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Driving Performance Towards Quality Right First Time

A case study exploring the development and implementation of an RFT measurement tool

Master's thesis in the Master Degree Program Quality and Operations Management

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CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2024
www.chalmers.se

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Abstract

Quality plays a crucial role in today's competitive and rapidly evolving market, influencing an organisation's market position and growth. To cut unwanted costs incurred from failures, rework, and other quality-related issues, working with quality and continuous improvements in a systematic way is necessary. Continuous improvement (CI) initiatives require support from accurate data to ensure efficient decision-making, highlighting the importance of establishing a reliable measurement system that can identify areas where a process is inefficient or does not meet desired standards. Measuring the proportion of Right First Time (RFT) is an instrumental part for facilitating the identification and prevention of quality gaps in a process. For global companies operating in highly regulated industries, improving performance and driving CI is considered particularly critical and complex. This thesis thus aims to explore how a measurement tool supportive of RFT can be developed to effectively assess process steps requiring quality control within a regulated process, thereby facilitating data-driven decision-making to increase performance and reduce cost of rework. The study also examines key aspects to consider when implementing a measurement tool to encourage desired behaviours supportive of RFT, as well as for its implementation to reach its full potential.

This thesis is a case study performed at a global development and production company within a highly regulated market. As a part of this case study, an RFT measurement tool has been designed and developed. Findings from this thesis demonstrate that for a measurement tool to be designed, developed and implemented successfully, it is necessary to consider both technical aspects, such as tool characteristics, and behavioural aspects, such as user acceptance and employee embracement. Furthermore, an RFT measurement tool should be capable of capturing both quantitative and qualitative data, facilitating identification of improvement opportunities and data-driven decision-making. To increase the chances of a successful implementation and utilisation, managers hold the responsibility of establishing supportive conditions for employee involvement and engagement. This study also proposes that effectively communicating the tool's purpose, impact and benefits is essential for promoting employee engagement and raising awareness about the importance of doing things RFT, thereby fostering a quality culture.

Keywords: Quality Management, Continuous improvements, Right First Time, RFT, Measurement tool

Acknowledgements

This master thesis has been conducted during spring 2024 as a part of the master program Quality and Operations Management at Chalmers University of Technology. The research has been performed in collaboration with a case company.

We would like to express our gratitude to the case company for their cooperation and support throughout this research. A special acknowledgement goes to our enthusiastic supervisor at the company and to our project team for their guidance, expertise and valuable insights. We are also grateful to the employees of the company who generously shared their input and expertise during our interviews and meetings.

Lastly, we extend our appreciation to our supervisor at Chalmers, Ida Gremyr, for her valuable feedback and guidance during the course of this work. Your encouragement and continuous support have been greatly appreciated.

Amy Joelsson & Josefin Nilsson
Gothenburg, June 2024

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List of Acronyms

QM	Quality Management
CI	Continuous Improvement
RFT	Right First Time
COPQ	Cost of Poor Quality

1. Introduction

This first introductory chapter aims to introduce the research area and problem under investigation and lays the foundation for the master's thesis work performed as the final part of the master program Quality and Operations Management, at Chalmers University of Technology. The chapter outlines the background, research aim, research questions, and delimitations.

1.1 Background

Reflecting on the past, quality has consistently been a key consideration for customers (Bergman et al., 2022). As the usage of the term goes back to antiquity, the concept of quality has accumulated multiple definitions over time. According to the international standard for quality management systems ISO 9000:2015, developed by the International Organization for Standardization, quality is defined as the "*degree to which a set of inherent characteristics of an object fulfils requirements*" (ISO, 2015, p. 1). Rosak-Szyrocka et al. (2023) emphasise how quality continues to play a crucial role in today's competitive and rapidly evolving market economy, as it not only affects an organisation's market position but also influences its overall growth and organisational development. Working with quality and quality improvements in an innovative and systematic way not only cuts unwanted costs and strengthens competitiveness but has also been shown to shorten the design and development phase of new products, leading to success in the market and decreasing internal costs (Bergman et al., 2022). Furthermore, Aragon et al. (2017) explain how manufacturers worldwide operate in an environment characterised by more informed and demanding customers as well as increased complexity in the supply chain compared to the past. Consequently, the importance of quality, or more specifically, the importance of avoiding a quality lapse is important.

In today's complex business landscape, where quality is regarded as a fundamental business principle, it is important for organisations to acquire capabilities such as flexibility, responsiveness, and the ability to quickly adapt to changes driven by factors such as changing customer needs or competitive benchmarking (Jurburg et al., 2016). Furthermore, in order to effectively address constantly evolving customer needs, which are influencing the perception of quality over time, it is essential for an organisation to develop a strategy for continuous improvement (CI) (Gremyr et al., 2020; Jurburg et al., 2016). According to Sanchez & Blanco

(2014), CI is a cyclical process with the aim to improve organisational performance by focusing on areas such as waste reduction and identifying new improvement opportunities. Gremyr et al. (2020) highlight the importance of this concept by explaining how even industry-leading companies have gone bankrupt due to their failure to prioritise CI, resulting in overlooking market changes and thus facing decreased competitiveness. Focus on CI can be achieved if the concept of Quality Management (QM) is incorporated in an organisation. Although scholars have discussed different definitions, the most common view of QM is that it "*deals with systematic efforts to improve products and processes for the good of the organisation's stakeholders* [...] *by providing the practitioner with a set of core principles, practices and tools*" (Gremyr et al., 2020, p. 21). Experts within quality suggest that QM is the most important success factor for performance improvements (Abdullah & Tari, 2012).

According to Yong & Wilkinson (2002), the concept of QM has had a long history of diverse definitions and perceptions. The evolution of this concept has evolved from being reactive and primarily associated with inspection activities to a more proactive and strategic approach. This development of QM has progressed through several stages; from quality inspection where the quality activities were performed after production, advancing through quality control with activities performed during production to quality assurance with activities mainly performed before production (Weckenmann et al., 2015). In summary, whilst the earlier stages of the evolution of QM primarily focused on detecting defects and "fire-fighting", today's QM is characterised by CI both before, under, and after production (Yong & Wilkinson, 2002).

Zeng et al. (2015) explain how modern QM can be classified into two distinct dimensions: soft and hard QM. While the soft dimension encompasses aspects such as organisational culture and behavioural attributes, the dimension of hard QM focuses on tools and techniques essential for quality improvement, such as the adoption of quality control tools and adherence to the Right First Time (RFT) principle. RFT is a QM concept emphasising the importance of doing things correctly from the initial attempt to minimise errors and strive for zero defects in processes, products, or services (Cambridge University Press, 2024; Psarommatis et al., 2021). Bhushi et al. (2023) underscore how the cost of quality, including the cost of poor quality (COPQ) associated with a zero-defect culture, is more strategically and economically crucial than previously believed. This increased awareness arises from researchers' demonstrations of its impact on the overall organisational performance. To enable identification of COPQ, which encompasses the cost incurred from failures, rework, and other quality-related issues, measurements are crucial (Aragon et al., 2017; Krishnan, 2006). Aggarwal (2021) highlights a measurement system as a vital element of a process for preventing defective products, and that it needs to be capable of identifying areas where the process is inefficient, ineffective, or does not meet the desired standards.

As the implementation of QM tools and techniques often results in significant changes within an organisation, it is important to understand the potential outcomes of a change and its impact on the organisation and its people. Employee involvement and engagement are aspects that have been demonstrated to influence employees' receptiveness to adapt new ways of working, hence contributing to an organisation's ability to sustain change (Albrecht et al., 2023). Furthermore, there is a consensus that the pace of change in today's business landscape has never been greater, further highlighting the importance of being able to manage change (Aragon et al., 2017). The concept of change management is here defined as *"the process of continually renewing an organisation's direction, structure, and capabilities to serve the ever-changing needs of external and internal customers"* (Moran & Brightman, 2001, p. 111).

Despite the growing importance of quality across all industries, quality management is particularly critical in highly regulated industries (Kang, 2019). In these industries, failing to manage quality effectively can lead to severe and harmful consequences, such as injuries, fatalities, property loss, and environmental damage. Regulated industries are described as businesses controlled by government, laws and other requirements, and highly regulated industries, such as the healthcare, oil and gas, and air and water transportation industries, are characterised by having ten times more restrictions in federal regulations than average industry (Kang, 2019; Schiavone & Simoni, 2019). Thus, improving performance and achieving CI becomes even more complex for global companies operating in regulated markets, hence implying the importance of focusing on both the concept of QM as well as change management. To enable tools that primarily emphasise the hard QM aspects to realise their full potential when implemented within an organisation, it is essential to also account for the soft QM aspects and comprehend their interconnected influence. As the relationship between hard and soft QM can be complex (Nasaj & Al Marri, 2019), delving deeper into their importance in the context of developing and establishing a measurement system becomes interesting. In addition, previous research, centred on enhancing QM practices, highlights the scarcity of studies that delve into the elements and success factors associated with implementation (Saihi et al., 2021). Consequently, there is a need to further research the interplay between the implementation of hard QM tools and concepts, such as RFT and measurement tools, and their impact on soft aspects such as employee dynamics, communication, and organisational culture.

1.2 Aim

The aim of this research is to explore how a measurement tool supportive of RFT can be developed to effectively assess process steps requiring quality control within a regulated process, thereby facilitating data-driven decision-making to increase performance and reduce cost of rework. Additionally, the study will examine key aspects to consider when implementing a measurement tool to encourage desired behaviours supportive of RFT, as well as to create support for the accompanying change and its implementation. The chosen case organisation, a global development and production company within a highly regulated market, is expected to be well-suited for this study, given its high quality standards and strict quality requirements.

1.3 Research Questions

In order to fulfil the study's aim, it is essential to understand the requirements and needs for designing, developing, and implementing a measurement tool that aligns with the principles of Right First Time (RFT) successfully. Furthermore, it is necessary to elaborate on how the implementation of an RFT measurement tool can contribute to driving continuous improvements and fostering a quality culture. The aim of this study is therefore decomposed into the following two research questions:

RQ1*: What factors and key requirements need to be taken into account to ensure successful design and development of a new RFT measurement tool, within quality control processes facing strict regulatory requirements?*

RQ2: What factors are important to consider when implementing a measurement tool supportive of RFT, in order to facilitate continuous improvements and promote a quality culture?

1.4 Delimitations

This study is a case study limited to examining a single case, within a highly regulated market. The research will be conducted within the Quality Department at the chosen case company. Processes and activities that already have established measures, standardised visualisation tools and governance structures, will be excluded and considered outside the research scope. The study is limited to solely assessing the quality control activities related to one specific sub-process in the development process. Visualisation of the data collected by the developed measurement tool is not included in the study's scope. Moreover, the study is focused only on the development, design, and pre-implementation stages, meaning that the research does not include the actual implementation or subsequent follow-up evaluation of the developed measurement tool.

2. Theoretical Framework

This chapter presents the theoretical framework that serves as a conceptual foundation for this study, outlining factors and actions to consider when developing and implementing a measurement tool, to enhance performance and encourage behaviours supportive of RFT, successfully. Section 2.1 presents practices that an organisation can adopt when focusing on continuous improvements, along with both hard and soft QM factors necessitated during change initiatives. Section 2.2 outlines soft factors crucial to consider during an implementation to reduce resistance and optimise the potential of a change. Section 2.3 delves into hard factors essential to consider to ensure a measurement tool generates valuable insights that can drive data-driven decision-making, and foster a quality culture. Lastly, in chapter 2.4, the key findings from the previous chapters are compiled into a conceptual framework.

2.1 Continuous Improvement

According to Singh & Singh (2015), the concept of continuous improvement (CI) has garnered considerable attention since the Western world began facing intense global competition. It is now widely recognised as a pathway to achieve excellence in quality and hence vital for attaining a superior position in highly competitive markets (Singh & Singh, 2015; Vinodh et al., 2020). Despite differing views on the practices and tools employed to support CI, recent research indicates the continued need for organisations to place a strong emphasis on CI to consistently develop high-quality products and achieve business excellence (Jimoh et al., 2018; Sanchez & Blanco, 2014).

Singh & Singh (2015) elaborate on the origin of the generic term CI, tracing it back to the Japanese philosophy of Kaizen (Kai – do, change, Zen – well). In the Western context, the philosophy has been translated to be associated with a variety of organisational development initiatives, achieved through integration of quality management (QM) practices and tools tailored to the particular business. Examples of such practices include the incorporation of "lean management" practices, which focus on minimising waste and maximising efficiency in processes, the incorporation of tools and techniques focused on pinpointing root causes of problems, as well as initiatives aimed at promoting employee involvement and empowerment (Singh & Singh, 2015). The drive to achieve CI stems from various factors. Examples of factors are: an imperative to enhance business performance, a need to better meet customer needs, to maintain competitiveness in the market, to improve quality, to minimise waste, to tackle challenges associated with a complex business environment, to improve new product development and process improvement, and to ensure streamlined workflow (Vinodh et al., 2020). Singh & Singh (2015, p.2) state that many researchers in broader terms define CI as "*a culture of sustained improvement targeting the elimination of waste in all systems and processes of an organisation*", achieved by fostering collaboration among all stakeholders without necessarily requiring substantial financial investments. In greater detail, CI can be described as a structured cyclic process striving to "*optimise production effectiveness by identifying and eliminating waste and production efficiency losses [...] through active team-based participation of employees across all levels of the operational hierarchy*" (Singh & Singh, 2015, p.5).

The incorporation and use of well-organised QM practices and tools are considered key for organisations to successfully drive and facilitate CI (Salah et al., 2010; Walsh et al., 2002). While CI can be seen as one of several fundamental principles of QM, acting as high-level guidelines, practices and tools encompass methods, activities and techniques facilitating the fulfilment of the principles (see Figure 2.1) (Dean & Bowen, 1994; Gremyr et al., 2020).

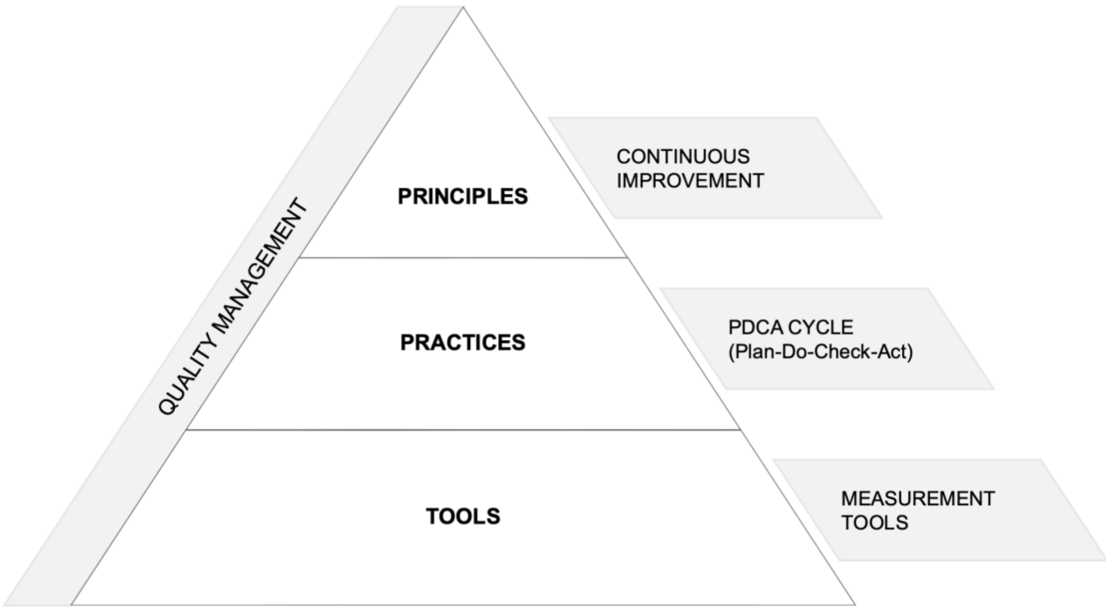


Figure 2.1 *Principles, practices and tools of QM*

Though internal CI strategies vary among organisations, they all share the common goal of driving process change by consistently elevating execution levels to enhance the performance of existing tasks and lay the groundwork for future improvements (Jimoh et al., 2018). Deming's renowned concept of the Plan-Do-Check-Act (PDCA) cycle has long been recognised as a widely embraced management practice for fostering CI (Salah et al., 2010). Realyvásquez-Vargas et al. (2018) outline the PDCA cycle (see Figure 2.2) as a structured QM approach to process improvement, emphasising its relevance not only in the development or redesign of processes but also in implementing organisational changes. The cycle begins with the identification and prioritisation of improvement opportunities, along with the establishment of clear improvement targets. Subsequently, the 'do' phase entails the execution and implementation of the action plan made in the first phase. In the third 'check' phase, performance control is conducted, meaning the outcomes and effectiveness of the actions implemented are measured, analysed, and evaluated (Lewis & Cooke, 2013). In this phase, performance metrics are compared against predetermined objectives, and various tools and techniques may be employed to facilitate the analysis and ensure that the desired results are achieved (Realyvásquez-Vargas et al., 2018). Finally, in the 'act' phase, informed decisions are made based on the insights from the 'check' phase. Adjustments are then made to further enhance or optimise the process.

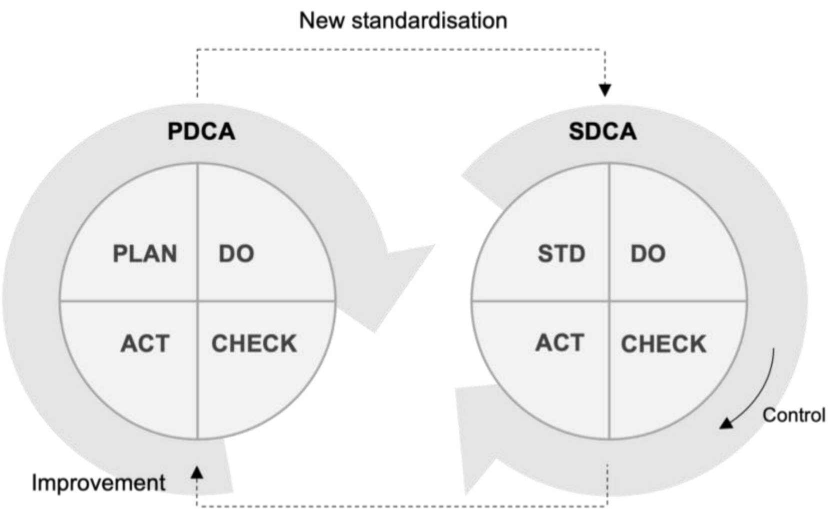


Figure 2.2 *The PDCA and SDCA cycle*

Furthermore, Singh & Singh (2015) elaborate that if the objectives are achieved, methods are required to be developed to standardise the improved process. This starts a second cycle referred to as the "standardising cycle", Standardise-Do-Check-Act (SDCA) cycle, which ensures a sustained integration into the workflow, as shown in Figure 2.2. Once the process has been stabilised and restored to a state of stability, the cycle progresses to initiate a new round of improvements, resulting in CI and enhancement of quality performance levels, as visualised in Figure 2.3.

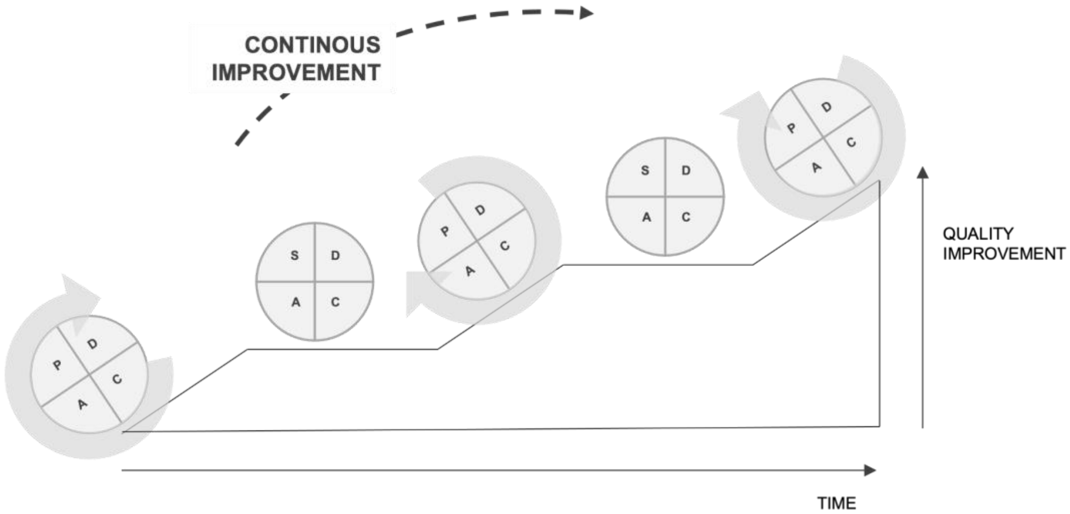


Figure 2.3 *Continuous improvement creation*

Chen (2023) highlights how QM practices rely on the combination and integration of both hard and soft QM factors (see Table 2.1) to be effective. Hard QM is related to the technical aspects of QM and primarily focuses on improvements and control of processes through a variety of tools and techniques, such as process management. Soft QM focuses on the organisational culture and human dimension of the system being addressed, encompassing factors such as management commitment, and employee involvement (Zeng et al., 2015). These two interrelated dimensions have both direct and indirect impacts on performance, making it essential to address both in order to succeed with QM practices (Escrig-Tena et al., 2018). As an example, Abdullah & Tari (2012) emphasise the importance of the social and human aspects and explain how some factors within hard QM will depend significantly on the support of soft QM to succeed. Moreover, while hard QM factors can serve as tools for improvements, their effectiveness relies heavily on the support of the soft aspects, such as management commitment, employee involvement, and culture.

Table 2.1 *Examples of QM factors based on Chen (2023)*

Soft factors	Hard factors
Top management leadership	Process management
Top management commitment and support	Quality control tools
Management commitment	Quality data and reporting
Employee involvement	Information and analysis
Employee empowerment	Kaizen approach
Teamwork and communication	Zero defect mentality
Strategy quality management and planning	Technology utilisation
Shared vision	Quality culture
Rewards and recognition	Quality assurance
Continuous improvement	Information and performance measurement
Employee training	Continuous improvement
Culture change leadership	Quality measurement
Facts-based decision-making	Quality improvement
Employee commitment	Process control and improvement
Quality culture	Tools and techniques
Knowledge sharing	Quality information availability and usage

A recent study by Chen (2023), evaluated various factors and identified certain ones as "driver factors", due to their notable key impact on the system (See Table 2.2). Among these success factors were "top management commitment", "leadership", "continuous improvement", and "information and analysis" acknowledged as the most crucial factors. These four factors were recognised for their ability to serve as valuable instruments for effective decision-making in QM practices, thus advocating for their consistent prioritisation by managers.

Table 2.2 *Critical success factors based on Chen (2023)*

Critical success factors frequently highlighted for their key impact	
Top management commitment	Information and analysis
Leadership	Continuous improvement
Continuous improvement	Quality culture
Employee training	Zero defect mentality
Employee involvement	Quality tools and techniques
Employee empowerment	Quality measurement

"Employee training", "Employee involvement", "Employee empowerment", "Quality culture", "Zero defect mentality", "Quality tools and techniques", and "Quality measurement" were additional critical success factors frequently highlighted for their key impact on QM practices (Chen 2023; Lewis et al., 2006; Saleh & Sweis, 2017).

However, there is no established list of factors that can be universally applied, regardless of organisational context, to ensure successful QM practices (Chen, 2023). Organisations prioritise different factors and employ a range of practices and tools to establish a QM supportive of CI (Sokovic et al., 2010). However, Sokovic et al. (2010) underscore the crucial part of carefully selecting and integrating different QM practices, tools and factors, both soft and hard, to create a tailored set suited to the unique needs of the team and process. These observations by Sokovic et al. (2010) and Chen (2023) serve as a basis for the following sections, 2.2 and 2.3, which delve deeper into the factors considered to have a key impact on QM practices in this particular context, as well as being suited to the unique needs of this study and chosen case company.

2.2 Soft Factors

Establishing a solid foundation for CI initiatives requires considering important soft factors, such as *leadership and communication,* which can foster an environment supportive of change (Albrecht et al., 2023). Furthermore, providing employees with necessary resources and clear communication about the purpose, scope, and anticipated impact of a change increases their likelihood of participating, making *employee involvement and training* necessary factors to consider as well (Assen, 2020). The success of a change initiative is also determined by *employees' engagement*, influenced by empowerment and psychological aspects, which play a crucial role in determining their eagerness and willingness to contribute (Assen, 2020; Jurburg et al., 2016). Each of these three factors will be elaborated on in the following, with the relations between them visualised in Figure 2.4.

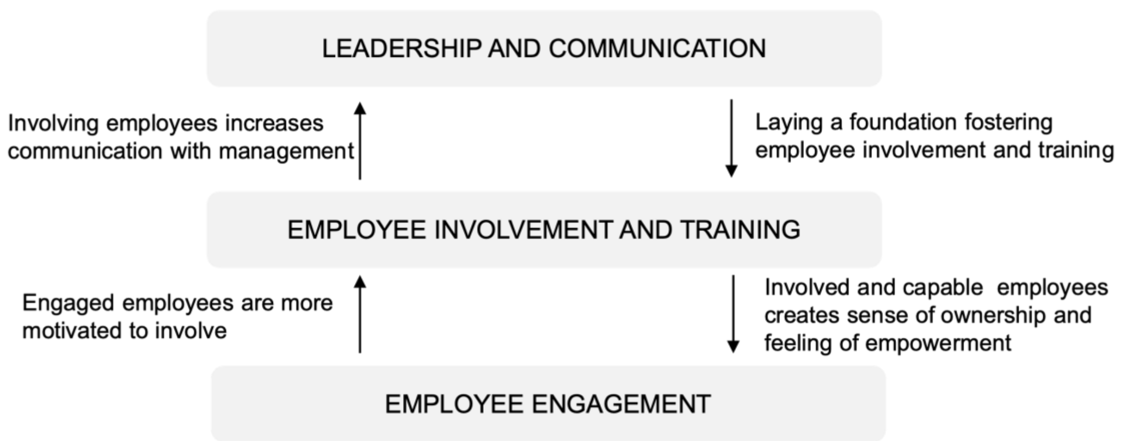


Figure 2.4 *Relationship between soft factors*

2.2.1 Leadership and Communication

Strategic vision, planning and communication by senior leaders are all important factors that influence the success of a change initiative (Albrecht et al., 2023). Also, Beer (2021) underscores the crucial role of leaders and highlights their role in initiating open and honest conversations as well as investing a significant portion of their own and their organisation's time, attention, and resources into a change process. Effective communication of an organisation's strategy throughout the entire company can be seen as essential for alignment as well as for successful organisational change, as a shared vision and common understanding of the change can influence the ability to sustain it (Done et al, 2010). Clearly communicating the scope, the progress and the activities associated with a change will also contribute to the likelihood of success (Nah et al., 2001).

Furthermore, several barriers can be recognised in most organisations, capable of hindering the development of effective and sustainable change (Beer, 2021; Beer and Eisenstat, 2000). These include poor horizontal coordination and collaboration; unclear strategy and conflicting priorities; inefficient senior team; "Hands off" top-down leadership; Inadequate leadership development and skills; and poor communication down and up. Among these barriers, underlying leadership differences contribute to four of the six barriers, while an unaligned strategy and poor vertical communication account for the remaining two. According to Beer (2021) all mentioned barriers are seen as complex as they necessitate human capabilities such as collaboration and leadership. Given their interconnected nature, effectively managing these barriers can initiate a positive cycle characterised by increased alignment, performance, learning, and change, further underscoring the importance of leadership commitment and communication.

Done et al. (2011) emphasises how change initiatives often imply resource competition, as these activities typically compete with daily operations and other projects. This highlights the necessity for management to prioritise and create pre-condition for the employees to focus on the change. Without adequate resources and priority, change initiatives are likely to suffer in both short-term outcomes and long-term sustainability. For example, management may underscore the importance of change initiatives by, where possible, reallocate resources. Moreover, Blomme et al. (2015) emphasise the significant role of managers in providing work-related resources and creating an environment fostering social support, feedback and autonomy, which in turm can contribute to increased employee engagement. Moreover, having leaders and internal change champions who can lead by example as well as support in coaching, motivating, and fostering commitment within the organisation before, throughout and after a change, can be seen as important for both short- and long-term success (Done et al., 2011; Assen, 2020).

2.2.2 Employee Involvement and Training

While specific tools and techniques for continuous improvement (CI) may have been successful in some contexts, they can fail in other contexts due to a lack of support and skills from employees within the specific organisation (Jurburg et al., 2016). Miller (2001) argues that even the most well-designed CI initiatives can fail if the people involved lack the necessary skills or motivation. Furthermore, researchers have identified employee involvement in change initiatives as a critical factor to reduce resistance and foster employee commitment to change (Assen, 2020). Consequently, it is crucial to prioritise the development of employees' capabilities, understand how these can be enhanced, and comprehend the reasons behind their decision to participate in improvement projects associated with change (Assen, 2020; Jurburg et al., 2016).

A study from Jurburg et al. (2016) showed that improvements within training and organisational support can result in employees feeling more capable and empowered to engage. Assen (2020) argues that while employee involvement is a crucial factor for successful CI, the contribution from each employee is also influenced by their personal capabilities. This underscores the importance of training, which enables employees to acquire the skills and competencies necessary to actively engage and contribute to specific change activities. Moreover, a skilled and well-equipped employee is often more eager to be involved in continuous improvement initiatives (Assen, 2020).

Findings from Jurburg et al. (2016) showed that employees' intention to participate in CI initiatives have a direct relationship with the individual's own perceived benefits of participating, meaning that they will be more eager to contribute if the change also implies improvement to their own daily work. If employees perceive the anticipated benefits expected from the improvement as unreasonable in relation to the level of investment required of them, they may experience negative emotions, which could potentially hinder the success of the change (Blomme et al., 2015). The ease of participating is also shown to affect people's attitude towards engaging in the change (Jurburg et al., 2016).

If employees lack the knowledge of how to manage change effectively, the likelihood of experiencing resistance to the change increases. To minimise the risk of resistance, Nau et al. (2001) suggest involving employees in the implementation of changes, such as system implementation, and allocating resources for training and education to enable them to do so effectively. Moreover, providing training and clearly communicating how the change will impact business processes and workflows, will create a sense of involvement amongst the employees, thereby fostering commitment to the change (Assen, 2020; Nah et al., 2001).

2.2.3 Employee Engagement

The success of change, and particularly sustaining change, lies in employees embracing new mindsets and behaviours (Albrecht et al., 2023). For continuous improvement (CI) initiatives to succeed, high levels of employee engagement, empowerment and a mindset supporting organisational change are considered to be key (Assen, 2020; Jurburg et al., 2016; Albrecht et al., 2023).

Moreover, research has demonstrated a positive correlation between employee engagement and their likelihood to undertake proactive behaviours (Albrecht et al., 2023; Blomme et al., 2015). Furthermore, psychological conditions, such as meaningful work and empowerment have been shown to impact employee engagement, and therefore the intention to participate in change initiatives (Blomme et al., 2015). Kahn's recognised engagement theory (1990) identifies three psychological conditions laying the foundation for employee engagement: psychological meaningfulness, which is linked to autonomy and a sense of ownership of the work produced; psychological safety, indicating that employees feel secure to express their own thoughts; and availability, in the sense of possessing the physical, emotional and psychological resources to feel capable to engage. Additionally, research indicates that engaged employees demonstrate higher levels of self-efficacy, meaning they possess a stronger belief in their ability to successfully perform a task. Consequently, they exhibit greater eagerness to participate in change initiatives (Albrecht et al., 2023; Blomme et al., 2015). Successfully establishing psychologically beneficial conditions for change could therefore lead to enhanced employee motivation to engage in change initiatives, thereby elevating the likelihood of achieving successful organisational change (Albrecht et al., 2023).

2.3 Hard Factors

The Cost of Poor Quality (COPQ) has gained greater strategic and economic importance than previously recognised, this is derived from research revealing its unfavourable impact on overall company performance (Bhushi et al., 2023). Addressing COPQ is therefore considered essential in order to minimise the challenging costs that negatively impact both competition and customer satisfaction. To thrive and remain competitive over the long term, organisations therefore must place a strong emphasis on ensuring quality and make it a priority (Rosak-Szyrocka et al., 2023). The COPQ is intertwined with the culture of zero defects and encompasses both direct and indirect costs stemming from poor quality, including waste from inadequate performance and processes, as well as its impact on business markets and goodwill (Bhushi et al. 2023). Additionally, poor quality leads to resource waste, underscoring the importance of effective QM practices (Azamfirei et al., 2023; Psarommatis et al., 2021).

Singh & Singh (2015) argue that the PDCA cycle, implying regular measurement and evaluation resulting in continuous improvement of processes, represent an effective strategy for organisations to stay competitive and tackle the persistent challenge of maintaining a low cost of poor quality, reducing waste, optimising, and accelerating processes. By employing various tools and techniques specifically designed to identify sources of problems, waste, and variation, organisations can effectively pinpoint areas for improvement and develop strategies to minimise them (Singh & Singh, 2015). Pavletić et al. (2008) mention selecting the most appropriate and suitable tools not always being easy due to the large number of tools available to quality experts and managers. A QM tool can be described as "*An instrument or technique to support and improve the activities of quality management and improvement*." (American Society for Quality, 2019). According to Pavletić et al. (2008), appropriate QM tools support decision-makers throughout the different phases of the PDCA cycle, leading to true process improvement. During the planning phase, tools have the potential to support problem identification and process analysis. Similarly, in the checking phase, tools can facilitate both process analysis and result evaluation. Bhushi et al. (2023) concur that an appropriate application of QM tools enables cost reduction without compromising quality, and instead ultimately enhances both productivity and quality. However, Chojnacka-Komorowska & Kochaniec (2019) underscore the challenge of increasing efficiency and cutting COPQ, which adds pressure on organisations to establish efficient quality control activities. Consequently, quality control activities should be improved and refined to not solely differentiate between good and defective products but also to locate and identify the cause of the irregularities, facilitating process improvements.

2.3.1 Measurement System

Although organisations have employed traditional QM tools and techniques for several decades, many of them were developed before recent advancements in technology, particularly those related to data-driven approaches (Azamfirei et al., 2023). Aragon et al. (2017) emphasise the significance of investing in digital capabilities to be able to access, utilise, and analyse all essential data, as this can lead to valuable insights for future improvements. Improvement initiatives require support from accurate "hard" data to ensure efficient decisions-making, hence underscoring the importance for a reliable measurement system (Lewis & Cooke, 2013). Wouters & Sportel (2005) emphasise that using performance measurement systems is one method for collecting and analysing data, which can be used to support and follow up on strategic initiatives. Moreover, the aim of such systems is to establish measures that are clearly aligned with the operational strategy of the organisation, as well as to generate meaningful data that can drive decision-making and identify areas for improvement (Guerra-López & Hutchinson, 2013). Lewis & Cooke (2013) explain that one method by which a measurement system can do so is by formulating its objective to identify and eliminate non-value-added activities, thereby improving the efficiency of the concerned process or activity. Non-value-added activities refer to those performed by an organisation that do not contribute to an increase in the value of a product. Value-added activities, on the other hand, are those that enhance the value, or customers' perception of value, of a product (Lewis & Cooke, 2013).

Kueng (2000) explains that it is essential to have a performance measurement system supporting a process-oriented approach. This means that it is emphasising processes rather than the entire organisation, or its units, as well as encompassing both quantitative and qualitative aspects. One approach to achieve this is to establish a measurement tool that enables the assessment of process performance and provides timely information about its progress. Furthermore, the information generated from such a tool can be used to communicate the current performance and evolution of a process, facilitating the prioritisation and allocation of resources. It can also pinpoint weaknesses and enable the assessment of actions of improvements taken (Kueng, 2000).

Moreover, for a measurement tool to possess proactive functionality, it is beneficial to consider its placement. Establishing it further upstream in the process, can prevent it from solely functioning as a final inspection tool, hence facilitating proactive improvements (Lewis & Cooke, 2013). Selecting the most suitable tool at the appropriate stage of the process can profoundly impact the outcomes (Antony et al., 2021). Moreover, Wouters & Sportel (2005) emphasise the importance of designing and using an appropriate measurement tool and highlight that having a clear understanding of the objective with the tool will be crucial for its success. This can be achieved through reviewing documents, standards, as well as conducting workshops and interviews. Additionally, using an iterative approach when designing a measurement tool, and revising it when new information about processes and its key customers becomes available, will help ensure that appropriate measures are identified.

Furthermore, continually involving managers in the design process is of high importance as these most likely are the "end-users" of the data generated by the tool. An outlined limitation of traditional QM tools is that they are often not capable of capturing qualitative data (descriptive data on specific conditions leading to e.g. failures or deviations), resulting in their inadequacy in capturing broader organisational issues (Antony et al., 2021). According to Guerra-López & Hutchinson (2013), when performance metrics are inaccurately measured and not aligned with management intentions, it becomes challenging to effectively assess and improve employee performance. Mitra (2016) underscores the ability to collect the data in a "clean" format influencing the analysis promoting future improvements. According to Antony et al. (2021), a successful implementation and usage of measurement tools also depend on variables such as user-friendliness and usefulness, which facilitate accurate utilisation and ensure the tool generates reliable data. These are claimed by the authors (ibid.) to be crucial aspects along with understanding associated terminology. Usefulness refers to the degree to which the tool effectively fulfils its designated purpose or function. The ability to integrate these tools into existing CI initiatives is another factor influencing successful implementation and utilisation (Antony et al., 2021).

2.3.2 Impact of Measurement System

Laihonen & Pekkola (2016) emphasise that a measurement system does not only affect organisational performance, but also people's behaviours and organisational capabilities, as it stimulates learning and knowledge sharing. Having access to - and being able to communicate based on - actual data, can facilitate cross-functional communication and understanding.

Furthermore, Hall (2008) argues that information about performance has the potential to enhance psychological empowerment and intrinsic task motivation. This is, when the measurement system is designed to empower and support employees, and not perceived as a tool for control by management. Conversely, performing tasks without knowledge of the outcome, can be perceived as dissatisfying, thus reducing motivation (Hall 2008). Training and awareness of the benefits associated with the use of measurement tools are therefore considered to have a direct impact on the usage and adoption rate (Antony et al., 2021). Prevedello & Khorasani (2009) also highlight the challenges associated with measurements, which may entail demanding and repetitive data collection tasks, potentially absorbing considerable effort and time, hence increasing the workload. As lack of time to use tools is an obstacle hindering the implementation and usage, having sufficient resources to utilise measurement tools is considered vital for their success (Antony et al., 2021).

2.3.3 Quality Culture

The quality culture, recognised as a relatively new emerging QM component compared to others, is increasingly acknowledged as an important factor for organisational performance (Chen, 2023; Kumar et al., 2020). A quality culture involves developing and shaping the beliefs and values of organisational members to cultivate an awareness that emphasises the importance of doing things right the first time and every time, and continually enhancing processes by involving each member in achieving and improving quality (Kumar et al., 2020). According to Sundari et al. (2015), establishing a quality culture can be attained through the application of quality control and quality assurance, which also are regarded as essential components for ensuring product quality. Furthermore, Jimoh et al. (2018) underscore that one of the most important determinants influencing an organisation's commitment to quality is its capability to understand, combine, and eventually establish quality-related behaviours, with a specific emphasis on making quality assurance practises a continuous process integrated in regular operations. Bodek (2020) highlights the growing importance of quality control and CI for world-class companies, necessitating the integration of quality into every management decision. One proposed solution to address this is introduction of ideas, methods, and examples of new measurement tools that not only measure the quality value, but also capture behaviours that promote, or obstruct the quality culture (Bodek, 2020; Durana et al., 2019).

2.3.4 Right First Time (RFT)

For organisations to achieve sustainable manufacturing and efficiently manufacture products with zero errors and minimal waste, the concept of Right First Time (RFT), which emphasises ‘doing things right the first time’, is considered instrumental (Azamfirei et al., 2023). Philip Crosby, the pioneer of the principle, underscored the importance of prioritising prevention, referred to as quality assurance, over post-event inspection to enhance RFT and reduce COPQ (Ghobadian & Speller, 1994). Despite this, Aragon et al. (2017) highlight how many organisations continue to hesitate when it comes to investing in quality initiatives, possibly due to the perception that improved quality also leads to increased costs. But as the market trend is moving towards a quality culture where good quality is expected, investing in it can entail lower costs such as reduced warranty cost and cost of rework (Aragon et al., 2017). According to Mitra (2016), incorporating an RFT focus can reduce overall costs and enhance productivity by minimising the time spent on reworks and the replacement of nonconforming output. Aggarwal (2021) also underscores the importance of a measurement system as a crucial component of a process, enabling the identification of gaps and the prevention of defective products. Specifically, measuring the proportion (or percentage) of Right First Time in a specific process is highlighted as an instrumental part of achieving these objectives concerning identification and prevention.

2.4 Conceptual Framework for an RFT Measurement Tool

The conceptual framework presents a compilation of identified factors and actions from section 2.1, 2.2 and 2.3 that need to be considered to develop and implement a measurement tool successfully. The framework has been developed to function as a basis for developing a measurement tool with the purpose to enhance Right First Time (RFT) within a process, hence it will subsequently be referred to as an RFT measurement tool. The framework consists of three main parts: *Goals*, *Key factors and actions*, and *Enablers*, see Table 2.3. The level of goals encompasses the central objectives and outcomes an RFT measurement tool aims to achieve. Key factors and actions refer to the specific elements or actions which require deliberation in order to achieve the defined goals, while the level of enablers outlines factors facilitating attainment of the goals. In section 5, this conceptual framework will be used as a basis for analysing the empirical data collected.

Table 2.3 *Proposed conceptual framework for an RFT measurement tool*

RFT MEASUREMENT TOOL			
Goals: *Objectives the RFT measurement tool aims to achieve*	Enhance productivity and quality by elimination of waste and non-value-adding activities	Effectively identify areas for improvement by generating meaningful data that can drive decision-making	Drive behaviours supporting new ways of working and a quality culture
	Design & Development	**Tool Characteristics**	**Implementation**
Key factors and actions: *Factors or actions considered key to achieve the defined goals*	Identify the most suitable process stage to implement the tool by locating non-value-adding activities. Placing it further upstream enables proactive functionality (Lewis & Cooke, 2013)	Ability to identify and locate the causes of irregularities and errors, facilitating process improvements (Chojnacka-Komorowska & Kochaniec, 2019)	Clearly communicate the scope and activities associated with the change and effectively communicate the objective of the tool, as well as how it will impact business workflows (Nah et al., 2001)
	Design RFT tool to ensure seamless integration into its regular operations (Jimoh et al., 2018)	Collects and presents the data in a “clean” format, making it easy to interpret and understand (Mitra, 2016)	Integrate application of RFT tool into regular operations (Jimoh et al., 2018)
	Identify and establish appropriate measures, clearly aligned with the operational strategy of the organisation and management intentions (Wouters & Sportel, 2005)	Incorporates a data-driven approach, enabling access, utilisation, and analysis of essential data (Aragon et al., 2017)	Ensure ease of participating by ensuring sufficient resources are available to focus on implementation and adapt to new working methods (Antony et al., 2021)
	Identify and establish measures that not only measure the quality value, but also capture behaviours that promote or obstruct the quality culture (Durana et al., 2019)	Fulfils the needs for which it was designed and effectively accomplish its intended function or objective (Antony et al., 2021)	Provide training for employees to acquire the necessary skills and knowledge for successful utilisation and implementation of the tool (Assen, 2020)
	Emphasis stakeholder involvement, involving employees across all levels of the operational hierarchy (Assen, 2020)	User-friendly, with terminology that is commonly understood by users (Antony et al., 2021)	Emphasise stakeholder involvement, involving employees across all levels of the operational hierarchy (Nau et al., 2001)
	Design RFT tool to empower and support employees (Hall, 2008)	Promotes empowerment and support for employees without being perceived as a tool for management control (Hall, 2008)	Emphasise the individual's usefulness of participating by highlighting potential improvements to their daily work experience (Jurburg et al., 2016)

		Captures both quantitative and qualitative measures (Durana et al., 2019; Kueng, 2000)	Ensure level of investment required, in terms of time and effort, to be reasonable compared to the benefits gained from improvement (Blomme et al., 2015)
Enablers: *Factors facilitating the achievement of the defined goals and contributing to the successful development and implementation of the RFT measurement tool*	➢ Leadership commitment and communication (Beer, 2021; Albrecht et al., 2023) ➢ Training and organisational support (Jurburg et al., 2016; Blomme et al., 2015) ➢ Prevention of resistance to change (Nau et al., 2001) ➢ Environment supporting employee engagement (Albrecht et al., 2023; Kahn, 1990)		

Goals

Previous research emphasises the critical importance for organisations to continually improve their processes to enhance quality, adapt to changing customer demands and market dynamics, and maintain competitiveness in the modern market landscape. Identification and reduction of waste and non-value-adding activities, leading to a decrease in poor quality occurrences, play a pivotal role in this effort (Bhushi et al., 2023; Singh & Singh, 2015). To enhance organisational performance and competitiveness, the first goal of an RFT measurement tool is to: *Enhance productivity and quality by elimination of waste and non-value-adding activities.* Furthermore, utilising measurement tools is essential for effectively identifying waste, non-value-adding activities, areas for improvement, and evaluating process performance (Aragon et al., 2017; Lewis & Cooke, 2013). This sets the basis for the second goal: *Effectively identify areas for improvement by generating meaningful data that can drive decision-making.* Lastly, the achievement of continuous improvement and successful development and implementation of measurement tools are dependent on a balanced consideration of both hard and soft QM factors (Chen 2023; Escrig-Tena et al., 2018). Therefore, it's crucial not only to focus on technical aspects but also to foster a shift in attitudes, values, and behaviours to create a supportive organisational culture that values quality, promotes a 'right first time' mindset, and encourages employee participation in continuous improvement initiatives (Albrecht et al., 2023). This sets the basis for the third goal: *Drive behaviours supporting new ways of working and a quality culture*.

Key Factors and Actions

Based on insights from previous research, the level of *Key factors and actions* outlines the specific elements and actions identified as necessary to effectively develop and implement an RFT measurement tool, and hence to successfully achieve the goals. These are further subdivided into three main sections: *Design & Development*, *Tool Characteristics,* and *Implementation*. The key factors and actions connected to *Design & Development* and *Implementation* serve as the foundation for guiding the design, development, and implementation of an RFT measurement tool, ensuring goal alignment throughout the process and a sustained change. The section of *Tool Characteristics* encompasses specific attributes and functions of an RFT measurement tool that are considered essential for its effectiveness in driving continuous improvement and fostering a quality culture within an organisation. These attributes and functions need to be considered during the development stage to ensure they are incorporated into the design and functionality of the tool. Subsequently, these attributes should be met or realised after the implementation phase to ensure that the tool effectively serves its intended purpose and supports continuous improvement initiatives within the organisation.

Enablers

The *Enablers* involve factors or elements identified to facilitate achievement of the defined goals and contribute to the successful development and implementation of an RFT measurement tool. These enablers are: *Leadership commitment and communication, Training and organisational support, Prevention of resistance to change, and Environment supporting employee engagement.* All playing a vital role in creating a supportive environment for change, fostering employee involvement, empowerment, and engagement, and ultimately driving sustainable improvements within an organisation (Albrecht et al., 2023; Blomme et al., 2015; Nau et al., 2001).

3. Methodology

This chapter presents the structure of the research, providing a description of how the research is designed, the workflow, the data collection methods used, and how the collected data is analysed. The chapter also includes a section presenting the case company. It will additionally present and discuss ethical considerations which have been taken into account throughout the research.

3.1 Research Strategy and Design

According to Bell et al. (2019), qualitative research places emphasis on words and the understanding of human experiences, prioritising qualitative data over numerical data during both data collection and analysis. Given the nature of the research questions in this study, an in-depth investigation beyond the scope of statistical data is considered. Therefore, this study predominantly undertakes a qualitative research approach, with quantitative elements incorporated, indicating the utilisation of a mixed methods approach. The research design adopts the form of a case study, which is an approach widely used in business research entailing a comprehensive and intensive analysis of a particular case (Bell et al., 2019). According to Kang (2019), it is a well-suited methodology for the development of a deep and detailed understanding of a complex phenomenon. Furthermore, a qualitative case study design emphasises the focus on exploration and is described as both flexible and iterative, enabling the research design to evolve as the study progresses. Hence, the case study design was chosen to be the most suitable for this research.

Bell et al. (2019) also discuss the logic of inquiry, referring to the approach to theory-building and the relationship between theory and research in business research. The deductive and inductive approaches are recognized as the two main approaches in business research. A deductive approach implies the strict logic of testing a known theory and falsifying hypotheses, while an inductive approach involves developing new theories based on observations (Bell et al., 2019). This study adopts an abductive approach, meaning it focuses on identifying the most likely explanation for a given set of observations and allows for adaptation based on emerging evidence. In recent years, the abductive strategy has gained prominence, being commonly used to develop explanatory models or theories based on observed patterns or phenomena. Abductive reasoning is flexible and allows researchers to explore complex phenomena by considering multiple potential explanations and selecting the most promising one based on the available evidence (Bell et al., 2019). This research began with a review of research on quality management and measurement tools aligned with the study's aim. Throughout the research process, literature was expanded and added based on findings and observations made during the study, indicating the study's employment of an abductive reasoning approach. As an example, more previous research on the concept quality culture as well as how a measurement system impacts behaviours and employees was included.

The case company for this research adopts Lean and Six Sigma principles. Accordingly, the research process has been structured in alignment with the company's established procedures, adhering to the Lean Six Sigma DMAIC process. The acronym stands for the five phases of Define, Measure, Analyse, Improve, and Control, which together provide a structured and comprehensive methodology for process improvement (Zhang et al., 2014). The research process has been iterative, and an agile approach has been embraced, incorporating elements similar to agile sprints which additionally justifies the choice of a flexible research design, i.e., an abductive approach. The research process' overall alignment with the case company's standard project model was also taken into consideration from the outset to ensure adherence to established practices.

3.2 Case Company

The case company operates globally within a highly regulated market. It is a product development company, or a so-called innovation company, with a commitment to delivering high quality work and cultivating a quality-centric culture. The company views quality control activities as both required and of high importance to ensure safe and effective delivery of high-quality outputs. Consequently, they recognize the importance of having established methods and tools that can yield meaningful data, thereby enabling informed, data-driven decision-making. The regulatory nature, and quality-centric culture, of the chosen case company make it a suitable choice for sampling in this case study. Furthermore, it makes the case company appropriate for understanding the aim of this study as well as to answer the research questions.

The research is conducted within the company's Quality department, which is currently engaged in an ongoing project aimed at enhancing the efficiency and effectiveness of quality control activities. This research aims to contribute to this initiative by introducing a new measurement tool, specifically, a Right First Time (RFT) measurement tailored to the department's quality control activities. At the case company, both Quality Reviewers and Quality Providers play important roles in managing and overseeing steps requiring quality control, in order to maintain the company's high standards and comply with regulatory requirements. Quality Reviewers, who are part of the Quality department, support so-called Quality Providers from other functions and departments in the organisation with quality-related inquiries. The Quality Provider conducts assessments and evaluations of these quality-related events, hereafter referred to as cases, while the Quality Reviewer has the responsibility for reviewing and approving these cases, ultimately making decisions regarding their acceptance or rejection.

3.3 Data Collection

Data collection can be seen as the key point of any research project (Bell et al., 2019). In the early stage of the study, secondary data provided by the case company was analysed to obtain indicative knowledge and valuable insights. The dataset comprised data from 33 sub-processes overseen by the quality department from 2023 to 2024, indicating a total of 4628 managed cases and their distribution during that period. To collect the primary data necessary for this research, both unstructured and semi-structured interviews were conducted with several employees (n= 10) from the case company. The primary data collection started with expert interviews, of more unstructured character, involving individuals within the company who were seen to possess a high level of expertise in the company's procedures and processes relevant to the research topic. The unstructured interview approach is appropriate for qualitative studies since it allows interviewees to freely respond to open-ended questions posed by the interviewers (Bell et al, 2019).

As the study advanced, the interviews adopted a more semi-structured approach, where the interviewers were supported by a developed interview guide with predefined questions (see Appendix A). Bell et al. (2019) explain how the semi-structured interview approach is suitable for qualitative studies, as it encourages follow-up questions and enhances the likelihood of obtaining insights into the interviewees' perceptions of the topic. The flexibility of the semi-structured interview allows for adaptation to the direction taken by interviewees, potentially adjusting the research emphases if significant issues emerge during the interviews. The data collection methods and workflow employed during this research are illustrated in Figure 3.1.

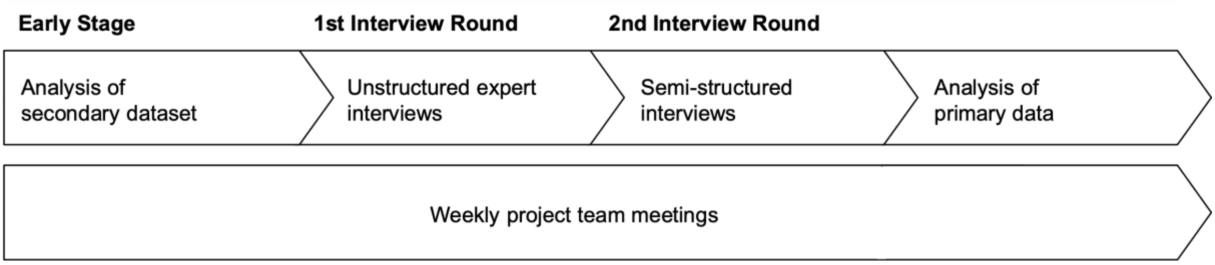


Figure 3.1 *Overview of the research's methodological workflow*

In the initial interview round, consisting of expert interviews, a purposive sampling approach was used, meaning the respondents were chosen strategically to ensure that participants possessed the appropriate knowledge and could effectively contribute to the research questions (Bell et al., 2019). As the study progressed, a theoretical sampling approach was used when selecting new participants. This implies new participants were chosen based on the insights and knowledge gained during the research process (Bell et al., 2019). However, a criterion during the data collection process was to only include participants who have a certain degree of experience or involvement within the process in focus for this research. Before selecting respondents for the second interview round, the process manager provided a list of potential respondents. This ensured representation from various functions and sites involved in the process. Notably, the supervisor and manager at the case company hold substantial influence over participant selection, potentially introducing bias.

In total, 13 individual interviews were conducted as presented in Table 3.1, utilising both face-to-face and online formats. Aligned with the theoretical sampling approach, interviews were carried out until a satisfactory level of knowledge and understanding was attained, and theoretical saturation was achieved (Bell et al., 2019). Furthermore, to preserve valuable insights effectively and allow answers to be quoted directly, interviews were recorded with consent and later transcribed.

The interviews conducted at the case company involved both employees and managers from three different sites and various departments. To maintain the anonymity of respondents, the specific sites and functions of individuals are not disclosed in Table 3.1 due to confidentiality concerns. Respondents identified as 'Employee' are either in the role of Quality Provider or Quality Reviewer. In addition to the interviews, weekly meetings, referred to as project team meetings, were held with a team consisting of managers and experts within Quality, Lean and IT, as well as the researchers themselves. In total, 17 project team meetings were conducted.

Table 3.1 *Overview of interviews*

Interviewee	Reference Code	Role	Number of Interviews	Duration (min)	Type of Interview
1	I_1	Manager	2	60 60	Unstructured Semi-structured
2	I_2	Employee	2	60 30	Unstructured Semi-structured
3	I_3	Employee	1	45	Semi-structured
4	I_4	Employee	1	45	Semi-structured
5	I_5	Employee	1	45	Semi-structured
6	I_6	Employee	1	45	Semi-structured
7	I_7	Employee	1	45	Semi-structured
8	I_8	Manager	2	30 60	Unstructured Unstructured
9	I_9	Manager	1	45	Unstructured
10	I_{10}	Employee	1	60	Unstructured

3.4 Data Analysis

According to Bell et al. (2019), data analysis accounts for the stage where collected data are managed and reduced to enable interpretation. Creswell (2009) states that the process involves making sense of the data and text to later be able to draw conclusions from it. In this study, both primary data and secondary data were analysed. Before beginning the processes of gathering and analysing the primary qualitative data, which mainly serves as the foundation of this study, secondary data analysis was carried out. Secondary analysis refers to analysis of data collected by others rather than the researchers themselves (Bell et al., 2019). Bell et al. (2019) underscore that secondary analysis offers the opportunity to gain insights from large datasets presented in statistical form without spending the time required to collect new data. As also noted, this freed up time for the initial analysis, which led to the acquisition of knowledge required to proceed with interviews. However, limitations concerning lack of familiarity with the data, complexity of the data, and no control over data quality were managed and considered during this analysis (Bell et al., 2019). The secondary data examined in this study was collected by the case company for its own purpose and was of quantitative character. It was analysed using both Microsoft's business analytics tool Power BI and Excel.

After conducting and transcribing the interviews, which resulted in qualitative data, primary data analysis was performed. Even though the analysis process of qualitative data can be similar to the quantitative one, the procedures rely on text and image data rather than numbers (Creswell, 2009). According to Bell et al. (2019), qualitative data derived from meetings and interviews are often composed as unstructured textual material, making it less straightforward to analyse. To facilitate qualitative data analysis, two widely recognised strategies are outlined - thematic analysis and grounded theory. In this study, the data analysis was conducted using the thematic analysis approach, which involved identifying and analysing patterns or themes within the qualitative data. As recommended by (Bell et al., 2019), repetitions and recurring topics were acting as guiding criteria to identify themes. Microsoft Word was used for the analysis. Firstly, all notes and transcriptions were analysed and colour-coded separately. Then, text and citations with colour-coded markings were transferred to a new document to be organised within different themes, which are presented in Table 3.2.

***Table 3.2** Identified themes deriving from repetitions and recurring topics*

Theme	**Exemplary quotes**
Training/competence	*"It would be valuable with training and learning sessions within the process to gain a greater understanding for what is needed in the process"*
Work Instructions	*"There are too many documents, and there's a lot of different instructions to look at and search amongst"*
Iterations/communication	*"At step 3 there is probably more iterations, and then in terms of investigation we work really closely with them anyway"*
Quality Reviewers consistency in approval	*"It can vary, sometimes things get through quality control at step 3, whereas if you submit a similar documentation, it might not get through without a mark"*
Due dates	*"Very strict requirements from government regulations"*
Complex/uncertain/time-consuming steps	*"Within those parts, we do end up with a little bit more back and forth of agreement"*
Measurement: Where in the process would a measurement create value?	*"Probably initially at step 3, which means risk assessment, because if it is not correct right away, the QR will sent it back to you"*
Measurement: What is needed from the tool?	*"It must be very easy and require a minimal amount of time"*

The identified themes were: *Training/competence, Work Instructions, Iterations/ communication, Quality Reviewers consistency in approval, Due dates, Complex/uncertain/time-consuming steps, Measurement: Where in the process would a measurement create value?,* and *Measurement: What is needed from the tool?.*

3.5 Quality Criteria

Bell et al. (2019) highlight the importance of quality criteria to evaluate the quality of business research. Particularly in qualitative business research, the foremost criteria revolve around ensuring trustworthiness, encompassing four key aspects: credibility, transferability, dependability, and confirmability. These four aspects have been considered and adopted during the research process.

Credibility concerns whether the studied phenomenon is accurately represented and can be relied upon for meaningful insights. To establish the credibility of the findings, the researchers have adhered to principles of good practice. According to Bell et al. (2019), sharing the findings with the members of the study, i.e. respondent validation, is one technique to validate and confirm the researchers' understanding. This was conducted by the researchers before the study’s finalisation by sharing the report with the supervisor at the case company. Another approach taken to enhance credibility involves triangulation, implying multiple methods or data sources have been utilised in the study (secondary data, interviews, meetings etc.).

Transferability concerns the degree to which the findings can be transferred to other contexts or settings involving other respondents, recognizing the unique and context-dependent nature of qualitative studies (Bell et al., 2019; Korstjens & Moser, 2018). According to Korstjens & Moser (2018), ensuring this criterion involves the study's description being richly detailed and offering a profound understanding of the specific context, commonly referred to as thick description. Due to the anonymized nature of the case company context in the study, this criterion was challenging to entirely fulfil. Nevertheless, efforts to highlight the most important aspects were made to provide as thorough understanding of the case context as possible.

The third criterion, dependability accounts for the findings' consistency and stability over time and was ensured through the adoption of an 'auditing' approach. This was enhanced by systematically documenting and reviewing all phases of the research process, as recommended by Bell et al. (2019). Another countermeasure for this issue was to adhere to a clear and standardised interview template (Bell et al., 2019).

Lastly, confirmability addresses the aspect of neutrality, ensuring that the findings of the study are based on the collected data and, as far as possible, not influenced by the researchers' viewpoints or potential biases (Korstjens & Moser, 2018). This was accomplished by both researchers being present in each interview, recordings made when permitted, as well as transcriptions of the interviews to minimise the risk of misinterpretations and biases. Additionally, if any questions or uncertainties arose, respondents were contacted for clarification. A peer review was also conducted of the interview template (see Appendix A), as recommended by Anney (2014). The peer review was performed by the supervisor at the case company to ensure coherence with the objectives of the interviews and coverage of essential aspects of the process.

3.6 Research Ethics

Maintaining ethical awareness is a crucial aspect when conducting business research. Bell et al. (2019) stress four primary ethical areas researchers are expected to address and deliberate on when carrying out business research, namely harm to participants, lack of informed consent, invasion of privacy, and deception. Even though the research was conducted at a company handling hazardous components, participants in this study did not face any risk of physical harm. However, it was important to consider the potential risk of leaking confidential information. A leakage of sensitive information can significantly harm both the reputation and market position of the case company. Additionally, it can lead to regulatory compliance issues or other legal consequences along with violating the trust of employees and business partners. Leakage of sensitive information could also put the interviewees at risk and potentially violate their position in the company. To mitigate these risks, all sensitive data was managed and stored on the provisional computers provided by the case company. Additionally, the researchers adhered to the signed confidentiality agreement throughout the research. By using pseudonyms and avoiding internal language throughout the report, the identities of both the company and the interviewees is kept anonymous. Throughout the work, the researchers moreover conscientiously kept in mind to not discuss sensitive information in open environments, whether at the company's site or elsewhere.

Participation in the study was voluntary, and interviews were only recorded with explicit consent. This was to ensure informed consent and prevent any invasion of privacy. The concept of informed consent refers to the principle of ensuring research participants the right to receive information regarding their involvement in a study, as well as details about the nature of the research (Denzin & Lincoln, 2013). All respondents received clear and easily understandable information about the research report's purpose, facilitating them to make informed decisions about their participation (Bell et al., 2019). Moreover, participants were notified about the data anonymization and the confidentiality of personal information. The contact person at the case company had the opportunity to review the report before publication to ensure the accuracy of the findings. To minimise the potential for deception, which takes place when researchers intentionally mislead or provide false information, the research adhered to the ethical guidelines and principles (Bell et al., 2019), Furthermore, informed consent and transparent communication was prioritised throughout the study.

4. Empirical Findings

This chapter presents the empirical findings derived from employee interviews and project team meetings with experts at the case company, regarding development, design, and implementation of a Right First Time (RFT) measurement tool. Section 4.1 outlines the findings of the initial interviews and meetings, during which a process suitable for measurement was determined, along with an overview of the selected process and its current state. Section 4.2 presents the result that established the basis for choosing the optimal implementation point for an RFT measurement tool within the selected process. The final section, 4.3, encompasses findings related to requirements for a successful development and implementation of an RFT measurement tool.

4.1 Identifying and Selecting Process Suitable for an RFT Measurement Tool

Before considering how to develop and implement an RFT measurement tool, managers highlighted the necessity to identify the most suitable process. This involved examining a selected set of 33 sub-processes requiring quality control. The various factors considered when determining which process was suitable for RFT were: Level of standardisation, Total cases managed within the sub-process, Source of frustration, Average time spent, and Cost of poor quality, all presented and described in Table 4.1.

During meetings and interviews, the starting point was to identify which processes had a moderate to high level of standardised procedure, as this was considered a prerequisite for implementing an RFT tool. Additionally, employees were asked about which of the processes were perceived as causing frustration, time-consuming, and suitable for measuring RFT. The results revealed that several processes were standardised to a sufficient degree for RFT measurement. Others were noted to require a lot of discussions and continuous interaction between the Quality Provider (QP) and Quality Reviewer (QR), and therefore not considered either standardised or suitable for an RFT measurement. Some of the processes were also perceived to be somewhat frustrating, partially due to the time spent on tasks within these processes. Among these was the sub-process managing deviations, which further will be referred to as the Deviation process. Interviews and meetings confirmed that RFT already is measured in a few processes, but it was not widely established across all sub-processes. Furthermore, during a project team meeting, it was noted that the established RFT measurements had resulted in improvements, suggesting that a new RFT measurement tool could have a similar effect. Additionally, an aspiration to systematically work with improvements was expressed.

Table 4.1 *Description of determining factors*

Determining Factors	**Description**
Level of standardisation	Refers to how consistent the process is in terms of its procedures and practices, involving adherence to predetermined steps. A high level of standardisation implies a greater degree of consistency and predictability in the process, while a lower level may indicate more variability
Total cases managed within the process	Refers to the total number of cases managed by the QR within each sub-process
Source of frustration	Refers to if process steps are being perceived to cause dissatisfaction, inefficiency, or challenges for those involved
Time spent	Refers to the average time consumed or utilised during the execution of a case in the particular sub-process. The calculation is based on the duration from the moment a case is opened to when it is closed by a QR in the case company's system
Cost of poor quality	Refers to cost calculated by the case company based on the following formula: (Average time spent for cases logged as RFT - Average time spent for cases logged as non-RFT) * The volume of non-RFT cases * The standard cost per hour for transactional tasks

The secondary dataset, representing the cases within the 33 sub-processes managed by the quality department during 2023-2024, showed a total number of 4628 managed cases, whereas the Deviation process accounted for 641 of these, as shown in Figure 4.1. Of the total 4628 cases, 3243 were blank and not logged as either RFT or non-RFT. The data showed the Deviation process was one of the top five processes with the highest "Average time spent". Due to underreporting regarding the Cost of Poor Quality, this factor was not considered to be the most guiding in the decision-making process.

During a project team meeting, where the top five most suitable sub-processes were evaluated, the Deviation process was selected as the most suitable process for measurement and implementation of an RFT measurement tool. This sub-process had the highest number of managed cases, it was noted to have a high level of standardisation, perceived as a source of frustration and time-consuming.

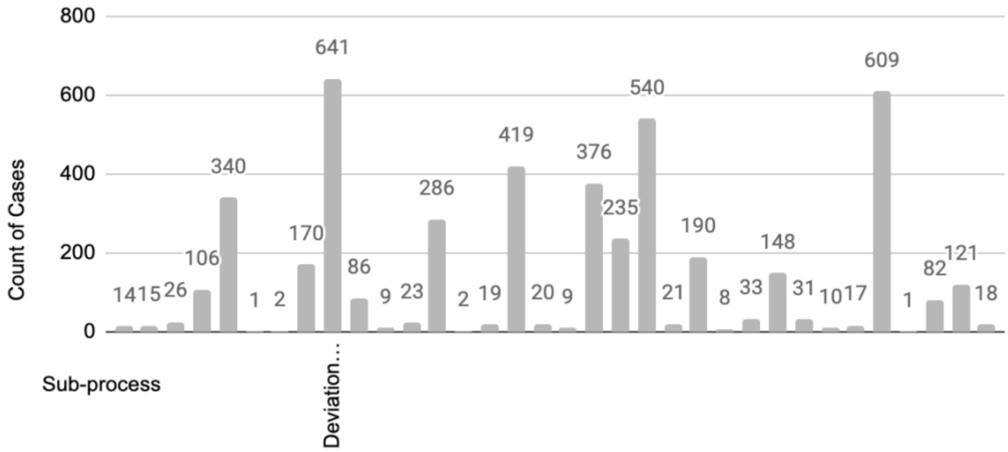
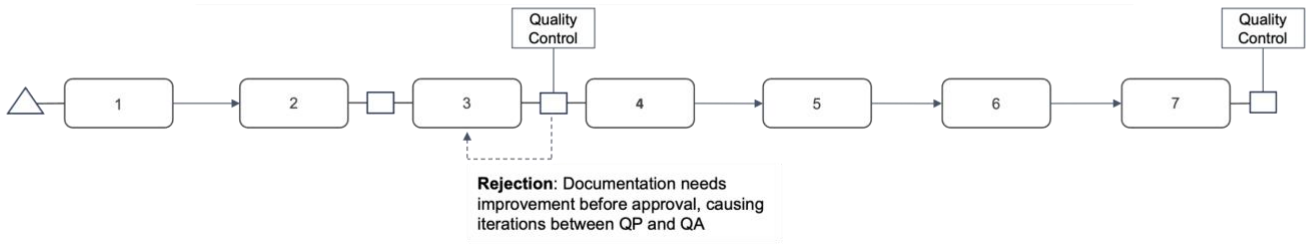


Figure 4.1 *Total cases managed per sub-process 2023-2024. To keep anonymity of the case company, not all sub-processes are disclosed due to confidentiality concerns*

Additional motivators for the decision to proceed with the Deviation process were raised during a project team meeting, where “A process of regulatory importance”, “No RFT measurement established within the process today”, and “A lot of ongoing discussions about this process” were some of the aspects considered in the decision-making process. Managers also raised a concern about the process containing unaccounted non-value-adding iterations between the QP and QR, referring to unnecessary communication that occurs outside of the system or are not logged. Furthermore, these potential non-value-adding iterations were emphasised as crucial to capture in order to minimise waste and rework, and thereby making the process more efficient.

4.1.1 The Chosen Process

The Deviation process, as illustrated in Figure 4.2, consists of seven steps dedicated to the investigation and evaluation of deviation cases. A deviation case refers to any instance or event in the development and manufacturing processes where there is a departure from the accepted standard. To ensure compliance with regulatory requirements and maintain product quality and safety standards, deviation cases require investigation and documentation. While the deviation process may be perceived as standardised in its approach, the deviation cases themselves can vary significantly, thereby adding complexity to the process. Within this process, Quality Providers have the responsibility for corrective actions, conducting assessment and investigations of deviation cases, while Quality Reviewers hold the responsibility of evaluating and approving the documentation, actions, and assessments. The process adheres to a strict timeline with set deadlines, indicating that steps two, three, and seven must be completed within specific time frames. Currently, time is the only established metric in this process. One employee emphasised the criticality of meeting deadlines due to "*very strict requirements from government regulations*" (I_2) to avoid the risk of losing development or production permits. Furthermore, during both meetings and interviews, it was noted that both internal and external regulatory inspections are conducted to ensure compliance with the regulatory timeline and requirements of this process.



Process Step	Description of Step
1	Start of deviation investigation
3	Step where risks associated to the deviation are being assessed and categorised based on a three-grade scale by Quality Provider. Initial documentation of the deviation, including its categorization based on the three-grade scale, needs approval by the QR.
7	Final documentation of the assessment and closure of the deviation case. Final documentation of the deviation needs approval by the QR.

Figure 4.2 *Flowchart of the process selected as suitable for RFT measurement, including step description. To maintain anonymity of the case company, not all process steps are described due to confidentiality concerns.*

4.1.2 Current State of the Chosen Process

After identifying and selecting a process suitable for RFT measurement, it was necessary to understand the current state of the chosen process. This to later be able to locate where an RFT measurement tool implementation could be both feasible and yield the most value, as well as how it could be used to improve the process. The findings indicated that different sites - and individuals - experience the process to some extent differently. Nevertheless, a few common themes regarding areas for improvements and challenges could be identified, see Table 4.2. Results from interviews confirmed what was observed from the dataset presented in section 4.1, indicating a high frequency of iterations between Quality Provider and Quality Reviewer within the process. It was also noted that discussions occur either through verbal communication during meetings, or via written communication in emails or over Teams.

Table 4.2 *Identified challenges and areas for improvements*

Identified Theme	Description
Iterations/communication	High frequency of iterations between QP and QR
RFT definition	Lack of shared perception and understanding of what is meant by RFT within the process
Instructions	Too many documents and they could be simplified for better clarity
Training	Need for training within the process, lack of understanding for requirements and what is needed from the employees
Resources	Individuals within the process are busy and have other responsibilities as well
Strict time frame	The process is more time-consuming than necessary and too many cases are not managed within deadlines

Interviews with employees revealed a lack of common definition and perception regarding what is meant by RFT in the Deviation process. One employee underscored the necessity for a clear definition of RFT within the process, and stated "*What is meant by RFT? Some iterations and discussions have to be allowed without a case being perceived as non-RFT"* (I_2). Furthermore, interviews indicated that employees feel overwhelmed by the abundance of guiding documents and instructions containing too much information. One employee expressed, *"There are too many documents, and there's a lot of different instructions to look at and search amongst"* (I_7). This opinion was expressed by an additional employee, stating *"There's a lot of different work instructions for performing steps within the process, but the structure is a bit messy"* (I_2). Several employees highlighted that all necessary information for performing steps RFT is available. One employee emphasised "*I believe all necessary information could be found in work instructions",* but also pointed out challenges with the structure of the information, adding "*The information could be more straightforward and easier to follow"* (I_3). However, other employees expressed that important information is missing and that instructions could benefit from being revised. The following was therefore suggested: *"It would be good having some kind of guidance on everything you might need to include, that would probably be good and helpful to get things right the first time"* (I_6).

During several interviews with employees, it was stated that improvements to the current way of working is necessary. Additionally, concerns about being too busy and lacking time were also expressed by several employees involved within the Deviation process. Moreover, interviews with employees revealed a partially shared perspective regarding the necessity for training within the process. Additionally, the high frequency of iterations within the process was perceived to potentially stem from skill gaps, underscored by the statement *"I spend so much time on the Deviation process, and I feel that it is due to the need for more and better training"* (I_2). This was confirmed by another employee stating *"it would be valuable with training and learning sessions within the process to gain a greater understanding for what is needed in the process"* (I_7).

The importance of following instructions and meeting deadlines was pointed out by employees, emphasising the strict requirements that must be followed. Furthermore, the majority of employees expressed that the overall timeline for the Deviation process should be able to be upheld. One employee stated *"Most cases can be closed within the deadline. However, it can be challenging as you can have a lot of other things on your table at the same time"* (I_4). Another employee stated that the deadlines are often maintained but added "*I often feel that I could have closed the cases more quickly if the process instructions had been clearer"* (I_3). However, it was raised during a project team meeting that there are still too many cases not closed and managed within deadlines, indicating an area for improvement, especially given the regulated nature of the process and the necessity for compliance.

4.2 Identifying and Selecting an Optimal Implementation Point for an RFT Measurement Tool

To find and determine the optimal implementation point for an RFT measurement tool within the Deviation process, several aspects were examined. The first aspect was to locate in what process step iterations frequently occurred between Quality Provider and Quality Reviewer, and the second was to locate where in the process it would be feasible to measure RFT. The third aspect involved delving deeper into the occurrence of iterations and the reasons behind them, to determine whether they were considered value-adding or non-value-adding. To ensure the tool development and implementation was targeted towards achieving meaningful improvements, managers highlighted the importance of identifying uncertainties and critical steps or activities in the chosen process. To uncover and pinpoint where potential occurrence of non-value-adding activities could be found, employees were asked questions regarding which process steps were considered most difficult and where uncertainties often arose. Process steps perceived as time-consuming were also discussed.

Results showed somewhat divided opinions regarding which steps were perceived as the most difficult and uncertain. One employee stated "*I have a lot of experience, which has made it much clearer for me as a newcomer to this, but I don't think everyone might have the same view, but I don't know for sure*" (I_3). Another employee also noted uncertainties stemming from the severity of the particular deviation, mentioning *"It could be very different and it all depends on the nature and the severity of the incident"* (I_4). However, two steps, both requiring quality control, were repeatedly mentioned as critical stages where iterations frequently take place, and where a measurement could fit. These were steps 3 and 7, as shown in 4.2.

Employee I_7 highlighted the value of education in step 3, emphasising its critical nature and that assessing associated risks can be complex, making it challenging to determine the appropriate risk level. Another employee agreed and when asked where improvements could be made to reduce uncertainties, it was expressed that "*In terms of getting things right and reducing the time spent, I definitely say the guidance for putting it into the system and conducting the risk assessment* [step 3], *as well as at the very end when you are writing it up at last, to understand what's expected – like a sort of guidance document. I think that would be very good*" (I_6). Additionally, several employees, I_3, I_7 and I_5, highlighted step 3 as a step where recurring questions and iterations occur. One employee stated "*Within those parts* [referring to step 2 and 3] *we do end up with a little bit more back and forth of agreement"* (I_5). Results showed that iterations in step 3 partly occur due to Quality Provider having difficulties with assessing risks associated with the deviation, leading to Quality Provider and Quality Reviewer having different opinions about the categorization based on the three-grade scale. Lack of justification and missing information were also cited as reasons for iterations before reaching quality control approval at step three.

Several employees indicated step 7 consisting of a lot of iterations, but also that these were of a more value-adding kind to "*make sure that the investigation is thorough*" (I_5). In the later steps where the investigation gets more into detail, involving the 7th step, Quality Provider and Quality Reviewer is also noted to "*work really closely anyway*" (I_6), making it hard to measure RFT. Reasons behind iterations in step 7 could not be identified.

Iterations and communication seem to be essential in the chosen process to create high quality deviation assessment and documentation. When discussing process steps where numerous discussions and iterations between the Provider and Quality Reviewer commonly occurred, one employee, I_4, noted that involving the Quality Reviewer from the beginning and throughout the process facilitates the early detection of missing parts or points needing clarification, rather than waiting until a few days before the deadline. When discussed how to distinguish between what, in the 3rd step, could be considered as value-adding iterations and what could not, one employee stated *"When the discussion supports you in identifying the right risks associated with the deviation, or in expressing the risks, resulting in getting it right, because it's not always easy, that's where I think we have the best dialogues that create value. But when iterations involve things that should be clear based on the instruction, it is not considered value-adding. But as I said, it's not always easy and often you need to have a discussion to reach an agreement."* (I_2).

During a project team meeting, where findings and opinions from interviews with employees were raised and discussed, step 3 was assessed as the optimal implementation point for an RFT measurement tool. Managers considered step 3 as suitable not only due to the presence of iterations, likely non-value-adding ones, but also emphasised their preference to measure earlier in the process rather than later. This to align with a prevention-oriented approach rather than correction.

4.3 Requirements for Successful Development and Implementation of an RFT Measurement Tool

In order to determine how to develop and design an RFT measurement tool, as well as how to implement it successfully, employees and managers were asked about their preferences for tool characteristics as well as important considerations during a future implementation. Section 4.3.1 presents findings concerning requirements for tool characteristics, while section 4.3.2 presents findings related to its implementation.

4.3.1 Tool Characteristics

During interviews with employees, they were asked about the essential features required from an RFT measurement tool for it to be utilised properly by those involved in the process. Respondents agreed that it should be easy to use and require minimal effort and time. One employee stated *”if it's something that requires a short amount of time, that would be good”* (I_6). Another emphasised “*It must be very easy and require a minimal amount of time”* (I_3). Furthermore, it was highlighted by employees that having a maximum of three additional clicks, when using the tool compared to the previous way of working would be desirable. Moreover, several employees concurred that if the purpose with the tool is to use it temporarily during a specific period of time to collect data, they would be more tolerant of a more time-consuming tool than if the tool is to be continuously used. This was underscored by “*If I'm informed that this tool will be utilised for a few weeks to gather information, I am open for more clicks*” (I_2). Similarly, during meetings with the project team, these same requirements, regarding time and ease, were underscored as crucial for the tool to be embraced by employees.

Another employee, I_7, stated that it might be challenging for individuals to remember utilising a new tool. It was therefore suggested that it could be beneficial to incorporate some form of reminder to encourage the use of it. Employees also informed that they are already operating within numerous systems. Consequently, people might be tired of being introduced to new systems and the preference for the tool to integrate within existing systems rather than to add on a new one outside the existing one was expressed. Employee I_2 stated that if a tool integrated within the existing system was not feasible to develop, having an easily accessible link on the computer would be preferable.

During discussions with the project team the importance of choosing appropriate terminology within the tool was emphasised. Meaning that the words and the language used should align with those already established in existing systems and work instructions to minimise the risk of misinterpretations. Managers also stressed the potential benefits of developing an RFT measurement tool that not only captures data on iterations, but also the underlying reasons behind them. Furthermore, understanding the process and its users well enough to develop response options within the tool capable of capturing as much valuable data as possible was underscored as important. In addition, employee I_8 pointed out the potential of generating data-driven insights and findings about areas for improvements, which could drive CI, further underscoring the importance of developing response options capable of generating useful data. Employee I_{10} also highlighted the potential benefits of excluding open-ended response options in the tool. This entails, including only predefined answer options, thereby encouraging employees to carefully consider all options presented. Additionally, I_{10} pointed out that designing the tool in a way that makes it impossible to proceed to the next step, or to submit, without selecting at least one option could be beneficial. Developing a tool and a concept that fits the specific selected step while also being scalable for use in other processes, was also highlighted as an attractive feature from managers perspective.

4.3.2 Tool Implementation

During interviews with employees, important considerations for a potential future implementation of an RFT measurement tool were discussed. The importance of seeing and understanding how the tool can lead to improvements in their daily work were underscored by several employees, but also by the management team. One employee stated *"People already have much to do, it will be very difficult to get people to prioritise the utilisation of the tool if they do not see the benefits that could be gained from it"* (I_7). Employee I_3 highlighted that being aware of the necessity of the tool and understanding how one's contributions can lead to improvements, could increase people's willingness and attitude towards involvement and utilisation of it. Additionally, employee I_7 pointed out that since many systems are already in use, there is a risk that people's initial reaction may be resistant to implementing an additional tool. Thus, I_7 noted the importance of communicating purpose, objectives, and benefits during its implementation, as well as explaining the long-term benefits that could be attained. Furthermore, an opinion towards incorporating workshops and learning sessions during the tool implementation to demonstrate and guide individuals through the usage of it was formulated. This was highlighted by the statement "*Demonstrate the change, instead of communicating it via email; we already have so many things to read"* (I_7). Managers also pointed out that ensuring and establishing a common definition and understanding of what is meant by RFT will be important during the implementation, as well as establishing a shared perception on what constitutes value-adding and non-value-adding activities.

5. Analysis

The following chapter provides an analysis of the empirical findings and the theoretical framework, with the aim to elaborate on and answer the Research Questions presented in section 1.3:

> *RQ1: What factors and key requirements need to be taken into account to ensure successful design and development of a new RFT measurement tool, within quality control processes facing strict regulatory requirements?*
>
> *RQ2: How can a measurement tool, supportive of RFT, be implemented to facilitate continuous improvements and promote a quality culture?*

Section 5.1 introduces the RFT measurement tool developed as a part of this case study. Research Question 1 is addressed within section 5.1.1 and 5.1.2, presenting key considerations during the development and design phase of the tool to enable successful tool implementation and ensure it accomplishes its intended purpose. Section 5.2 examines the implementation of the tool and factors necessary for fostering continuous improvements and promoting a quality culture, thereby addressing Research Question 2. Section 5.2.1 addresses how an RFT measurement tool can contribute to establish quality-related behaviours, while section 5.2.2 delves deeper into essential considerations moving forward to ensure successful tool implementation. Section 5.2.3 analyses how the implementation of the tool can contribute to the current state of the process within the case company, hence driving continuous improvements.

5.1 The Developed RFT Measurement Tool

An RFT measurement tool has been designed as a part of this case study, and subsequently developed in Microsoft Power Apps by the case company's IT department. Insights gathered from interviews with employees and managers, as well as feedback and input received during project team meetings throughout the study's progression, ensured that the developed RFT measurement tool aligns with the objectives and procedures of the case company. The purpose of the developed tool is to collect data on the proportion of RFT within the selected process, allowing it to function as a basis for developing strategies to improve the process, thereby enhancing RFT and facilitating continuous improvements. This means that the tool is designed to systematically collect data on whether the tasks, requiring quality control, are completed correctly on the first attempt or not. It will accomplish this by measuring the frequency of approved or rejected deviation cases, along with the reasons for rejections, as well as capturing the occurrence of value-adding and non-value-adding iterations. In some cases, iterations are considered necessary to create a high-quality deviation assessment, and those cases should therefore still be regarded as RFT (see Figure 5.1). Consequently, value-adding iterations have been defined as: *"Value-adding iterations entail a collaborative process between the Quality Reviewer and Quality Provider focusing on identifying, assessing, and communicating the risks associated with the deviation to ensure that all aspects of the deviation are thoroughly evaluated, contributing to assignment of the appropriate risk level."*

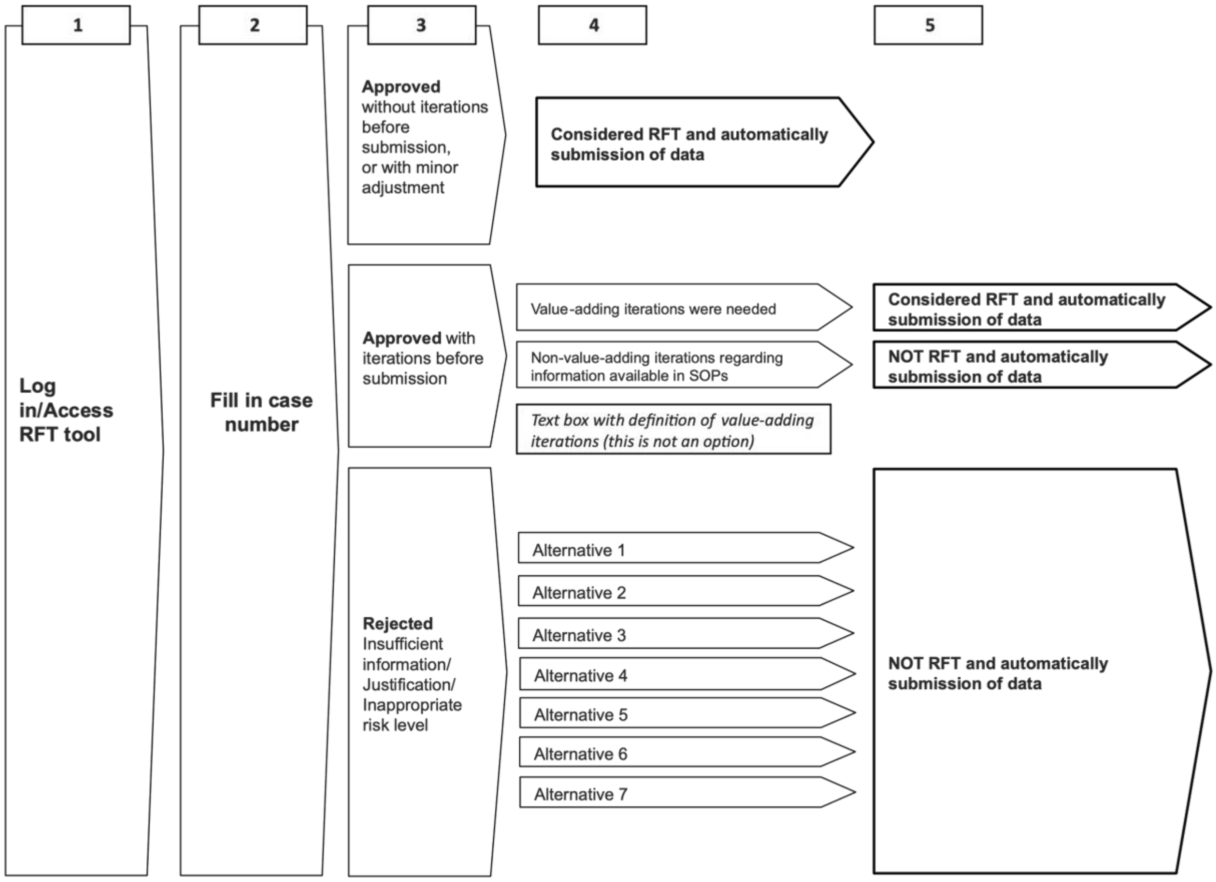


Figure 5.1 *Proposed tool layout, outlining the step-flow*

The tool will be implemented at step 3 of the chosen process, see Figure 4.2. Once the Quality Provider has performed the assessment and submitted the documentation requiring approval, it will be received by the Quality Reviewer for approval/rejection. This process step takes place within the case company's deviation management software, a specific system designed for managing deviations. After this, the tool will be utilised. The Quality Reviewer will employ the tool after approving or rejecting the assessment made by the Quality Provider, following the steps outlined in the overall step-flow layout of the tool presented in Figure 5.1. After submission, the data will be submitted and classified as either RFT or not RFT. The tool will be incorporated into the current workflow as an additional tool external to the already existing system. It can be accessed either via a link on the web browser or through the phone, for example, using Microsoft Teams. Furthermore, there is potential for it to be integrated into the existing system for deviations in the future, if implemented successfully.

5.1.1 Key Considerations During the Development Process

In order to successfully design and develop a new RFT measurement tool for a process requiring quality control, several factors and key requirements need to be considered. Firstly, Wouters & Sportel (2005) argue that having a clear understanding of the objective with the tool from the outset of the development will be crucial for its success. The case study showed that two goals with the development of the RFT measurement tool were to facilitate process improvement and enable data-driven decision-making by capturing reasons behind non-value-adding iterations within a chosen process. By identifying the locations and causes of non-value-adding activities in the process, countermeasures can be established to minimise waste and rework, ultimately enhancing process performance and reducing instances of poor quality (Bhushi et al., 2023; Singh & Singh, 2015). Prior to developing the tool, managers highlighted the need to first identify the most appropriate process, and then determine which specific process step was most suitable for an RFT measurement. Lewis & Cooke (2013) and Antony et al. (2021) emphasise that the placement of a measurement tool affects its outcomes and its proactive functionality. The results from the case study suggested that placing it further upstream in the process facilitates a prevention-oriented approach rather than a correction-oriented one, which aligns with Lewis & Cooke's (2013) suggestion to promote the proactive functionality and prevent it from being solely a final inspection tool at the end of the process. Placing it further upstream also cohere with the principle to enhance RFT, which is to prioritise prevention over post-event inspection (Ghobadian & Speller, 1994). Findings from interviews and meetings suggest that pinpointing the optimal location for the tool before its design ensures that it is targeted towards achieving meaningful improvements. It has also been demonstrated in the case study that searching for uncertainties and time-consuming or challenging process steps can serve as an indicative guide for pinpointing the optimal location for the tool. Involving stakeholders during the search enables a comprehensive understanding of the process and its various steps, facilitating the identification of areas for improvement and locations where waste is likely to occur. Additionally, by involving employees from the outset, resistance to the tool can be reduced and commitment fostered (Assen, 2020).

5.1.2 Design Considerations to Facilitate Successful Tool Implementation

When designing a measurement tool, insights from Aragon et al. (2017) and Wouters & Sportel (2005) underscore its crucial role in effectively identifying areas for improvement by generating meaningful data that can drive decision-making. Thereby, making it one of the central objectives within the developed conceptual framework for an RFT measurement tool. Important considerations during tool design, derived from both empirical and theoretical findings, to meet this objective, are compiled and presented in Figure 5.2. One key factor essential in accomplishing this goal is the tool's ability to identify and locate causes of irregularities and errors in the process, thereby facilitating process improvements (Chojnacka-Komorowska & Kochaniec, 2019). This aspect is also identified as a key requirement in the empirical findings, as managers emphasise the tool's ability to yield insights into areas for improvement and capture data on the underlying reasons behind iterations. This can, for instance, be achieved by adopting the approach employed in the RFT measurement tool developed, where response options have been designed to capture both quantitative data on the frequency of RFT, as well as qualitative data capable of capturing possible reasons for rejections. These specific response options are presented in Figure 5.1 as Alternative 1-7. By incorporating multiple options to choose from when entering information on why a case is rejected, insights regarding areas requiring improvement are enabled. Furthermore, both Durana et al. (2019) and managers involved in this study underscores the importance for a measurement tool to generate both qualitative and quantitative data.

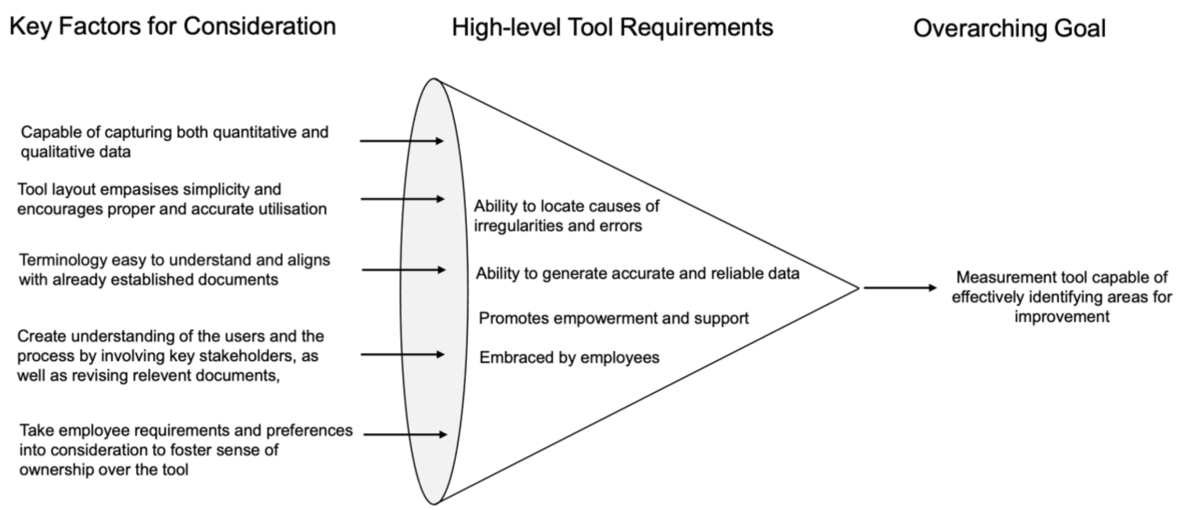


Figure 5.2 *Important factors to consider during the design of an RFT measurement tool*

Furthermore, to design a tool that can yield meaningful data driving decision-making, it will also be crucial that it is utilised consistently and correctly by the users in the process, ensuring that accurate and reliable data are generated (Antony et al., 2021). Findings from meetings with managers suggest that one way to do this is by designing the RFT measurement tool in a way that prevents the user from proceeding in the tool without selecting at least one response option. This ensures that blank or incomplete submissions cannot be submitted. Furthermore, by not providing any open response options, data that is easily analysed are ensured. This aligns with findings from Mitra (2016) which highlights the necessity to present data in a format that is easy to interpret and to understand. Furthermore, Antony et al. (2021) stress the importance of designing a tool with terminology commonly understood by users, while managers express the preference for a tool with terminology aligning with what is already established in existing systems and work instructions. This highlights the necessity for involvement of employees and key stakeholders when designing a tool, which was noted by both Assen (2020) and by employees and managers in the study. Additionally, it underscores the importance of using an iterative approach when designing the tool, and revising it when new insights are gained from, for instance, reviewing documents regarding processes, or when opinions emerge from employees (Wouters & Sportel, 2005). Furthermore, this aligns with insights from Abdullah & Tari (2012), highlighting the importance of considering both hard and soft factors during a change. Hence, soft factors such as motivating, encouraging, and engaging individuals to actively use the tool are additional aspects that must be considered during its design to ensure it generates accurate data. As outlined in the conceptual framework, aspects such as leadership commitment, necessary training and support, and efforts to prevent resistance to change are all enabling factors for achieving this (Beer, 2021; Jurburg et al., 2016; Nau et al., 2001).

Since the empirical findings revealed that employees are lacking time and feeling busy, developing a tool that is too comprehensive and extensive, with the purpose to gain as much qualitative insights as possible, could actually create resistance against it. It is therefore crucial to understand the specific process, its users, and their requirements, which also emerged as essential factors in the empirical findings to ensure the tool is embraced and utilised by employees. Furthermore, Hall (2008) underscores the importance of developing tools that promote empowerment for employees without being perceived as a tool for management control. Taking employee preferences into consideration during the design, could help reduce this risk. For instance, insights from employee interviews revealed a preference for a maximum of 3 additional clicks using the tool, compared to the current way of working, as well as for it being easy to use. By taking the formulated preferences for tool characteristics into consideration when designing it, employees are shown that they are supported and involved. Additionally, this may foster a sense of ownership over the tool developed, which, according to Kahn (1990), is one of the key factors underlying employee engagement.

Despite the formulated preference for this tool to be integrated in already existing systems, it has been designed as an external additional tool. This could potentially increase the risk of resistance towards its utilisation and embracement by employees. How this could be minimised during tool implementation will be discussed in the following sections. However, managers indicated that when designing a measurement tool, it can be advantageous to tailor it to the specific selected step while also ensuring scalability for use in other processes. Hence, one positive aspect of having it as an external tool is that it can more easily be integrated and implemented in additional process steps. Furthermore, if the tool can be expanded to collect additional data, it strengthens its capability to serve as a basis for continuous improvements.

5.2 Implementation of a Measurement Tool Supportive of RFT

5.2.1 The Tool’s Contribution to Establish Quality-related Behaviours and a Quality Culture

For organisations to successfully implement measurement tools and facilitate continuous improvement, a balanced consideration of both hard and soft QM factors is needed (Chen 2023; Escrig-Tena et al., 2018). This involves, according to Albrecht et al. (2023), to along with collecting data also foster a shift in attitudes, values, and behaviours to create a supportive organisational culture that values quality, promotes a 'right first time' mindset, and encourages employee participation in continuous improvement initiatives. It was decided by the case company to introduce a new Right First Time (RFT) tool, tailored to the department's quality control activities. As a quality culture involves cultivating an awareness that emphasises the importance of doing things right the first time and every time, and can be attained through the application of quality control and quality assurance (Kumar et al., 2020; Sundari et al., 2015), the introduction of a new RFT tool could foster a quality culture. Additionally, application of new measurement tools that not only measure the quality, but also capture behaviours that promote or obstruct the quality culture is suggested to support a quality culture (Bodek, 2020; Durana et al., 2019). The RFT tool about to be implemented at the case company is designed to capture both quantitative and qualitative data to facilitate this phenomena.

According to Hall (2008), information about performance has the potential to enhance psychological empowerment and intrinsic task motivation. Measuring RFT could raise an awareness promoting a 'right first time' mindset, making employees put in more effort to complete tasks correctly on the first attempt. However, as mentioned in the previous section (5.1.2), tools should promote empowerment for employees without being perceived as a tool for management control (Hall, 2008). The tool will be utilised by the Quality Reviewer within a step where quality control takes place, making it likely to be perceived by Quality Providers as an additional control tool. This does, nevertheless, not need to hinder the quality culture or negatively affect employee empowerment in this context, as employees already work in a highly regulated environment where control and regulations are necessary and expected to meet quality requirements. Furthermore, as employees need to comply with strict standards and requirements on quality, a tool that potentially leads to improvements and better training in areas where uncertainty exists, could instead be perceived as supportive and result in employees feeling more empowered. Moreover, case study findings indicate a lack of, and a need for a common definition of RFT, suggesting that such a definition must be established before implementation so that employees and managers understand what and how performance is being measured. This is also important from the Quality Reviewers' perspective, so all the assessments are based on the same definition.

According to Jimoh et al. (2018), a determinant influencing an organisation's commitment to quality and its ability to establish quality-related behaviours, and thus its quality culture, is the integration of quality assurance practices into its regular operations. Therefore, for the tool to contribute to a quality culture, it is crucial to ensure seamless integration into regular operations, to the fullest extent possible, both during development and implementation.

By investing effort in identifying an appropriate process and stage for the tool implementation, as done in the case study, a smoother integration in current operations can potentially be facilitated and ensured. Having a process step identified as suitable by the employees could potentially streamline the implementation process as the tool has been specifically designed for the specific step, while taking their opinions into considerations to make it fit the current workflow.

5.2.2 Essential Considerations to Ensure Successful Tool Implementation

The primary goal with the tool is to generate insights about areas for improvements, thereby facilitating and driving continuous improvements and potentially enhancing RFT in the chosen process. The implementation will entail a change in the existing process and the existing workflow. Laihonen & Pekkola (2016) emphasise that measurements not only affect the organisational performance, but also people's behaviours and organisational capabilities. For the implementation to be successful and hence result in its intended purpose, both behavioural aspects and actions fostering capabilities to drive improvements need to be taken into account.

According to Prevedello & Khorasani (2009), one vital capability contributing to the success of measurement tools is having sufficient resources to implement and utilise them. Since measurements risk absorbing considerable effort and time, thus increasing the workload, lack of time is considered an obstacle hindering both the implementation and utilisation. Findings indicate that employees often have busy schedules and many tasks to manage simultaneously, suggesting that they may not have additional time to utilise another measurement tool. Without sufficient resources and prioritisation, both short-term and long-term outcomes are likely to suffer (Done et al., 2011). To address this challenge, Beer (2021) outlines the importance for leaders to invest their own and their organisation’s time, attention, and resources into the change, creating the pre-conditions needed for the employees to focus on the change (Done et al., 2011). The study results indicate that a lack of time will make it challenging for people to prioritise tool utilisation, particularly if the individuals are unaware of its potential benefits. This observation is consistent with the emphasis made by Prevedello & Khorasani (2009) and Jurburg et al. (2016) about the importance of having sufficient resources and being aware of the objectives and impact of a change. It underscores the importance, as emphasised by Beer (2021), for management to prioritise resources and ensure that employees operate under the necessary conditions to utilise the tool before and during implementation. This entails not only providing the resources required in terms of time but also ensuring that employees understand the benefits of utilising the tool.

Assen (2020) also states that skilled employees are often more eager to participate in change initiatives, underscoring the importance of focusing on developing people’s capabilities. The need for training is therefore important to consider moving forward with the implementation of the tool. Providing training for employees to acquire the necessary skills, through for instance learning sessions and workshops, is mentioned as an important factor to achieve successful change by both Assen (2020) and during interviews with employees. Furthermore, both Jurburg et al. (2016) and Miller (2001) underscore the importance of training and motivation in mitigating failures during change initiatives and in promoting employee engagement and empowerment. As employee engagement is considered an important factor to both foster the success of the current change initiative but also for facilitating future CI initiatives (Assen, 2020; Chen 2023), managers should prioritise resources for training. This will enable employees to acquire the skills and competencies necessary to utilise the tool as planned and to actively engage in the change (Assen, 2020).

Providing sufficient resources will not only enable employees to contribute but also enhance the ease of participation, which has been shown to positively influence people's willingness to engage (Jurburg et al., 2016). Strengthening individuals' perception of the value of participation by communicating the benefits will further encourage employees to contribute to the change, which, in this context, implies utilising the tool (Jurburg et al., 2016). Blomme et al. (2015) warn that if employees perceive the anticipated benefits as unreasonable relative to the level of investment required, they may experience negative emotions, leading to resistance. Therefore, it is considered crucial to clearly communicate the benefits to users before implementation to mitigate resistance, e.g. by emphasising the value of the change, which aligns with recommendations by Nah et al. (2001). Furthermore, involving and communicating how a change affects business processes and employees can, according to Nah et al. (2001), create a sense of involvement, which is one of the key factors mentioned in the conceptual framework to achieve a successful tool implementation. Additionally, since interviews with employees and managers revealed six common themes for areas of improvement, it could be advantageous for employees to understand and be informed of how the developed RFT measurement tool can provide insights and contribute to improvements within these areas.

5.2.3 The Tool’s Contribution to The Current State of the Process

The empirical findings of this study reveal several themes for areas of improvement within the chosen process, namely: Iterations/communication, training, instructions, resources, and strict time frame. Furthermore, according to Jimoh et al. (2018), continuous improvements (CI) involve driving process change and enhancing performance by consistently evaluating and raising the level of performance of existing tasks. Since the RFT measurement tool developed is designed to collect data on process steps and areas with low RFT, it enables identification on where improvements are needed and should be prioritised, a capability underscored by Kueng (2000) as essential for a measurement tool to facilitate CI. Moreover, as indicated in the conducted interviews, there is a recognised need for training within the process. In this context, the tool could serve to identify areas where training efforts would be most beneficial. Additionally, it could pinpoint deficiencies or areas for improvement in work instructions, a concern also raised by employees. Furthermore, the high frequency of iterations between Quality Provider and Quality Reviewer, identified during interviews with managers and employees, also present an opportunity for improvement in the process. By addressing areas that currently lack adequate training or support, iterations could potentially be reduced. This indicates that the RFT measurement tool can enable prioritisation and allocation of resources, facilitating data-driven planning for future improvement initiatives, a significant consideration given employees' frequent mention of time constraints in the specific process. Moreover, this aligns with Aragon et al. (2017) findings regarding the importance of using a data-driven approach that enables analysis of essential data during decision-making.

Lack of resources and strict time frames are additional areas identified by employees and managers as challenges within the process. In the long term, improving the process within areas that have been identified as inefficient or frustrating by employees, could help free up resources. Furthermore, since the result from the case study suggests that the process is more time-consuming than necessary, freeing up resources could, in turn, facilitate compliance with given time frames. This implies that the developed tool can provide data-driven insights and potentially drive improvements within challenging areas such as iterations/communication, training, instructions, resources, and strict time frames, all of which have been identified as areas for improvement. This aligns with findings from Singh & Singh (2015), along with insights from interviews and meetings with managers, which highlight the potential of a measurement tool to identify sources of problems and waste, as well as its ability to serve as a basis for developing strategies to minimise them.

6. Discussion

To maintain competitiveness in the modern market landscape, previous research emphasises the critical importance for organisations to continually improve their processes and enhance quality through identification and reduction of waste and non-value-adding activities (Bhushi et al., 2023; Singh & Singh, 2015; Vinodh et al., 2020). The aim of this research was to explore how a measurement tool supportive of RFT can be developed to effectively assess process steps requiring quality control within a regulated process, thereby facilitating data-driven decision-making to increase performance and reduce cost of rework. Additionally, the study aimed to examine key aspects to consider when implementing a measurement tool to encourage desired behaviours supportive of RFT, as well as to create support for the accompanying change and its implementation.

In order to evaluate and improve business processes, it is essential to establish methods for effectively assessing, analysing and following up on performance within an organisation's processes. Implementing and utilising hard quality management (QM) tools, such as a measurement tool, offers one way to achieve this, given their capability to identify quality-related issues and non-value-adding activities (Krishnan, 2006). Previous research highlights the complex relationship between soft and hard QM, as well as the scarcity of studies that delve into success factors associated with implementation of QM practices (Nasaj & Al Marri, 2019; Saihi et al., 2021). Hence, a need was recognised to delve deeper into the interplay between the implementation of hard QM tools and concepts, such as an RFT measurement tool, and their impact on soft aspects such as employee dynamics and organisational culture. This master's thesis has contributed to this gap by encompassing both soft and hard QM factors when investigating how an RFT measurement tool can be developed, designed, and implemented successfully to effectively assess process steps requiring quality control and to encourage behaviours supportive of RFT.

This master's thesis suggests several factors and actions to ensure successful development, design and implementation of an RFT measurement tool. For efficient assessment of process steps, this study proposes that a measurement tool supportive of RFT should be tailored to the specific process stage and capable of capturing both quantitative and qualitative data. Accordingly, the generated data provides insights that can support decision-makers in making data-driven decisions throughout the different phases of the PDCA cycle, thereby supporting and monitoring improvement initiatives (Pavletić et al., 2008; Wouters & Sportel, 2005). The RFT measurement tool developed through this study collects data on whether the tasks within the targeted stage are completed correctly on the first attempt (RFT) or not, including the reasons for any failures. In the planning phase, this data provides an overview of RFT proportions within the specific process stage and insights about which steps most commonly cause iterations and rework. As noted by Aggarwal (2021) and this study, this facilitates identification of quality gaps and improvement opportunities, supporting the creation of action plans to prevent defective products and inefficient processes. Thereby increasing performance and reducing cost of rework. Furthermore, managers can establish measurable RFT targets for the process stage based on the data, which then can be evaluated in the check phase. In the check phase, the RFT measurement tool also supports analysis of the implemented changes' effectiveness, helping identify areas for further improvements.

Overall, if the RFT measurement tool is implemented and successfully employed, accurate information about the process performance enables the organisation to continuously improve their operations and achieve higher levels of quality. Guerra-López & Hutchinson (2013) emphasise that measurements should be clearly aligned with the operational strategy of the organisation. In this case, the RFT measurement tool aligns with the organisational commitment to delivering high-quality work and cultivating a quality-centric culture, contributing to improvement initiatives within the target process are also being aligned with organisational objectives. Furthermore, by designing a measurement tool to be scalable, it can be utilised in additional processes, thus enabling systematic improvements. The tool developed in this study can specifically contribute to systematic improvements within RFT, which is also aligned with the strategic objectives of the case company. However, it is important to note that a prerequisite for driving improvements is the collection of accurate data. This, in turn, relies on correct utilisation of a tool, placing a substantial responsibility on the users, who in this case are the employees.

Moreover, this master's thesis suggests that several factors, including employee involvement and employee engagement, have the potential to influence the success of an upcoming tool implementation and CI initiative. In addition, Albrecht et al. (2023) argue that the success of change, and particularly sustaining it, lies in employees embracing new mindsets and behaviours. Considering behavioural factors can therefore be seen as essential to implement a RFT measurement tool successfully, and for the change to reach its full potential. Moreover, this research indicates that creating supportive preconditions for employees to involve in improvement initiatives can initiate a positive cycle, where employee involvement cultivates a feeling of meaningfulness and ownership amongst employees, thereby driving employee engagement. This does, in turn, enhance employees' willingness to adopt proactive behaviour, further increasing their likelihood of future involvement (Blomme et al). Creating an environment where employees feel safe to express their honest opinions is an additional factor contributing to employee engagement (Blomme et al., 2015). Additionally, it can affect the success and quality of the work being produced, making it an important consideration both during and after the implementation of a measurement tool. Moreover, ensuring employee opinions are expressed and taken into consideration, can be seen as crucial to maximise the potential of a change. In line with Nah et al. (2001), this study also suggests that communicating the purpose and impact of the tool is another crucial action to consider to promote employee engagement. Additionally, this study proposes that this could raise awareness about the importance of doing things right the first time, thereby fostering the desired behaviours supportive of RFT and contributing to a quality culture. Therefore, to successfully develop and implement a measurement tool, this master thesis recommends a leadership that provides employees with the necessary preconditions, including capabilities, resources, and support to actively engage, hence enhancing the ability to both sustain change and to create an environment supportive of CI.

6.1 Limitations and Future Research

This master’s thesis has focused exclusively on examining and evaluating a single case, thus it could be beneficial to explore additional organisations operating in regulated markets. The case company analysed in this research is an established product development and production company with a global presence and a long operational history. Consequently, it would be interesting to examine the objectives of this study within different contexts, such as smaller organisations or start-up companies. Such a comparative analysis could yield valuable insights on how various factors influence the outcome. Furthermore, the case company included in this study is recognised for delivering high-quality work and fostering a quality-centric culture. Hence, there is room for future research to investigate how the development of an RFT measurement tool would be impacted if implemented in an organisation where quality-related concepts are not as firmly established.

The case study conducted focused on examining the development and design of an RFT measurement tool, as well as how to design it to be supportive of a successful implementation. However, the actual deployment of the developed tool was not within the scope of this study. Future research could therefore delve deeper into the implementation phase. Additionally, it would be valuable to conduct follow-ups after implementation to assess the extent to which the tool has contributed to the broader perspectives included in this study, such as enhancing quality-related behaviours and facilitating continuous improvements.

7. Conclusion

In order to fulfil the purpose of this study, this master’s thesis identifies several key factors crucial for successful design and development of a new RFT measurement tool. By considering both “hard” requirements, such as technical specifications, and behavioural aspects, such as user acceptance and employee embracement, an upcoming tool implementation is also more likely to succeed. It can be concluded that incorporating employee preferences, user requirements, and employee input is crucial throughout development and design of an RFT measurement tool. This ensures effective identification and localisation of appropriate process steps, enabling the tool to function as a tool for empowerment and support. Furthermore, understanding the tool's objective, users, and the process in which it will be utilised, are all essential factors for fulfilling its intended purpose. To enhance RFT, the tool's design must cover all potential error-prone areas, ensuring that as much insights as possible can be gathered from it. This can be achieved through, for instance, involving stakeholders, reviewing relevant documents, and observing processes. Furthermore, a successful RFT measurement tool should be able to capture both quantitative & qualitative data, facilitating identification of improvement opportunities and data-driven decision-making that can assist in reducing/eliminating non-value-adding activities and errors. It can be concluded that simplicity in design, including terminology and layout, as well as designing the tool to encourage correct utilisation, promotes accurate data generation and easier analysis. Furthermore, alignment of the tool’s objective with the company's operational strategy is crucial for long-term success.

This master’s thesis also concludes that for a measurement tool to facilitate continuous improvements and promote a quality culture, several actions and aspects are crucial to increase the chances of a successful implementation and utilisation. As correct utilisation of the tool is a prerequisite for the implementation to result in its intended purpose, managers hold the responsibility of establishing supportive conditions enabling and encouraging employees to involve and engage. One part of this involves the provision of sufficient resources in terms of both capabilities and time through training, resource prioritisation and resource reallocation. This is important both for short-term and long-term success. Another important part is the communication of the tool implementation’s objective, impact, and potential benefits, along with the specific definition of Right First Time within the context. Not only can this mitigate resistance and strengthen employees' perception of the value of engagement, but also promote the adoption of new mindsets and behaviours supportive of RFT among employees. Moreover, it is argued that the implementation of an RFT measurement tool has the ability to raise an awareness highlighting the importance of doing things right the first time. This, in turn, is discussed to potentially encourage employees to put in more effort in completing tasks correctly on the first attempt, thereby reducing waste and fostering a culture of quality.

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Appendix A: Interview Templates

A.1 Template for Quality Reviewer

- Are we allowed to record this interview?
- Would you like to tell us about your role and your responsibilities?
- How often do you manage deviations?
- Where are you, as a QR, involved in the deviation process? Which steps?
- At which step in the deviation process do you feel you need to provide most support?
- How do you provide this support? E-mail/teams/face to face?
- Which steps do you experience have the most uncertainties?
- Which steps in the process are the most difficult?
- What/which steps do you experience creates the most frustration?
- What/which steps are the most time-consuming?
- How do you define RFT in the process?
- Is it clear how QR should assess, approve and reject deviations?
    - Do you think everyone assesses in the same way or can the assessment vary between QR?
- How do you reject/approve deviations?
    - In what system and which information are given when you reject a deviation in order to make the QP understand the reasons behind rejections?
- What are the most common reasons for rejections?
- If we would implement a measure in this process to gather data on iterations and reasons for iterations, where in the process would be most appropriate and beneficial?
- If a measure is introduced requiring the use of a tool at a specific point in the process, what level of user-friendliness do you expect from this tool?
    - What is an acceptable time frame?
    - How many steps or questions would be optimal for accurate and consistent completion?
- What key considerations do you believe are pivotal in the successful implementation of measures or new work methodologies?

A2. Template for Quality Provider

- Are we allowed to record this interview?
- Would you like to tell us about your role and your responsibilities?
- Frequency-wise, how often do you fill these in - how many times per month?

- Do you experience the process as standardised?
- Are there relevant documents for guidance?
- We have understood there are several SOPs to follow, how do you experience these?
- Where in the process do you experience the most uncertainties?
- Which parts are perceived as the most challenging?

- What/which steps cause the most frustration?
- What/which steps are the most time consuming?
- How do you define RFT in the process?
- Do you find that there are certain parts/steps/recurrent questions that are often iterated with QR?
- If a deviation is rejected, is it easy to understand why?
- Do you feel that the assessment can vary between different advisors, and that they judge differently?
- If we would implement a measure in this process to gather data on iterations and reasons for iterations, where in the process would be most appropriate and beneficial?
- If a measure is introduced requiring the use of a tool at a specific point in the process, what level of user-friendliness do you expect from this tool?
    - What is an acceptable time frame?
    - How many steps or questions would be optimal for accurate and consistent completion?
- What key considerations do you believe are pivotal in the successful implementation of measures or new work methodologies?

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