transformation field and production of chemical additives.

The steps followed to develop the case study were the specification of the research questions, data collection, assessment of the evidence and the formulation of the case study (Ryan, Scapens, Theobald, 2002; Yin 2018). Several visits happened in the field site for the interviews to be conducted, in this situation, the researcher role was “Visitor”. (Ryan, *et al.*, 2002).

The research took place between September 2022 and May 2023 and comprised two phases. The first phase, regarding the pilot case study, spanned in September 2022 and comprised 2 interviews, with a total of 2 hours and 40 minutes. All the interviews were structured and tape-recorded and transcribed. The main phase intends to answer the research questions and ran from January 2023 to May 2023. This phase comprised 7 semi-structured interviews, lasting 4 hours and 12 minutes.

The collection of data was also supported by the collection of internal documents and manuals provided by INCHEMICA.

1.3 Structure of the thesis

The present thesis is structured as follows. Chapter one comprises the introduction of the case study.

Literature review on Quality and TQM, Oakland model and ISO regulation, is presented in chapter two. Within the literature some factors are explored as quality perspectives definition and how

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Oakland revised model can be a tool to analyze the quality culture in a company and consequently the perceptiveness of the employees.

Chapter three describes the methodology adopted in the investigation, which includes a description of the field site, a theoretical approach to quality research and an explanation of the methods used to gather data.

Chapter four is responsible for the development of the case study (empirical study), a detailed description of the key moments and decisions that helped build the history of quality in INCHEMICA. Some of these decisions are the implementation of the norms ISO 9001, ISO 14001 and ISO 45001, the implementation of SAP systems and the generational change in employees.

Chapter five presents a discussion and the results of the findings. An analysis through the Oakland revised model and reality faced by INCHEMICA is made. This chapter also includes the answers to the research questions proposed and the quality management journey developed by INCHEMICA and what is going forward.

Finally, chapter six summarizes the contributions of this thesis and the limitations encountered while it was developed. It also suggests opportunities that can be applied in future research.

Chapter 2 – Literature Review

2.1 Quality

Quality has different perspectives. According to Cameron & Sine (1999) there are seven common definitions of quality. The first five are focused on quality as an attribute of a product or service, or on specific tools, techniques, or activities in an organization. But the last two are related to a system, a cultural or a management model, the topic addressed in this study.

The (Japanese Industrial Standards Committee Z8101 1981, p. 14) approach quality as system base definition “(Quality is) a system of means to economically produce goods or services which satisfy customer `requirements”.

There is another perspective that relate quality to a management philosophy. “(Quality) means that the organization’s culture is defined by and supports the constant attainment of customer satisfaction through an integrated system of tools, techniques and training” (York & Mire, 2004).

The last two definitions focus on quality as the overall functioning of an organization or an ultimate outcome (that is consistent with Juran’s “Big Q” approach to quality) (Cameron & Sine, 1999). The term “Big Q” quality is usually used as a synonym of the term TQM.

According to (Juran *et al.*, 1999), Quality means those features of products which meet customer needs and thereby provide customer satisfaction. In this sense, the meaning of quality is oriented to income. The purpose of such higher quality is to provide greater customer satisfaction and, one hopes, to increase income.

Consequently, providing more and/or better-quality features usually requires an investment and hence usually involves increases in costs. Higher quality in this sense usually “costs more”. (Juran *et al.*, 1999).

Quality is also defined by (Juran *et al.*, 1999) as freedom from deficiencies, for an industrial context this is a key concept. So, a process or a management process with quality envision “freedom from errors that require rework, or that results in field failures, customer dissatisfaction and customer claims”.

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To attain quality, an organization must be fulfilled of vision, supported by policies and specific goals. Subsequently the managerial processes will oversee converting the goals into results. This is called “The Juran Trilogy”, that comprehend the three dimensions of quality: quality planning, quality control and quality improvement.

According to ISO 9001:2015, an organization focused on quality promotes a culture that results in the behaviour, attitudes, activities and processes that deliver value through fulfilling the needs and expectations of customers and other relevant interested parties. The quality of an organization’s products and services is determined by the ability to satisfy customers and the intended and unintended impact on relevant interested parties. The quality of products and services includes not only their intended function and performance, but also their perceived value and benefit to the customer.

2.2 Total Quality Management

Total Quality Management is defined by (Cameron & Sine, 1999) as an “ultimate outcome” closely related with the general functioning of the organization.

According to (Rad, 2006), TQM can be defined as “the development of an organizational culture, which is defined by, and supports the constant attainment of customer satisfaction through an integrated system of techniques and tools”.

It also interprets TQM as a translation of a culture of an organization committed to total customer satisfaction through the continuous improvement, which must be aligned with a strategic plan (Rad, 2006).

A culture of continuous improvement has been considered by the researchers as a critical success factor for quality management implementation, involving all different types of organizations, from the smallest to the largest, and in particular when they are linked to innovation and high levels of employee involvement (Bessant, 1998; Bessant & Caffyn, 1997; Bessant, Caffyn & Gallagher, 2001). As is the case with INCHEMICA, which during its history was linked to different types of organizations that focused on continuous improvement.

Regarding TQM systems, researchers associate four governing principles that organizations must follow: (i) delighting the customers, (ii) people based management, (iii) continuous improvement

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and (iv) management by fact to achieve excellence (Kanji, 1998). The benefits of maintain these principles in a company can be cited as quality improvement, productivity improvement or cost reduction (Suaréz- Barrasa & Ablanedo-Rosas, 2014).

(kanji), also complement that the cultural aspects of an organization are crucial and can directly impact the effectiveness of TQM initiative. It is possible to conclude that it is impossible to focus on business excellence without the right organization culture. (Dahlgaard *et al.* (2013. P 527)).

Dahlgaard and Dahlgaard-Park (2006, p.266), defines TQM as “TQM is a corporate culture characterized by increased customer satisfaction through continuous improvements, in which all employees actively participate”.

The primary aim of the TQM philosophy is to shift an organization's culture from a passive and defensive stance to one that is proactive and open. This transformation ensures the comprehensive application of core TQM principles, including strong commitment, continuous improvement, and customer-centric focus, throughout the entire organization (Juran *et al.*, 1999).

The Lean concepts and tools should be seen as supportive to the overall objectives of TQM and not as an alternative (Dahlgaard and Dahlgard-Park, 2006).

Moreover, TQM, has been linked to business and positive outcomes (including financial and non-financial performance) in organizations (Duh, Hsu & Huang, 2012; Erikson & Hansoon, 2003; see also Dahlgaard, Chen, Jang, Banegas, & Dahlgaard-Park, 2013).The study lines of this topic has been following includes formal evaluation of the models that work in a measurement of these outcomes and results of the framework in practice.

Today, after many years of study and research, financial performance, does not capture all the outcomes and results of organizations (just as customer satisfaction, quality or innovation and organizational changes in the environment) (Johnson & Kaplan, 1991).

There are different opinions regarding the implementation of TQM. However, the quality movement remain a useful and valuable framework in many organizations and countries. (Dahlgaarg- Park, 1999, 2011). Some innovative managerial systems have been developed over the last decades, that in addition to financial performance, focused in image, quality management and clients/ customer satisfaction. (Pimentel & Major, 2016).

These new managerial systems are strategic management accounting, management control, management by objectives, TQM and balance scorecard (Hopper, Northcott, & Scappens, 2007).

2.3 Oakland Revised Model

The "Oakland Model" refers to a management approach known as the Oakland Integrated Management System (OIMS). The comprehensive framework focuses on achieving and sustaining high levels of performance and quality.

One of the key goals of the Oakland model is to establish a strong culture of quality in an organization. It emphasizes the integration of various management systems and processes to drive continuous improvement and excellence. The model is based on the idea that TQM is crucial to achieving excellence.

For organizations to perform in a more effective way, need to be aware of structural factors which are described in the model as the 4 P's, and 4 C's. The 4P's are relevant to delivering quality products and services, and as a result, improving performance. Consequently the '3 C's' produce what the literature calls as the "the glue" or "the soft outcomes" responsible for this connection between the parts.

Pimentel & Major (2016), in a study conducted in a public company, that was responsible for analyze the key success factors for a quality management implementation, suggested after findings of the research a new structure for the Oakland framework, that will be used in this study.

They concluded that two additional critical success factors should be included, to explain how companies can improve performance: firstly, collective involvement, as a "soft outcome"; and secondly, power, characterized as a "hard management necessity".

The proposed revised model links the customer (the most important performance outcome) to performance, and proposed some arrows, that points the effect of the other factors to performance and customer. The model also includes two additional factors mentioned above, power and collective involvement.

The Oakland revised model, can be defined as the "5 P'S" and the "5 C's" and must be translated and adapted into a framework that can be established in distinct categories for effective implementation.

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The five P, can be defined as:

- 1- **Planning** – The development and deployment of policies and strategies; setting up appropriate partnerships and resources and designing quality.
- 2- **Performance** – Establishing a performance measure framework, for example BSC (balance score card), for the organization; carrying out self- assessment audits, reviews and benchmarking.
- 3- **People** – Managing the human resources, the culture changes; teamwork, communications, innovations, and learning.
- 4- **Process** – Understand management and design the quality management system, work from a perspective of TQM and in walk in the principles of continuous improvement.
- 5- **Power** – Defined by an *invisible force* that produces respect and influence and positively affects the quality culture.

The five C's can be defined as:

- 1- **Culture** – Definition and implementation of the values and ethics to support the creation of a TQM culture and ensure creativity and innovation as a culture.
- 2- **Commitment** – Involvement in a personal and active way in the quality and improvement activities. Be committed to improve the effectiveness of your acts and leadership.
- 3- **Communication** – Stimulate and encourage communication and collaboration. As a leader, clearly communicate the vision, mission and values.
- 4- **Customer (resides in the same spot as 'performance')** – Involvement with the customer and the stakeholders, making sure that the needs are understood and responded. Implement the continuous improvement in the partnerships.
- 5- **Collective Involvement** – Defined as the capacity of behave the commitment by initiatives in an active way, crucial as it represents the consolidation of the intentions, mostly by the employees.

According to Oakland “Quality management, to be successful, must impact on the organization's performance, including the results from the customer. This can be achieved through good planning

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and improvements in process through involvement of people. The framework provide a new model for quality management “ (Oakland, 2004).

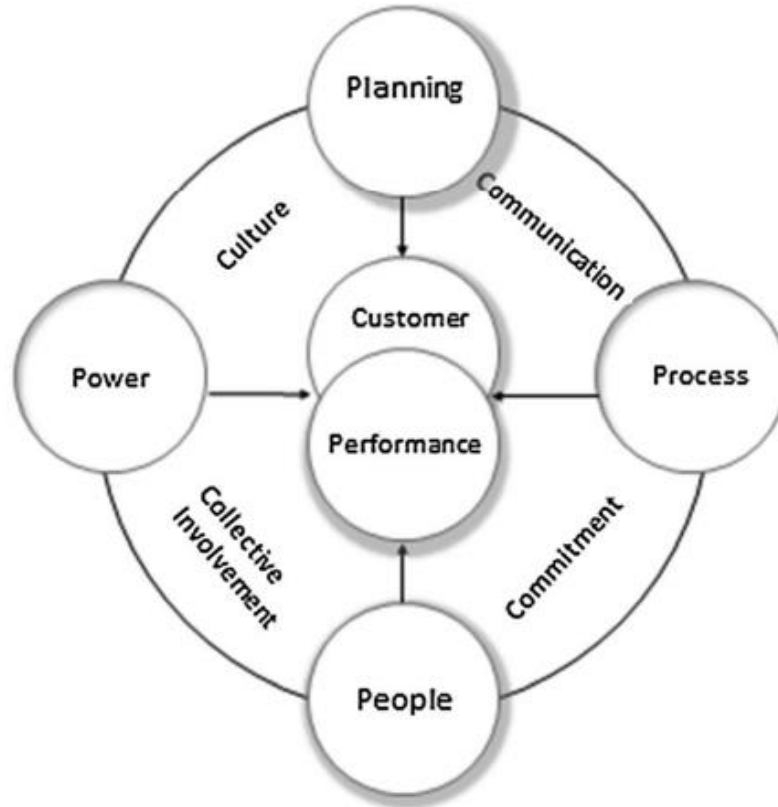


Figure 1: Oakland TQM revised model (Pimentel & Major, 2016)

2.4 Quality Systems /Supporting Tools

Quality systems feature an important role in the regulation of an organization, it is very common to see its application in industries. If implemented correctly, they have a direct impact on different aspects of the organization, including the quality of the outcomes.

2.4.1 ISO 9001

Much of what we call quality management is covered by ISO 9001. The standard provides requirements with the intention to ensure that their products and services are meeting the needs of the customer and that the quality is consistently improved. (ISO, 2015).

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ISO 9001 is the only standard in the family that can be certified to (although this is not a requirement). It can be used by any organization, large or small, regardless of its field of activity. In fact, there are over one million companies and organizations in over 170 countries certified to ISO 9001. (ISO, 2015).

The most updated version is ISO 9001: 2015, that replaced ISO 9001: 2008. The standard is based on a number of quality management principles in a strong perspective of customer focus, the motivation and implication of continual improvement in the process. (ISO, 2015).

The ISO family seven principles that are based on the quality management principles described in ISO 9000. They were developed and updated by international experts of ISO/TC 176, which is responsible for developing and maintaining ISO's quality management standards. (ISO, 2015)

Each of the principles are composed by 4 parts: (i) Statement: Description of the principle, (ii) Rationale: Explanation of the principle, (iii) Key Benefits: Examples of benefits associated with the principle, (iv) Actions you can take: Examples of typical actions to improve the organization's performance when applying the principle. (ISO, 2015).

The principles are not listed in a priority order. The importance of each principle varies from each organization and can change over time.

The seven quality management principles defined by ISO (2015) are:

1 – Customer Focus: The objective is to meet customer requirements and to strive to exceed customer expectations;

2 – Leadership: The leaders at all levels in a company establish unity of purpose and direction, they are the responsible for creating conditions in which the followers engage in achieving the organization's quality objective;

3 – Engagement of People: For a company to create and to deliver value, is essential that the people at all levels are competent, empowered and engaged.

4 – Process approach: A system that is coherent with interconnected process provoke a consistent and predictable results that are achieved in a more effective and efficient way.

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5 – Improvement: The culture of continuous improvement;

6 – Evidence-based decision making: The desired results are more likely to be produced by decisions that are based in a criterial analysis and evaluation of data.

7 – Relationship Management: The sustained success of a company is directly related to the capacity of keeping healthy relationships with interested parts, such as suppliers and partners.

According to (Marde, 2015), there are a lot of reasons for a company to adopt the certification ISO 9001, in principle, this process of certification is voluntary, but in practice it is often recommended by business partners, in this case, companies adopt it to have a good position and satisfy their influential partner.

The process of implementing ISO 9001, to be efficient, must be looked as a continual improvement and perceived as such by the external stakeholders, including the customers and partners, and as well in-house stakeholders, namely employees (Marde, 2015).

The literature shows that the benefits of implementing ISO 9001 impact companies in different levels.

- (i) **Company performance** – The main effects are increased productivity, the cost reduction, quality enhancement (Iwaro and Mwas 2012; Han, Chen, and Ebrahimpour 2007; Terziovski, Power, and Sohal 2003):
- (ii) **Financial profit** – Increased of the market share (Corbett, Montes-Sancho, and Kirsch 2005; Chow-Chua, Goh, and Wan 2003).
- (iii) **Internal organization improvements** – Provoking better internal communication and staff motivation (Casadesus, Gimenez, and Heras 2001).
- (iv) **Customer relationship management** – The customer become more loyal to the company and develop a better image of the service (Singh,2008).

Marde (2015), shares the idea that the implementation of a quality management system and its subsequent certification is a voluntary process supported by an organization's own strategy, motivation, policies and goals.

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Moreover, Tari, Molina- Azorín and Heras (2012), suggest that it is essential for the companies to see and consider the certification as an opportunity to improve internal processes and systems, rather than simply to hang a certificate on the wall, so they can enjoy broader repercussions.

2.4.2 ISO 14001

ISO 14001:2015 provides requirements for managing the environmental aspects in a business activity more effectively, taking into account environmental protection, pollution prevention, legal compliance and socio-economic needs. (ISO 14001, 2015).

The international consensus gathered around the ISO 14001:2015 standard enhances the reputation of any Organization, supporting compliance with environmental legislation and reducing the risk of sanctions and legal action. Demonstrating a real commitment to the environment can transform your organization's values: (i) Externally, for the creation of new opportunities of business with clients environmentally conscious and by the competitiveness reached by the cost reduction. (ii) Internally it can improve the workplace, the ethics and motivation for collaborations. (ISO 14001, 2015).

Compliance with ISO 14001:2015 ensures that a organization makes rational use of energy and resources, and with the consequence of reduce costs over time. In this way, certification of the Environmental Management System will help the organization to develop and improve performance.

The main benefits of the implementation of ISO 14001:2015 are the ability to demonstrate high levels of environmental compliance when bidding for international contracts or expanding new business locally. And the improvement of the reliability of the internal operations satisfying stakeholders and customers, enhancing the performance of the company and also giving a boost in employee motivation and awareness of their responsibilities. (ISO 14001, 2015).

2.4.3 ISO 45001

The ISO 45001 certification, is responsible for reducing the risk in a organization by promoting occupational health and safety (OHS).

An Occupational Health and Safety Management System (OHSMS) is a key element in the organizational risk management strategy. Implementing an OHSMS enables the organization to:

- Protect its workforce

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- Comply with legal requirements
- Facilitate continuous development

ISO 45001:2018 is applicable to any organization regardless of its size, type and activities. It is applicable to the OH&S risks under the organization's control, taking into account factors such as the context in which the organization operates and the needs and expectations of its workers and other interested parties.

The certification does not address issues such as product safety, property damage or environmental impacts, beyond the risks to workers and other relevant interested parties.

The benefits of implementing this certification also affect the organization's reputation as a safe place to work, which can affect the employees' perception/perspective of the company. The direct benefits can be listed as: (i) Improving its ability to respond to regulatory compliance issues; (ii) reducing the overall costs of incidents; (iii) reducing downtime and the costs of disruption to operations; (iv) reducing the cost of insurance premiums; (v) reducing absenteeism and employee turnover rates; (vi) recognition for having achieved an international benchmark (which may in turn influence customers who are concerned about their social responsibilities);

(Jannah et al., 2020), affirms that workers and employees are the most at risk of occupational safety and health, therefore their involvement in the organization's management is very necessary. ISO 45001 is one of the bridges in realizing employee participation in organization of this methods.

According to the (Masjuli, 2018), one of the goals of changing the OHSAS 18001 management standard to ISO 45001:2018 is to optimize the integration process with other international management standards, namely ISO 9001: 2015 regarding quality management systems and ISO 14001: 2015 regarding environmental management systems.

This integration of the systems has the objective of making the implementation process more efficient and effective, and facilitate the internal and external audit process.

Chapter 3 – Methodology

3.1 The field site

INCHEMICA was founded and it started its activities in 1986. In 1993, the implementation of ISO regulation began, namely the ISO 9001. Presently, the company is ISO 9001, ISO 14001 and ISO 45001 certified.

The company's core business is the production of surfactants for the detergent, personal care and cosmetic industries, which are: sulfonic acids, sodium laureth sulfates at 70% and 27% concentration, and sodium decyl sulfate at 35%.

The operating regime of the plant in the production areas is continuous (24 hours a day, 7 days a week). The administrative areas and the administrative and office areas operate on a shift system from Monday to Friday.

The main raw materials are: (i) Linear alkylbenzene; (ii) Natural alcohol; (iii) Oxygen from air captured from the atmosphere; (iv) Sulfur, normally received in liquid form, although the company always has a stockpile of solid sulfur, to be used in the absence of liquid sulfur. (De Alvarenga & Dias, 2016).

INCHEMICA belonged to the Shell group from 1986 to 2001. In the present time, the company belongs to RNM, a group that has 8 companies. RNM started as a distributor in the chemical industry of solvents and caustic soda and later acquired companies. Currently, there are companies in the transformation field and production of chemical additives.

INCHEMICA is organized in five different departments (i) Administrative Department – responsible for the sales, human resources and SAP systems; (ii) Logistics – responsible for management of stocking the trucks; (iii) Quality Control – quality control of the material in the production; (iv) Maintenance; (v) Production – production of the raw materials.

As presented in this study, INCHEMICA is in a transition of generations regarding the employees and the modernization of the equipment for a better quality of the process. And the goal is to implement a Total Quality Management system.

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INCHEMICA's turnover in 2022 was 35.3 million euros, compared to 28.2 million euros in 2021. The number of employees in 2022 was 36, while in 2021 it was 35. And the profit in 2022 was 930.6 thousand euros, while in 2021 they were 545.3 thousand euros (see Appendix 3).

The company complies all legal requirements that are relevant to the certification of the system of quality management (ISO 9001).

3.2 Research Methods

A qualitative and longitudinal case study was carried out in a chemical industry called INCHEMICA to understand how the quality is perceived by the employees during the period of analysis (2022-2023) and analyze what are the factors that make the company see quality as successful.

The main steps taken to develop the case study comprised research design, data collection, pattern identification and evidence assessing (Ryan, *et al.*, 2002; Yin 2018). Research design has an important role in defining “the logic that links the data to be collected (and the conclusion to be drawn) to the initial questions of the study “ (Yin 2018). The researcher role was “Visitor” since several visits happened on the filed site, where data were collected (through documentation and interviews) (Ryan *et al.*, 2002).

The research took place between September 2022 and May 2023 and comprised two phases. The first phase, regarding the pilot case study, spanned in September 2022 and comprised 2 interviews, with a total of 2 hours and 40 minutes. All the interviews were structured and tape-recorded and transcribed.

The main objectives of the pilot study were to refine the collection of data, and to identify and clarify the research questions. (Yin,2018).

After the pilot phase, three research questions were posed: (i) How INCHEMICA developed its quality management process? (ii) What is the perception/perspective of the quality of the employees? (iii) What are the key factors to assure a successful quality management implementation?

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Finally, the main phase intends to answer the research questions and ran from January 2023 to May 2023. This phase comprised 7 semi-structured interviews, lasting 4 hours and 12 minutes. In addition to direct questions, non-direct questions were usually asked to explore specific reasoning.

All the interviews were tape-recorded, transcribed, and most of them were followed up with an open discussion (see Appendix 1). Interview guidelines can be found in Appendix 2. To ensure the quality of the data gathered, evidence was triangulated. Informal calls were made to the Head of Manufacturing department whenever clarification was needed. Notes taken during and after the interviews were also used in this process.

Nine interviews were carried out, lasting 7 hours and 12 minutes. The interviewees comprised employees and members of the management of some of the departments. As it can be seen in Appendix 1, other operational managers were interviewed. The average was 48 minutes per interview. Interview guidelines can be found in Appendix 1.

After each interview, specific cardboards and notes were produced to support the analysis and facilitate the generation of patterns. The answers of interviewees were summarized and organized in themes (data reduction and categorization) (Miles and Huberman, 1994).

To meet the need to combine different sources, a way to increase the possibility to know how the true data are (Scapens, 1990; Yin 2018), data were also collected from direct observation (assistance of the Head of Manufacturing Department) and archival documentation: (i) organizational charts; (ii) internal politics and norms; (iii) vision, mission and values of the company; (iv) annual activity reports;

The collection of data was also supported by the collection of formal reports statements and internal manuals provided by INCHEMICA. (See Appendix 3).

Chapter 4 – Empirical Study

There was a deep organizational change in INCHEMICA regarding quality. Quality management was a current topic over the years in the company, and some factors that will be approached in this study affect the way the quality management is perceived by the employees and through different generations. Several key management decisions were made that have impacted this topic (see Figure 2).

The milestones described below are important to understand how quality management is perceived in INCHEMICA.

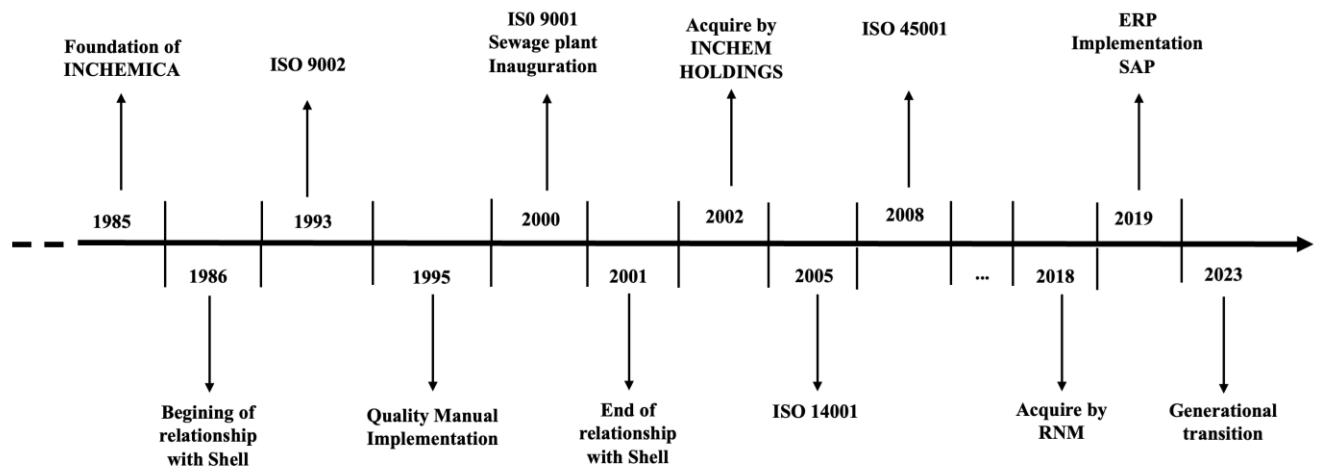


Figure 2: Timeline of the milestones in INCHEMICA.

Source: Elaborated by the author.

INCHEMICA's management model is based in an integrated methodology that seeks a goal, which is the total quality management. Named the same, integrated management model, follows as a backbone of the ISO regulation (ISO 9001, ISO14001 and ISO45001). It consists on a main manual, with some transversal topics and different procedures specific to the areas of organization, management and human resources management.

Ten years after the company was founded the manual was written. The employees who worked there were consulted, mainly the production and logistics employees, for greater accuracy of the

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information and procedures. In the beginning, some difficulties related to the handling of the manuals were reported, which were addressed later. As the Senior Production Employee describes:

“In the beginning it was a challenge for us to get used to handling the manual. It was a process to understand the importance of having everything documented and to know how to consult the material in order to justify our procedures for audits. There was a certain resistance from the staff, but over time it was possible to adapt and understand the importance of recording information.” (January, 2023).

The manual is a big guide and the foundation of the company's procedures. It has been nicknamed among employees as the INCHEMICA's Bible, because it is large, heavy, has a white cover and contains information that is a guidance role in the life of the company.

The guidebook is made up of several dossiers: the ones for the operational part, about 5 modules are kept on the production line for easy consultation. The most frequently handled sections are related to specifications, the other operational and production line details are consulted when preparing for an audit.

Since the foundation of the company in 1985, quality management was a relevant topic, as a chemical industry, the rigidities and the process work occur in a very specific and controlled way. What is different from other industry sectors. The quality of the raw material and the quality of the process affect directly the final product. The Head of Manufacturing Department describes:

“Quality in its definition is related to the customer's perspective in relation to the product, that is, the level of quality is determined by the degree of customer satisfaction with the final product. In the field of chemistry this is an even more present and relevant factor, because our final product must follow strict standards in its processes, so it is produced with specifications.” (January, 2023).

The main product produced by INCHEMICA is anionic surfactants, one of the key ingredients to produce cosmetics, detergents, and personal hygiene products. To produce the product there are a lot of specific parameters that must be followed to comply with the quality, this is called the quality of the own raw material.

In 1993 the implementation of the norms started, specifically, ISO 9002, the one related to the quality. At the time, the last pattern version of the norm was ISO 9002, but in 2000, the system went into a revision, so the standard became ISO 9001, until today they have ISO 9001. The first issued certification was in 1996.

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In 2005, INCHEMICA, started the implementation of ISO 14001, the one that is related to the natural environment. The similarities in the structure, operation and planning between the ISO14001 and ISO 45001 allowed the company, also in 2008, to implement and issue the certification of ISO 45001. This norm is related to the security of the process. The Head of Manufacturing Department reinforce:

“The implementation of the standards was a very important step for our company, always focusing on Total Quality Management. Each of the groups to which INCHEMICA belonged had its own specificity regarding the rigidity and requirements of the standards, which raised the reputation and credibility of the quality culture and management of our company.”

(January, 2023).

Regarding to the difficulty of implementation, ISO 14001 and ISO 45001 are more challenging because they adopt a more specific perspective. On the other side, ISO 9001 is more focused in the quality of the product and the activity in a more general perspective, so it is considered easier to implement. The specificities of ISO 14001 and ISO 4500 are related to not only the implementation but further in monitoring and complying with legal requirements and proper certifications.

Also, in ISO14001, there is a component related to all the industry emissions, namely, the gas, liquid, solid residues. In response to the need to control emissions INCHEMICA has a license that was previously called Environmental license, but now is called single environmental title. That has as its main purpose to settle and control the limits of the emissions, but also covers the wellbeing of the employees.

“The implementation of this standard was of great importance in establishing the quality culture related to safety aspects at INCHEMICA.” (Head of Manufacturing Department, January, 2023).

The maintenance of the norm is given by complying, controlling emission limits and frequently reporting the activities. The anionic surfactants produced by INCHEMICA are not considered toxic for people, but toxic to the aquatic environment, so it implies in a major control of these emissions.

In 1976, in Seveso, a city 22km from Milan in Italy, an accident happened that change all the history of the risk management in chemical industries.

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The catastrophic event known as the Seveso disaster originated from a mishap that took place at the ICMESA chemical plant situated in Meda. This facility was owned by the Swiss multinational pharmaceutical giant, Roche.

The incident occurred on a Saturday, precisely on July 10, 1976, around 12:30 p.m. It involved a reactor used in the production of trichlorophenol, which served as an intermediary in making herbicides and a germ-fighting substance called hexachlorophene.

Regrettably, an unforeseen exothermic reaction in the reactor led to the release of a poisonous dioxin cloud. This hazardous cloud dispersed over the regions of Meda, Cesano Maderno, Desio, and Seveso, due to prevailing winds. Among these areas, Seveso bore the brunt of the contamination, given the wind's direction (Centemeri, 2010).

After the accident, a new era of regulation at the European level on risks of this nature has begun which was eventually laid down preliminarily in the Directive on the major-accident hazards of certain industrial activities (82/501/EEC), known as "Seveso 1". Currently, the norms have evolved, and the most updated is "Seveso 3" and INCHEMICA follows the respective parameters.

The history of INCHEMICA, and specifically the quality management was impacted by the partnership and the groups that the company belonged to.

The first company that acquire INCHEMICA was the American giant Shell, the cooperation, started at the inauguration of the company and went until 2001. In terms of quality management and procedures, the company and the processes were directly affected. Shell, founded in 1907, had a more mature structure and organizational expertise to adopt the concept of TQM. As supported by the Head of Manufacturing Department:

"The partnership with Shell inaugurated a new standard that would dictate the quality culture at INCHEMICA to this day. Its reputation, its standards and its quality management processes and strategies influence us to this day." (January, 2023)

One of the oldest employees interviewed, the Senior Production Employee work in the company for more than 35 years, he affirms that the transition was hard when the company started implementing the norms and that they create resistance:

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"We had our own way of doing things, when the group came, it started to formalize the work and things that we had known how to do for some time, but it was necessary to adapt the way of doing it. The biggest resistance was from the staff, because they were obligated to follow the rules." (January, 2023).

As the time went by, he points out that he changed his mind:

"But that was good, we realized that the study and formalization brought us a greater internalization of the concepts and greater autonomy and security". (January, 2023).

Shell worked with a routine visit system in INCHEMICA. Which consisted in receiving a team of specialized consultants that were dedicated to implement and improve quality strategies with a personalized and proprietary methodology in the field.

The Senior Production Employee also remember that the firsts audits for the employees were a very stressful moment, because they were adapting in how to deal with the manuals. They dedicated the previous week to intense study to understand every detail of the process.

"The first audits were always a stressful time, we were still learning how to handle the manuals and justify our attitudes to the auditors. We had to say everything, just as, the number of the page, number of dossier. Today we know the standards practically memorized, and we know how to identify nonconformities more quickly." (January 2023).

Regarding the level of rigidity of the audits and the charge of the top management, the Senior Production Employee said that in his opinion they remain the same, what has changed is their ability to handle the manuals. Education and training for the internalization of the standards are crucial factors for the good performance of the roles.

The quality manual remains the same in its backbone, but it undergoes modifications whenever an update is generated, or a specification is changed. Senior Production Employee commented that the flexibility of the parameters and specifications has decreased over the years, and it can be justified by changing customer quality parameters and cost reduction by the end customer.

"Today there is much less margin for error in the specifications. In the old days the specifications were bigger, before there were 4 points of margin, today there are 2. They have been decreasing due to the customers demanding higher quality. If we want to sell, we have to follow what they ask for."

(January 2023).

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He also complemented that this change was progressive and that it generated a change in the way they worked:

“That change was progressive and then there are also quality specifications for specific customers. We were always taught to monetize production to reduce cost. It was necessary to increase quality to meet the parameters and thus satisfy the customer.” (January 2023).

When the partnership with Shell ended, they remained with the methods and norms related to quality of product and service. But they didn't have the same structure to maintain the same level of quality, as they perceived as total quality management. At the time of the partnership INCHEMICA had 40 employees, nowadays they have 33.

One of the justifications that the Head of Manufacturing Department gave for the inability to maintain the level of quality is the structure of the company, talking about numbers of employees and expertise to do reports.

“At the level of process registration, we are less formal than we should be. Many resolutions are made organically, that is, already internalized. For example, the repair requests are recorded, but often not with details at the level of what the fault was and how it was resolved. When a problem arises, we often try to solve it quickly and we have records, obviously, but we don't have formal reports of what happened. And so we do it in an informal way, we get the people involved and who know about the issue that need to be heard and then we execute.” (January,2023)

She also justifies that the solution for this question would be more qualified staff and organizational support:

“For a higher level of excellence, in my view, we would need more staff to do the records. We are excellent at work, but we don't have the same expertise as a larger company, for total quality and excellence in the organization due to this lack of resources and organizational support.” (January,2023)

Another specific topic that impacted the management was the way they approached security in a more global and systemic way, it is called global risk analysis. Shell, being a company that works with petroleum raw material, has in its values a concern for safety. Not only the safety of the installations, through the application of risk analysis tools, but also an intense concern with the safety of the employees.

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Also in the during the time it belonged to Shell, in the year 2000, INCHEMICA, inaugurated its sewage treatment plant. This was an important milestone, because it made the company comply with the legislation that came out at that time regarding the disposal of effluents. Its implementation was due to a need; since there was no municipal treatment plant and the company had only a basic effluent treatment station, which corrected some parameters, but it was not enough to comply with the norms in force. This achievement contributed to better quality in processes.

From the time the interview was conducted the Head of Manufacturing Department also commented that only her and more 2 employees that experienced the Shell management remain in the company. The plans are to remain on the path of a level of total quality management, notably renewing the staff, with a high level of instruction and autonomy and changing equipment for the most modern with a focus on automatization.

During the midst of 2002 and 2003, INCHEMICA has been acquired by another group, called Inchem Holding. The group is American, but the board member was English. In this same phase, INCHEMICA started to be called by the name it has today, no longer ESPÉQUIMICA, which in portuguese means "chemical specialties".

In terms of quality management there was a requirement that the companies belonging to the group (Inchem Holdings) had one quality-focused standard, in this case ISO 9001. During this period, as mentioned above, the other ISO 14001 and 45001 were also implemented, and the construction of the sewage treatment plant corroborated this process.

The implementation of safety and environmental standards was not exactly a demand or a requirement of the group. In matters of quality management and safety this group was not as demanding as Shell. Head of Manufacturing Department comments on the importance of this decision in the time:

“We were the ones who felt the need ourselves, to organize in this way because not only do we control the organization better in terms of environment and safety, but we also keep track of the legislation and compliance” (Head of Manufacturing Department ,May 2023)

In December 2018, INCHEMICA was acquired by another group called RNM. The company remains part of this group at the time of this study was conducted. The group started as a distributor in the chemical industry of solvents and caustic soda. Then they started to acquire companies.

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Nowadays they have 3 companies in the transformation field, one in the plastic field, the other one is INCHEMICA, and the last one is chemical too, but more related to mixtures. Beside that industry, the RNM, acquire other companies in the distribution field, such as water treatment, human drinking water and residual water.

All the enterprises that belong to the group follow the norms ISO 14001, 9001 and 45001. The further idea of the group is to create a management and quality system unifying the companies from the same field, keeping the goal of TQM and continuous improvement. There is also interest in implementing sustainability standards.

According to Head of Manufacturing Department, the partnership with the group has been in mutual interest since its inception and from various aspects. The group also acts as a supplier of raw materials to INCHEMICA, which facilitates access to certain raw materials.

"We can classify this relationship as "win-win", because even before we were bought, they were our customers, so they have ease of purchasing because we are the same company nowadays. In addition, we also use the group's transportation company which is another benefit."(Head of Manufacturing Department, May 2023)

In 2019, the board directors decided to implement SAP systems (Systems, Applications & Products in Data Processing), because most of INCHEMICA clients and suppliers already worked with this ERP. The biggest benefits of the implementation were the increased organization in the processes and the better management of them. The SAP interface allows the visualization of information such as: who order, at what price, how much was it sold, which department, when it was planned, also the supplier's evaluation was facilitated.

The Administration Employee commented that:

"It is the same process as before, but the records are much more organized, and recorded, resulting in better planning and quality in the process." (January, 2023)

At the time of the study, INCHEMICA was going through a time of profound transition, which had a profound impact on the conclusions of this work. One important topic that have severely impacted the quality management and its perception was the change of the numbers of the employees.

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INCHEMICA in the time of the interview had 33 employees. With a smaller team, the employees are all involved in the process, so it is hard to mobilize them for training and improving topics related to quality, as the Head of Manufacturing Department comments:

“With relatively few employees, often working in shifts, it is very difficult to make people available for training. This is our company's biggest challenge. I believe that companies with a very high number of employees manage to, perhaps, manage in terms of human resources more easily to train people. Here everyone is very involved in everything, so it ends up being more difficult to mobilize people for training.” (January,2023)

INCHEMICA is now almost 38 years, and the challenge that they are now facing is a generational change in the staff. Were interviewed in the study employees who have collaborated since the foundation and others who started collaborating a little less than a year ago and there is a different perception regarding quality.

The main differences that were seen between the generations were not only related to work but also related to a life perspective. It is possible to notice a difference when it comes to limits at work, in terms of what is tolerable for each generation.

The Head of Manufacturing Department explains:

"The younger generation has other work-related ideals that differ from the older generation. For the new generation, work isn't life, it's just a part of it." (January 2023)

The Senior Production Employee reinforce:

"When I joined INCHEMICA, my attitude was always one of great proactivity, of wanting to understand all the processes and audits, even those that were outside my scope of work. And sometimes I miss this grit in the new generation. The feeling of ownership in the processes." (January 2023).

During the triangulation with the Head of Manufacturing Department, it is possible to understand that there is not only a cultural difficulty between the generations, but there is also a difficulty in passing on this knowledge to the younger ones, even impatience. In addition to a little difficulty in processing the fact that they are going to retire.

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It is noted, during the interviews the importance of the manual as something that guides and sets limits for the work, but that there are other tips and procedures that go beyond what is designated in the manuals and this varied according to the departments.

In Quality department that behavior was perceived. The department strictly follows the ISO standards, and what is proposed through the quality manual, but for better excellence in the execution of the process and activity, the Senior Manager of the role proposed an alternative handbook, with pictures, more detailed instructions that is often used. As the Senior Quality Manager reinforce:

“The standards give us the parameters to be followed and approved, but they are not enough to work autonomously. Developing this manual with photos and answers to the most adverse situations encountered has created much more security for the new night shift workers to carry out their activities.”
(June, 2023)

The same behavior was recognized, in Production, the department that can be considered the backbone of the entire production process. The activities conducted by the department have a high load of analysis in ISO audits.

As much as the standards have the role of guiding the processes, at the level of specifiable limits, formats of the procedures and safety standards. They do not translate in their totality the nuances and details of the processes that influence quality management.

“One of the factors that makes the biggest difference in this process is the details of practice. These can only be passed on in social interaction. The production department encompasses several unit operations and the management of adverse situations. These problems often occur unexpectedly, requiring innovative solutions, sometimes different from what is commonly proposed.” (Senior Quality Manager)

An important consideration regarding the standards in the Production is the rigidity and some inflexibilities of the norm. Which need to be met, but do not necessarily play a role in promoting a culture of quality. For example, the need for a sandbox next to the boiler, even if coal-fired boilers have not been used for many years. If there is no sandbox, the company can be penalized.

“Some aspects of the standard add very little to the quality of the process, as well as being extremely outdated. The audits play a regulatory role, they are very inflexible but often have blind spots.”

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(Senior Production Manager)

The logistics, purchasing, human resources and maintenance departments behave in a different way. According to the information gathered, there is no need to add additional elements or parallel materials.

In conclusion, INCHEMICA, continues its path to a quality management culture increasingly aligned with TQM, despite the improvements, the company knows that there is still a long journey ahead and they plan to continue.

Chapter 5 – Discussion

Ever since, in INCHEMICA history quality management is a present topic. Over the years, the company has made several decisions that have impacted and improved the company's quality culture. Implementation of the quality system ISO 9001 showed to be a great asset on increasing quality across the organization and consequently increasing customer satisfaction. (Chiarini, 2011).

Quality management is an important topic for the company. INCHEMICA's management model is based in an integrated methodology seeking a goal, the total quality management. Called by the same name, integrated management model, follow as a backbone the ISO regulation (ISO 9001, ISO14001 and ISO45001). And it consists of a main manual, with some transversal topics and different procedures specific to the areas as (Organization, management, human resources management). Regarding ISO 900 standards (including ISO 9001 quality assurance requirements), Kanji (1998a) mentions that they have been used for the quality assurance of a system, to offer customer quality in products and services.

As a chemical industry the rigidities and the process work in a very specific and controlled way, what is different from other industry sectors. The quality of the raw material and the quality of the process directly affect the final product. The Head of Manufacturing Department states:

“Quality in its definition is related to the customer's perspective in relation to the product, that is, the level of quality is determined by the degree of customer satisfaction with the final product. In the field of chemistry this is an even more present and relevant factor, because our final product must follow strict standards in its processes so that it is produced within specifications.” (January, 2023).

Quality plays a significant role directed to customer satisfaction and continuous improvement (Dahlgaard & Dahlgaard-Park, 2006 ; Rad, 2006). And it is aligned with organizational and cultural change. According to (Kanji, 1998a), quality reinforce the governing principles associated with TQM systems, delighting the customers, continuous improvement.

The quality management in the history of INCHEMICA was impacted by the partnership and the groups that the company belonged to.

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The first company that acquire INCHEMICA was the American giant Shell, the cooperation, started at the inauguration of the company and went until 2001. In terms of quality management and procedures, the company and the processes were directly affected. Through its expertise and reputation in the market many changes were established that influence the culture to this day.

During the midst of 2002 and 2003, INCHEMICA has been acquired by another group, called Inchem Holding. In this period, ISO 14001 and 45001 were also implemented, and the construction of the sewage treatment plant corroborated this process.

And in December 2018, was acquired by another group called RNM. All the enterprises that belong to the group follow the norms ISO 14001, 9001 and 45001. The further idea of the group is to create a management and quality system unifying the companies from the same field, keeping the goal of TQM and continuous improvement.

As the results demonstrated by literature, experts in quality management have accepted the ISO 9000 standards series. However, this positive view refers mainly to the very idea of developing quality management standards, and the content structure of the standards (i.e. the components included in them). (Rogala & Wawak, 2021).

Adaptability is a very important aspect for the durability and permanence of a company and can be highlighted throughout the INCHEMICA'S history. Zhang et al. (2016), categorizes the adaptability of the organization to the various changes in the customers values and needs as a critical success factor for quality management.

The quality culture at INCHEMICA is formed by this formal aspect, supported by the standards, but it is possible to observe that in some specific departments such as quality and production the use of alternative papers and, above all, human contact for the transmission of knowledge. These can be characterized as informal aspects.

For example, in the quality sector and in production, in both it was possible to conclude that conversation, the exchange of experiences and the use of alternative materials were crucial to establishing a quality culture.

Dahlgaard and Dahlgaard-Park (2006) mention that the human factor and the right company culture are the key factors to successfully design a quality strategy, enhancing the importance of

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everybody's participation (cf. Pimentel & Major, 2014). It is possible to observe that all collaborators apply daily quality management procedures in an intuitive way. As a result of this behavior, good practices occur proactively (cf. Pimentel & Afonso, 2018).

A concern for quality management in the company was found in INCHEMICA. In answer to the first question, these conclusions were important and gave the researcher comfort for the development of the following questions and contributions.

INCHEMICA is currently going through some generational changes that have profoundly affected the perspective of quality in the company. One strategy that has been used to bring generations closer together and mitigate the problems that this situation has caused has been training and culture engagement sessions. Training increases skill sets, motivation, higher productivity, and knowledge transfer of the employees. (Oosterbeek, 1998; Pate and Martin 2000), Also, training positively impacts employee productivity, which results in higher levels of employee satisfaction. (Choo and Bowey 2007; Chang, Chiu and Chen 2010).

According to the findings in this case study, and regarding the second research question, it is possible to gather some factors that impacted the perception/perspective of the quality that the employees had. The factors were: (i) the employee age, how long they were working in the company; (ii) the department that they belong, (iii) seniority of the function. It is also relevant for a company to acknowledge the employee perspective, because a bad perception could produce negative outcomes for companies. (cf. Marde, 2015).

Lam and Robertson (2012), affirm that employee perception of an organization's approach to continuous improvement is a significant indicator when predicting willingness to participate in continuous improvement projects.

INCHEMICA is almost a 38-year company and as reported in this study generational change has been a factor that directly impacted the perspective of quality. Were interviewed in the study employees who have collaborated since the foundation and others who started collaborating a little less than a year ago, and there is a different perspective regarding quality. The higher the degree of knowledge, the better the perception. (cf. Marde, 2015).

The differences that were seen between the generations of the employees were cultural aspects regarding work and how it can relate to life. So, for the younger generation that was a clearer

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perspective about boundaries in work and what they can tolerate. The Head of Manufacturing Department states:

"The younger generation has other work-related ideals that differ from the older generation. For the new generation, work isn't life, it's just a part of it." (January 2023)

This behavior directly affects the perception/perspective of quality, because it is perceived based only on the norms and the scope of the work. It is noted that the older they were and the longer they had worked at INCHEMICA, the higher their perception of quality.

There is a very specific expression in Portuguese “*vestir a camisola*” that can be translated to “*be a team player*”, that describes this spirit of dedication. At the time of triangulation to validate the outlook of this factor with the senior manager of INCHEMICA, it is confirmed the information, including the difficulty of recruitment and the hiring of skilled people. The collective involvement of the employees increases the quality’s perceptions is also a important factor for quality management successful implementation. Employees with higher level of involvement in the process and implementation of the norms will have greater knowledge of the process, consequently your perception will be greater (Marde,2015).

Another important aspect of this behavior that affects directly in the quality management and consequently of the process, is that the older employees, participate in the construction of the process of the company, some of them participate since the beginning of the company, they collaborate in different transitions with input and valid information. This context creates a sense of ownership that brings a higher quality perception of the process in a company.

The Senior Production Employee reinforce:

"When I joined INCHEMICA, my attitude was always one of great proactivity, of wanting to understand all the processes and audits, even those that were outside my scope of work. And sometimes I miss this grit in the new generation. The feeling of ownership in the processes."

(Senior Production Employee, January 2023).

It is possible to change the average age of working in INCHEMICA, for closer to 50 to approximately near 30. Through the triangulation interview it is observed a problem of both sides, not just a lack of proactivity on the part of the younger generation. But the older employees with a

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high sense of ownership of the work and high effort of showing the importance of each part of the process. Didn't teach with patience and flexibility in the training sessions. Internal programs have been developed to improve this scenario and generate and good onboarding of the roles.

To succeed, top management must be able to recognize employees as equal partners in maintaining the quality management system (Zelnik et al. 2012). Suggestions and comments as well as help from more senior members of the team make a difference in the quality of the process and affect production. Also impact the quality's perception. All initiatives for management of quality systems must involve employees, and add that communication and the in-house training, these are important factors to attain that goal (Akdere and Schimidt, 2008). Consequently employees can acquire new knowledge, see the benefits of quality management, and obtain a higher sense of accomplishment by solving issues.(cf. Marde, 2015). Employees have a better image of their work when they participate in the decision making. (Delbridge & Whitfield, 2011).

The second factor observed that impacted the employee's perception of quality was the department that they belong. INCHEMICA has totally five departments. In the research was detected that the department is a factor that impact the quality of the perception/perspective of the employee because of the degree of collaboration it has with the chemical process and the aspects regarding quality that the department has.

Regarding the Production and Quality department, it is noticed a higher perspective of quality, among the other departments. INCHEMICA culture is permeated by what the norms provide and generate as an output for quality.

In Quality department it is observed a higher perception of quality. The department strictly follows the ISO standards, and what is proposed through the quality manual, but for better excellence in the execution of the process and activity, the Senior Manager of the department proposed an alternative handbook, with pictures, more detailed instructions that is often used. As the Senior Quality Manager reinforce:

“The standards give us the parameters to be followed and approved, but they are not enough to work autonomously. Developing this manual with photos and answers to the most adverse situations encountered has created much more security for the new night shift workers to carry out their activities.” (June, 2022)

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The perception of quality goes beyond the barriers of what is proposed in the standards (ISOs and quality manual). Through more specific training programs and this manual, the zeal for quality and the importance of quality is increased. The quality management approach and the inherent quality management models must be translated into practice to create value added (Pimentel & Afonso, 2018).

In Production, the department that can be considered the backbone of the entire production process, the perception of quality was also higher among employees. The processes conducted by the department have a high load of analysis in ISO audits.

The greater the involvement of the sector where there is an audit, and where the standard is applied intensively, the greater the perception of quality there (Marde, 2015). Employees involved in the implementation and audits ISO 9001, have more knowledge about the process because they understand better the benefits of the norms. The lack of employee involvement at the shop-floor level has been identified as a major reason for the non-sustainability of a quality management system in an organization (Weikala and Sohal, 2008).

The Senior Quality Manager comments that the standards have the role of guiding the processes, at the level of specifiable limits, formats of the procedures and safety standards, but they do not translate in their totality the nuances and details of the processes that influence quality management.

"One of the factors that makes the biggest difference in this process is the details of practice. These can only be passed on in social interaction. The production department encompasses several unit operations, and the management of adverse situations and the quality resolution of unexpected problems are not supported by the manual and ISO's." (Senior Quality Manager)

The other departments interviewed stated that affirmed that the standards are perceived as sufficient for the perspective of quality, without the need for additional elements or specific suggestions.

The third aspect observed in the analysis of the factors that influenced the perspective of quality was the seniority of the role. Senior managers have a different perception compared to the employees that don't have a management role.

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We can justify this fact, because the management position involves a more global and systemic view of the process, always seeking ways for the objectives to be met, which also ends up directly affecting quality.

For workers who usually executes tasks and do not make strategic decisions, the degree of knowledge remains low. In practice, because of that hierarchy, companies display a difference of treatment of their employees. For example, the training schedule is adapted to each employee according to his or her status. Is important for companies to communicate, explain, and secure the endorsement of all employees, not just managers. It is important to improve the relationship among all parties, perhaps through an improved status of the quality representative position over employees. (Zelnik et al. 2012). Creating an environment with actions that promote value of each task and each employee, and employer later the exercise of their duties (Marde, 2015).

The literature suggests two solutions for increasing the perception of quality among employees. The first one is when possible, integrate employees in a global process where all employees become one essential “link in the chain”, and the second one is to be totally transparent about the actions implemented by their colleagues with external partners. (Marde, 2015).

This answers the second research question and adds a contribution to the work, since the perception of quality is directly affected by the factors mentioned previously and the quality culture is increased by other additional elements that compounds the culture. The cultural aspects of an organization are crucial and impact on a TQM initiative (Green, 2012).

Answering the third question, analyzing by a qualitative perspective, according to the interviews and material collected, it is observed that, for the for the 5P’s and 5C’s of the Oakland Revised Model (Oakland, 2004; Pimentel & Major, 2016) a specific outcome for each of the topics. Although not all aspects were checked, the framework is an important tool to analyze quality culture.

All the groups that INCHEMICA belonged followed with diligence quality policies and strategies to improve quality. Emphasizing the first group Shell, for being a traditional and structured group, has also always invested in strategies to improve quality. As supported by the Head of Manufacturing Department:

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“The partnership with Shell inaugurated a new standard that would dictate the quality culture at INCHEMICA to this day. Its reputation, its standards and its quality management processes and strategies influence us to this day.” (January, 2023)

And the last group that INCHEMICA belongs that is RNM, which has its core policies very linked to improve quality, reinforced by the ISO norms (namely 9001,14001,45001), and all process and initiatives are focused in the TQM model of excellence.

Thus, reinforcing the presence of the planning factor defined by the efforts to develop policies and strategies to improve quality, setting up appropriate partnerships and resources and designing quality (cf. Oakland, 2004).

The factor process that is defined by the understanding of the management and design of the quality management system, work from a perspective of TQM and in walk in the principles of continuous improvement (cf. Oakland, 2004). This aspect was not observed in detail in this study, but it can be said that many processes are being established at INCHEMICA, both formally, supported by standards, and informally, supported by culture and alternative methods that build and reinforce a culture of quality.

Performance, in the refined model is clustered with Customer (cf Pimentel & Major, 2016). As a chemical industry, the quality of the products and the importance of them are very crucial for the product to be in the right limits as expected by the client. Customer satisfaction and the value they perceive in the product is even more important.

The role of logistics departments stands out, responsible for the dilution of the product to be loaded into the tanks and sent to the client. An activity of extreme detail and with a direct impact on the performance and quality of the final product expected by the client, seeking customer satisfaction.

Also, as a company that complies with ISO 9001, the audits routine, established in the culture a day by day focused on review in the process. Quality means those features of products which meet customer needs and thereby provide customer satisfaction (cf. Juran et al., 1999).

In the present moment of INCHEMICA, there is a transition. The generational change and the friction caused by its transition have a direct impact on the teamwork and perception of quality as

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detailed in previously in the second research question. As stated by the Head of Manufacturing Department:

"The younger generation has other work-related ideals that differ from the older generation. For the new generation, work isn't life, it's just a part of it." (January 2023)

Comprising with the definition People, the ability to manage the human resources, the culture changes; teamwork, communications, innovations, and learning (Oakland, 2004).

Furthermore, regarding to the topic added to the Oakland revised modified, Power, defined by an *invisible force* that produces respect and influence and positively affects the quality culture (cf Pimentel & Major, 2016). It is perceived by the role of the Head of Manufacturing Department, that is also a member of the board, has an important role in being the bridge to the stakeholders, what is excellent for the overview of the business and for creating improving strategies.

In other words, she has not only a management role, but a global knowledge of the entire INCHEMICA process, what is called *"man in charge"*, in other words, *"women in charge"*. Her daily presence in the factory and supervising each production shift, in a diligent and excellent manner, manifests the Power, proposed by Pimentel e Major (2016) in the modified model. Generating consequently an impact in the quality culture of the company.

Concerning to the 5C's proposed by Oakland revised model we found that, these factors are relevant for establishing a culture of quality in a company. Culture factor is observed frequently in INCHEMICA, by the implementation of the manual of quality, particularly called as the "Companies Bible", the handbook has a crucial role into building an importance of quality by the values, practices and initiatives related to culture.

Commitment is translated as the involvement in a personal and active way (firstly and mostly of the board and the senior leadership) in the quality and improvement activities (cf Oakland, 2004). This aspect can be seen in more detail in the answer of the second research question. It is possible to detect in the dynamics of the company behaviors that reveal this commitment. As described that the older employees set a pattern of proprietorship into the activities that generate as an input an attitude, always concern to be committed to improve the effectiveness of the products, processes, and relationships. As the Senior Production Employee reinforce:

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"When I joined INCHEMICA, my attitude was always one of great proactivity, of wanting to understand all the processes and audits, even those that were outside my scope of work. And sometimes I miss this grit in the new generation. The feeling of ownership in the processes." (January 2023).

We can find a relation between Commitment with Collective Involvement, the factor that is suggested by Pimentel and Major (2016), defined as the capacity of behave the commitment by initiatives in an active way, crucial as it represents the consolidation of the intentions, mostly by the employees. This phenomenon is seen frequently at INCHEMICA and can be related to what was proposed in the second research question, topic iii. The creation of parallel materials for a better perception of the activities to be performed, as for example in the quality department is a demonstration of collective involvement. As the Senior Quality Manager confirms:

"The standards give us the parameters to be followed and approved, but they are not enough to work autonomously. Developing this manual with photos and answers to the most adverse situations encountered has created much more security for the new night shift workers to carry out their activities." (June, 2022)

Communication defines the attitude of stimulating and encouraging the communication between the employees and the leadership, permeating the actions by the vision, mission and values of the company culture (cf Pimentel & Major, 2016). It is possible to conclude by the interviews that the managers always communicate the next steps of the company and again it is important to reinforce the role of the Head of Manufacturing Department present in the day-to-day activities, giving feedback and strengthening the values of the company by continuous feedback.

The factor Customer is also clustered with Performance, mentioned above, and it can be translated as the involvement with the customer and the stakeholders, making sure that the need as understood culture (cf. Pimentel & Major, 2016). Working in a sense of continuous improvement in the partnership. As mentioned, this is a goal for INCHEMICA, bolstered by the fact that the company is a Chemical industry, and the quality of the products are determined by the capacity of achieving the limits.

Ultimately, we can conclude that the Oakland revised model was a crucial in this work, to identify the key success factors for consolidating INCHEMICA's quality culture. As mentioned for

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Dahlgaard-Park (2011), Oakland framework helps us approach and understand how TQM can be more active in global management.

Chapter 6 – Conclusions

The thesis had as main objective to analyze the perspective of quality by the employees in the chemical industry, INCHEMICA, and what factors can affect this perception. Also, to examine what are the key success factors that assure a successful quality management implementation. An evaluation based on the Oakland revised model. For organizations to enhance their performance, it is crucial that they acknowledge the structural factors outlined within the model (Pimentel & Major, 2016).

INCHEMICA was the company chosen as the research subject because it has already a reputation for establishing methods and standards that compound a quality culture. The company is currently undergoing a transition which focuses on improving its quality management, always aiming for the standard set by TQM.

Considering the previous objectives, three research questions were posed: (i) How INCHEMICA developed its quality management process? (ii) What is the perception/perspective of the quality of the employees? (iii) What are the key factors to assure a successful quality management implementation?.

Answering the first question, it is possible to conclude that, many events in INCHEMICA's history have been important in consolidating the company's quality culture. From the implementation of ISO standards, respectively ISO 9001, ISO 14001, ISO 45001. Right up to the introduction the quality manual, which acted as a guide for the company's processes.

Each of the companies that has acquired INCHEMICA, namely Shell, Inchem Holdings and RNE has influenced its history not only by increasing its number of certifications, but also by influencing its culture and processes.

We can conclude that the quality culture at INCHEMICA is shaped by its formal aspects, sustained by established standards. However, it is noticeable that in certain departments, such as quality and

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production, alternative papers and, more importantly, interpersonal communication culminating in knowledge transfer. These aspects can be described as informal in nature.

The pivotal elements for effectively develop a quality strategy are the human factor and fostering the appropriate organizational culture. This emphasizes the significance of active participation from all individuals (Dahlgaard & Dahlgaard-Park, 2006).

Regarding the second question, it is possible to identify three factors that impacted the employee's perception/perspective in the company: (i) the employee age, how long they were working in the company; (ii) the department that they belong, (iii) seniority of the function.

For the first aspect, it can be concluded that the longer they have worked in the company, the greater their perspective of the company's processes and quality. Regarding point ii, it is observed that departments with a greater involvement in the process have a higher perception of quality, because of the ownership in the process.

Additionally, with respect to the third aspect, the higher the seniority of the function, the higher the perception. We can justify this fact, because the management position involves a more global and systemic view of the process, always seeking ways for the objectives to be met, which also ends up directly affecting quality.

Answering the third question, we can conclude that the Oakland revised model was an important tool for analyzing the quality culture at INCHEMICA and establish distinct categories of factors for effective implementation (cf. Pimentel & Major, 2016).

The key success factors for quality management identified in literature were found in the field site, namely, Collective Involvement, Customer and Power. Particularly, the ones proposed by Oakland revised model.

With respect to the Planning and Performance factors, it is possible to observe a very strong influence from the groups that acquired INCHEMICA, as they were able to influence planning and management strategies. As for to performance, it was possible perceive factor in the company, as it is a chemical industry that makes tailor-made products and how it can influence customer satisfaction. As confirmed by Oakland.

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Quality management, to be successful, has to impact on the organization's performance, including the results from the customer. This can be achieved through good planning and improvements in process, through involvement of people (Oakland, 2004, cover).

The intangible aspects called 'people', 'culture' and 'process' (Pimentel & Major, 2016) were also detected in the company, reinforcing what was concluded in question two. The informal aspects are extremely important for building a quality culture. In conclusion, it is necessary to develop strategies and training for integration and greater perception of quality. As Oakland states:

The content of the policy on quality should be made known to all employees; in order to involve everyone in the organization of quality improvement, management will enable all employees to participate in the preparation, implementation and evaluation of improvement activities (Oakland, 2011, p.520).

The factors of 'planning', 'power', 'commitment', 'collective involvement' and communication, as mentioned in the literature are highly influenced by the action of managers in a change management process (Pimentel & Major, 2016). That in the field site it is represented by the Head of Manufacturing Department. Its role, which is both strategic and operational, acts as a major vector for promoting a quality culture in the company.

6.1 Study Contributions

This master thesis demonstrates importance on an academic level, mainly in the area of management and quality, as explores the importance of employee perceptions/perspective in establishing a quality culture.

This work has theoretical implications since explores the perception/perspective of quality. An important contribution of this work is the analysis that the factors: (i) the employee age, how long they were working in the company; (ii) the department that they belong to, (iii) seniority of the function, affect the perception/perspective of quality. Going beyond what is proposed by Marde (2015), to increase the perception of quality: (i) transparency in communication, (ii) collective involvement in processes.

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Another important contribution to quality is the finding that informal factors (just as conversations, manuals parallel to formal rules and the exchange of experiences) play a very important role in implementing a quality culture.

This work has practical implications for companies that have ISO standards and are concerned about improving their quality culture. Alternatively, it serves as a model for other companies that share similar traits and operate within the same sector, or even for diverse scenarios provided that the fundamental principles and methods are customized accordingly.

6.2 Limitations of the study

The strongest limitation of this study is perhaps that it only involves a single case study in a specific context of a chemical industry, which cannot be generalized, but it's a challenge to be explored by other academic researchers to develop similar studies.

Because of some confidentiality and security reasons it was not possible to enter in the physical facilities, even though the interviews were very in-depth, it is possible to get a good reading of the industrial reality.

6.3 Future research

Despite some limitations, it is possible to identify several opportunities for future research.

It would be interesting to develop research in INCHEMICA a few years from now to understand how the quality culture has changed and evolved, what are the factors that impact the employee's perception/perspective, also evaluate the Oakland revised model again.

Other suggestion would be understanding how the generational transition has evolved over time, whether the current challenges have been overcome and realize what the new challenges are.

It would be also relevant, is to access the quality culture in the same industry but in different countries and compare the results with the present study to understand what the main differences are.

Appendixes

Appendix 1 : Interviews Conducted

No	Interviews	Date	Duration	Recorded and transcribed
Pilot study				
1	Head of Manufacturing Department	17-09-2022	1h20m	Yes
2	Head of Manufacturing Department	20-09-2022	1h20m	Yes
Main study				
1	Senior Production Manager /Production Engineer	24-01-2023	1h	Yes
2	Senior Production Employee	24-01-2023	1h	Yes
3	Administrator	24-01-2023	20m	Yes
4	Quality Manager	24-01-2023	38m	Yes
5	Logistics Employee	24-01-2023	24m	Yes
6	Head of Manufacturing Department	24-01-2023	20m	Yes
7	Head of Manufacturing Department	30-05-2023	30m	Yes
Total = 9	Average per interview		48 minutes	

Source: Elaborated by the author.

Appendix 2 : Examples of Interview Guidelines

Interview guideline, on 2022-09-17 with the Head of Manufacturing Department (Pilot Study):

- 1- What is your experience at INCHEMICA?
- 2- What is your perception of quality management in the organization?
- 3- What formalities are present in the context of quality culture in the company?
- 4- What is the history of quality management at INCHEMICA in cultural and global terms?

Interview guideline, on 2023-01-24 with the Head of Manufacturing Department and the other departments:

- 1- What is your experience in the company? (Tell me about your experience)
- 2- What is your perception of quality management in INCHEMICA?
- 3- Do you know the quality handbook of the company, how it works?
- 4- How do you perceive the politics of quality management in the company?
- 5- Does the subject quality have an impact in your role? In which extension?
- 6- Have you participated in any training or education? How do these trainings help in the perception of quality culture?
- 7- How do you perceive quality management as a whole? What do you think needs to be improved?
- 8- Is the formalization of standards enough to ensure that the practices are complied with?
- 9- How do you evaluate the adaptation of the entry of more junior elements in the teams?

Appendix 3 : Financial Reports

	2022	2021
Number of employees	36	35
Number of hours worked	74053	74120
Compensation	€ 930.587,73	€ 889.526,63
Profit	€ 3.477.876,72	€ 2.429.593,50

Source: Racius

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