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Pricing Process Improvement at the Case Company

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Preface

This Master's Thesis marks the culmination of an enriching journey toward a Master of Engineering in Industrial Management at Metropolia University of Applied Sciences. The path to this achievement was not straightforward; it was filled with the challenge of balancing a demanding professional life, rigorous academic commitments, and responsibilities. This journey tested my resilience and taught me invaluable lessons in time management and prioritization, contributing significantly to my personal and professional growth.

I extend my heartfelt gratitude to my workplace for its support, particularly to my line manager, and all colleagues and stakeholders who offered insights and encouragement. The academic guidance received from Dr. Thomas Rohweder and Sonja Holappa was pivotal, enriching my learning experience and supporting my journey.

Above all, the steadfast support from my family has been the cornerstone of my journey. My mother, an enduring inspiration and role model, alongside my spouse and daughter, who have consistently offered unwavering support and understanding, have underpinned my efforts. Their love and encouragement proved essential, allowing me to overcome challenges and secure this significant academic milestone. This thesis represents not merely an academic accomplishment but also a tribute to the collective belief and support of everyone involved in this endeavour.

Abstract

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The objective of this study was to develop an Improved Material Pricing Process for the Case Company's Business Line. The Case Company's Business Line has a large amount of variety and complexity in the way material prices are calculated, making it challenging to implement aligned material pricing.

The outcome of the study is the Final Improved Material Pricing Process.

The research was structured into four phases to address the identified business challenge. The initial phase conducted a Current State Analysis uncovering the Strengths and Weaknesses of the Current Pricing Process. The following phase was a literature review to find solutions from established knowledge to address the insights gained from the Current State Analysis. This phase also established the study's Conceptual Framework. The third phase focused on developing the Initial Improved Material Pricing Process, incorporating feedback from the decision makers. The fourth and culminating phase of the study was validation, where feedback on the initial proposal was sought from key stakeholders. This feedback facilitated the creation of the Final Improved Material Pricing Process.

The Final Improved Material Pricing Process lays a robust foundation for the Case Company's Business Line, enabling the effective integration of an Improved Pricing Process into use. With the Improved Material Pricing Process in place, the process will become more efficient, effectively reducing time-consuming bottlenecks. This improvement will free up valuable time and resources across the stakeholder teams, especially within product management, empowering them to focus on the pricing strategies and alignment.

Keywords: pricing management, pricing process, process improvement.

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List of Abbreviations

BA	Business Area
BL	Business Line
BLS	Business Line Sourcing
CSA	Current State Analysis
CRM	Customer Relationship Management
ECR	Engineering Change Request
ERP	Enterprise Resource Planning
GMDM	Global Master Data Management
GLP	Global List Price
GQS	Global Quotation Support
MA	Market Area
MALP	Market Area List Price
PBI	Power BI
PG	Product Group
PE	Product Engineer
PLM	Product Lifecycle Management
PM	Product Manager
QS	Quotation Support
SS	Strategic Sourcing
SVS	Services
TCS	Technical Commercial Support
TS	Tactical Sourcing
QOM	Quote and Order Management

1 Introduction

“One of the fundamental challenges for a firm is how to arrive at the right price for its products. The value a firm creates with its products can be determined by the difference between the buyer’s willingness to pay and costs for the firm to produce the product. How that value gets allocated, however, depends on the price the firm settles at. If a firm sets its price too low, then the customer garners more than its share of the value. If the firm sets the price too high, then the firm may garner more value for the products it sells but loses sales. Only by accurately understanding the pricing playing field can a firm arrive at the right price for its products” (Johansson, et al., 2012).

1.1 Business Context of the Case Company

The Case Company, a Finnish publicly traded entity, positions itself as a global leader in sustainable technologies, end-to-end solutions, and services for the rock crushing, minerals processing, and metals refining sectors worldwide. The company was established through a merger in 2020 when two Finnish machinery companies merged to form a large entity operating in the mining industry. The company's annual report for 2023 indicated sales of 5.39 billion euros and employed more than 16,000 individuals across more than 45 countries.

The primary customer segments of the Case Company primarily fall within the following main Business Areas: Minerals Processing, Aggregates, and Metals Refining divided into specific sectors. They cater to their customers with a comprehensive range of products and services. Given their global customer base and extensive offering that spans various products, services, and solutions, the Case Company maintains an organizational structure designed to respond efficiently to customer requirements.

This organization comprises five distinct Business Areas. Each Business Area operates with accountability for its own performance metrics, including orders, sales, operating profit, and capital employed. Furthermore, they actively contribute to the company's strategic objectives through business-specific initiatives.

This thesis focuses on Business Area C and specifically Business Line C3

Business Area C offers spare parts, refurbishments, and professional services tailored to the needs of mining customers.

Business Line C3 consists of three main product groups. In addition, the Technical Support team, Business Development and the Quotation Support Function, comprising Delivery Management, Proposal Management, Global Quotation Support and BL Pricing teams.

1.2 Business Challenge, Objective and Outcome

The Case Company's Business Line, BL C3, has a large amount of variety and complexity in the way material prices are calculated, making it challenging to implement aligned material pricing. BL C3 belongs to Business Area C as shown in Figure 1.

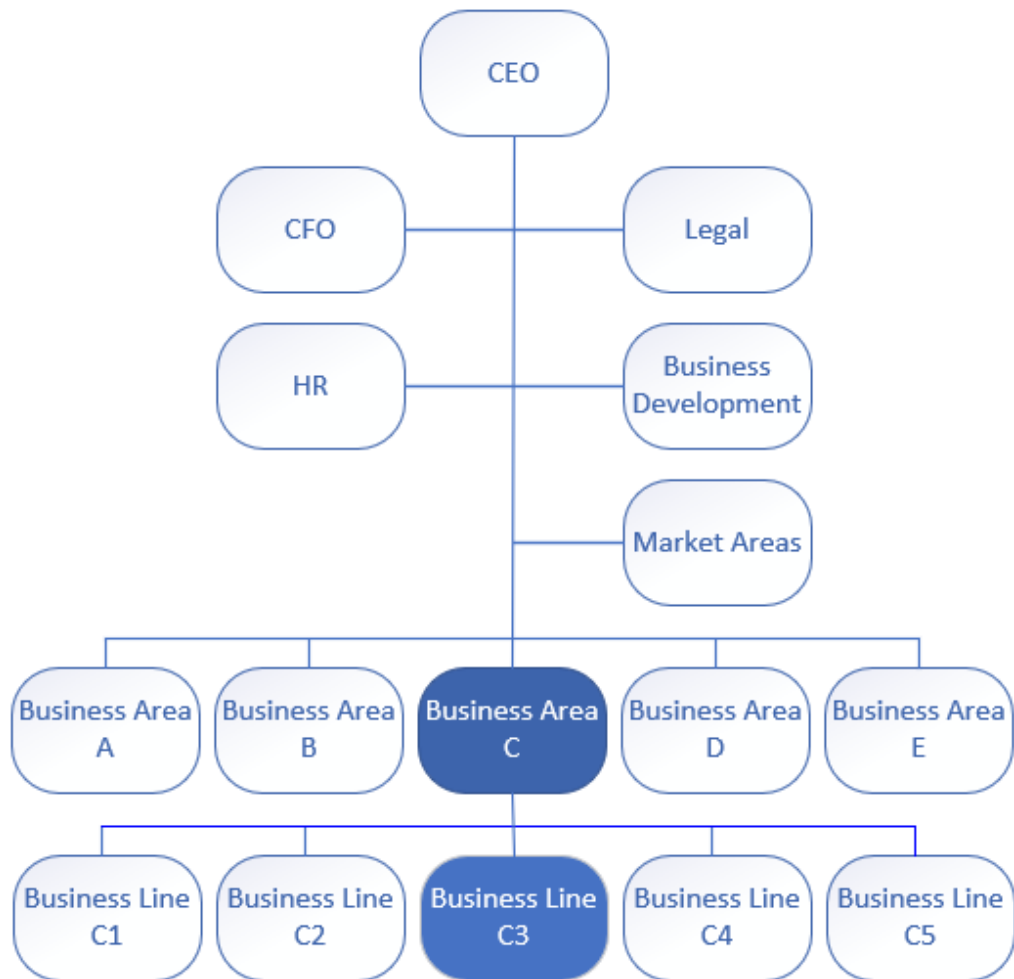


Figure 1: Case Company's simplified organizational structure

The objective of this thesis is to develop improved pricing process, enabling harmonized material pricing in the commercial component context with the idea to be used in other contexts outside this thesis. The outcome is an Improved Pricing Process to Case Company's BL C3 illustrated in Figure 1.

1.3 Scope and Outline of Thesis Report

The focus of this thesis is to analyse the Current Pricing Process in the Case Company, identify its Internal Pricing Needs, and assess the Strengths and Weaknesses of the Current Pricing Process.

This thesis is structured into seven distinct sections. The first section introduces the study. The second section details the Project Plan, including Research Approach, Design, and Data Collection. The third section details the Current State Analysis of the Pricing Process at the Case Company, summarizing the findings, and identifying critical areas for improvement. The fourth section researches relevant literature, related to the key improvement areas outlined in Section 3, forming the Conceptual Framework of the study. The fifth section proposed the Initial Improved Material Pricing Process. The sixth section further examines the Initial Improved Material Pricing Process and validates it based on feedback from relevant stakeholders, concluding with approval from the Vice President of Quotation Support, resulting in the Final Improved Material Pricing Process. Finally, Section 7 encompasses a discussion, conclusions, and self-evaluation of the study.

To improve the accuracy and reliability of the study, the following limitations have been set:

Firstly, the theoretical framework is tailored specifically to identifying appropriate process improvement strategies for the specific industry sector in question; thus, not all process improvement practices are explored in this study.

Secondly, given the case-specific nature of this thesis, its findings are directly relevant to the distinct BL (Business Line) of the Case Company, although there may be certain commonalities with other BLs and companies in the industry.

Thirdly, due to constraints in time and resources, the scope of this study is confined to one product hierarchy, commercial components. Lastly, it is important to note that this study provides an improved process rather than delving into the operational specifics of how the Case Company should implement the process in practice.

The following provides a comprehensive description of the Project Plan and offers an in-depth overview of the chosen Research Approach, Design, and Data Collection methods.

2 Project Plan

This section outlines the methodologies employed in the thesis research. It begins by explaining the choice of Research Approach and Analysis methods for the study. Subsequently, the Research Design Plan is introduced, with a discussion of each stage. The section concludes by detailing the Data Collection and Analysis methods, as well as the tools used.

2.1 Research Approach

Kananen (2013) states that design research (applied action research) does not constitute a distinct research methodology. Instead, it comprises a collection of various research methods that are selected based on specific situations or developmental goals. This is regarding a research approach or research strategy with several methodologies combining qualitative and quantitative research methodologies. "Design research is a combination of development and research in a cyclic process. Design research is close to development work conducted in the organisation to improve operations and produces functional and practical solutions" (Kananen, 2013: 20-21). Kananen (2013) states that "design research concerns only the phenomenon that was the object of the research. No generalisation can be derived from design research as those touch individual cases. With design research problems are eliminated and some aspects developed for better. Mere describing, understanding, or explaining states of affairs or a phenomenon does not satisfy design research like qualitative research does" (Kananen, 2013: 46-47).

Given that the selected Business Challenge was case specific to the Business Line, and the objective of the thesis was to identify specific improvements for the Pricing Process, the Design Research methodology was adopted. This approach was preferred for its direct practical relevance.

For this study, Qualitative Data Collection Methods were selected as they facilitate a deeper examination of the research topic. The study's design required employing semi-structured interviews to obtain comprehensive information and insights from participants, rather than focusing exclusively on quantitative data. This methodology offers a more profound comprehension of the topic and enables a more detailed analysis of the information gathered.

2.2 Research Design

This study is segmented into four separate phases, each illustrated in Figure 2 of the research design. Each stage delineates the necessary steps to attain a specific outcome.

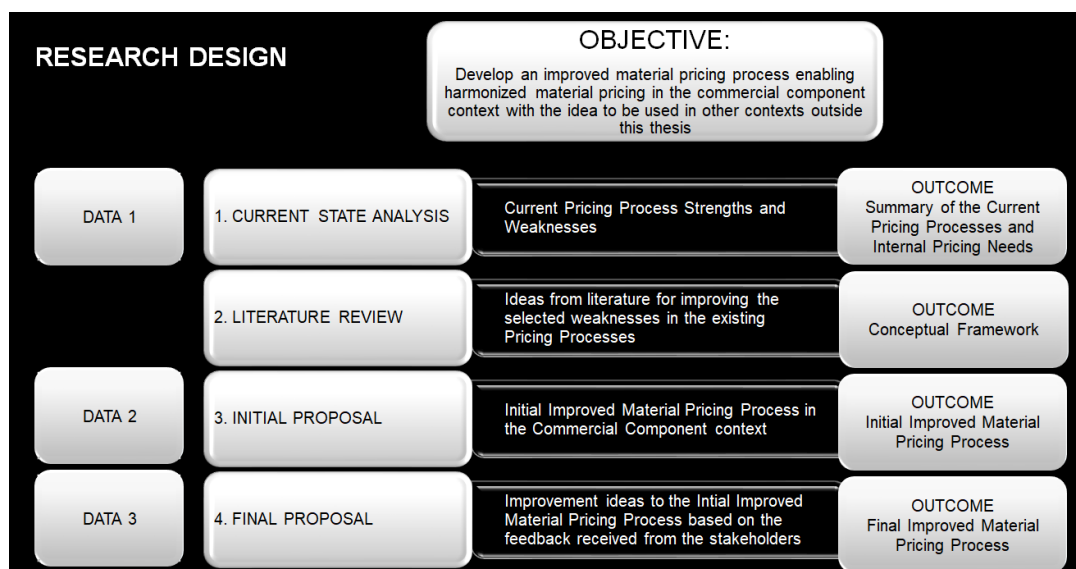


Figure 2: Research Design

As illustrated in Figure 2, the initial stage entails a comprehensive analysis of the current state of the Current Pricing Process Strengths and Weaknesses within the case organization. This in-depth examination of the processes is an essential prerequisite for formulating any pricing process improvement. To initiate this analysis, the data collection is commenced by mapping the existing processes and conducting an internal review of documents and instructions.

Additionally, interviews with key stakeholders are conducted to solicit their insights into the current processes and pricing requirements. The result of this stage is a concise summary detailing the Current Pricing Processes and Internal Pricing needs of the organization's BL.

The second stage of the research design focuses on the weaknesses identified during the Current State Analysis. This involves conducting a comprehensive literature review of various process improvement strategies. The key insights from this review are then integrated into a Conceptual Framework that will direct the formulation of the Initial Improved Material Pricing Process.

The third stage centers on creating the Initial Improved Material Pricing Process based on the weaknesses identified in the Summary of Current Pricing Processes and Internal Pricing needs from the current state analysis, along with insights from the Conceptual Framework derived from relevant literature. Key stakeholders are interviewed once more to develop the initial proposal. The outcome of stage 3 is the Initial Improved Material Pricing Process.

Finally, the fourth and concluding stage of the research design involves validating the proposal through feedback. Data collected during this stage also comprises a stakeholder interview. The result of stage 4 is the Final Improved Material Pricing Process.

2.3 Data Plan

Data for this study was gathered through three rounds of collection from diverse sources as shown in the Data Plan, Figure 3 below. These sources included observations, internal documents, tools, systems, and semi-structured stakeholder interviews.

DATA PLAN					
DATA	CONTENT	SOURCE	INFORMANT	TIMING	OUTCOME
1 ANALYSIS OF CURRENT PRICING PROCESSES	<ul style="list-style-type: none"> Description of Current Pricing Processes Description of Internal Pricing Needs 	<ul style="list-style-type: none"> Pricing Instruction Documents Pricing Process flowchart Stakeholder Interviews 	<ul style="list-style-type: none"> Product Director Product Manager Product Specialist Senior Manager, Proposal Management GQS Coordinator Lead Customer Care Coordinator Pricing System, ERP, QPR Portal ,Sharepoint 	January	Summary of Current Pricing Processes and Internal Pricing Needs
2 DEVELOPING IMPROVED PRICING PROCESS FOR CASE COMPANY	<ul style="list-style-type: none"> Clarify Roles and Responsibilities 	<ul style="list-style-type: none"> Workshop 	<ul style="list-style-type: none"> Pricing Data Manager Senior Manager, Proposal Management Product Specialist Tactical Sourcing Specialist Tactical Sourcing Manager VP Quotation Support 	March - April	Initial Improved Material Pricing Process
3 FEEDBACK ON THE PROPOSED PRICING PROCESS	<ul style="list-style-type: none"> Improvement ideas to the Initial Proposal 	<ul style="list-style-type: none"> Stakeholder Interviews Decision maker interviews 	<ul style="list-style-type: none"> VP Quotation Support Product Director 	April	Final Improved Material Pricing Process

Figure 3: Data Plan

Summaries of each data collection rounds are depicted in the three distinct tables below. Table 1 visualizes the first data collection (Data 1), focusing on the current state analysis, which includes interviews and review of internal systems and documents.

Table 1. Data 1 collection

DATA 1 - ANALYSIS OF CURRENT PRICING PROCESSES							
Code	Organization	Title	Area	Schedule	Duration	Location	Documentation
A1	BL C3 Product Management	Product Manager	BL C3, Product A	Tuesday 2.1.2024	63 min	MS Teams	Field notes
A2	BL C3 Product Management	Product Specialist	BL C3, Product B	Wednesday 3.1.2024	66 min	MS Teams	Field notes
A3	BL C3 Product Management	Product Director	BL C3, Product C	Thursday 4.1.2024	61 min	MS Teams	Field notes
B1	BL C3 Quotation Support	GQS Coordinator	BL C3	Tuesday 2.1.2024	56 min	MS Teams	Field notes
B2	BL C3 Quotation Support	Senior Manager, Proposal Management	BL C3	Wednesday 3.1.2024	43 min	MS Teams	Field notes
B3	BL C3 Quotation Support	Senior Manager, Proposal Management	BL C3	Thursday 4.1.2024	57 min	MS Teams	Field notes
C1	MA Sales	Lead Customer Care Coordinator	QOM	Friday 5.1.2024	45 min	MS Teams	Field notes
D1	Data	ERP, Pricing System					Field notes
E1	Documentation	QPR Portal, Sharepoint					Field notes
Summary of Current Pricing Processes and Internal Pricing Needs							

Table 1 illustrates the objectives of the Data 1 collection round, aiming to acquire essential insights into the current pricing procedures and instructions for conducting the Current State Analysis. The first data gathering round involved stakeholder interviews as well as reviewing internal documents and data from the Case Company's documentation, ERP, and pricing system. All interviews were facilitated by using the Microsoft Teams.

Data from interviews were documented through field notes and recordings. Data from rounds 1, 2, and 3 have been summarized in the field notes, and the interview questions are included as Appendix 1 in this thesis.

All the data from the existing systems (ERP, Pricing System, QPR Portal, SharePoint) was summarized documented to the extent that is relevant for the thesis.

All data collected at different stages was analysed by applying content and thematic analysis to identify the most suitable solution specifically fitting the Case Company's business case.

Table 2 below illustrates the second data collection round, Data 2, which aimed at drafting the proposal for the improved process.

Table 2. Data 2 collection

DATA 2 - DEVELOPING IMPROVED PRICING PROCESS FOR CASE COMPANY							
Code	Organization	Title	Area	Schedule	Duration	Location	Documentation
A2	BL C3 Product Management	Product Specialist	BL C3, Product B	3.4.2024		Espoo Workshop	Field notes
B2	BL C3 Quotation Support	Senior Manager, Proposal Management	BL C3	3.4.2024		Espoo Workshop	Field notes
B3	BL C3 Quotation Support	Senior Manager, Proposal Management	BL C3	3.4.2024		Espoo Workshop	Field notes
B4	BL C3 Quotation Support	Vice President, Quotation Support	BL C3	3.4.2024		Espoo Workshop	Field notes
B5	BL C3 Quotation Support	Manager, Pricing Data	BL C3	3.4.2024		Espoo Workshop	Field notes
F1	SVS Tactical Sourcing	Manager, Tactical Sourcing	SVS	3.4.2024		Espoo Workshop	Field notes
F2	SVS BL & BA Procurement	Specialist, Tactical Sourcing	SVS	3.4.2024		Espoo Workshop	Field notes
B3	BL C3 Quotation Support	Senior Manager, Proposal Management	BL C3	4.4.2024		Espoo Workshop	Field notes
B4	BL C3 Quotation Support	Vice President, Quotation Support	BL C3	4.4.2024		Espoo Workshop	Field notes
Initial Improved Material Pricing Process							

In the second data collection round, described in the Table 2, the Initial Improved Material Pricing Process was collaboratively developed with the stakeholders during a face-to-face workshop held at the Case Company's head office.

Table 3 displays the third and final data collection round, Data 3, which focuses on gathering feedback from the validation of the Initial Improved Material Pricing Process.

Table 3. Data 3 collection

DATA 3 - FEEDBACK ON THE PROPOSED PRICING PROCESS							
Code	Organization	Title	Area	Schedule	Duration	Location	Documentation
A3	BL C3 Product Management	Product Director	BL C3, Product C	8.4.2024	53 min	MS Teams	Field notes
B4	BL C3 Quotation Support	Vice President, Quotation Support	BL C3	8.4.2024	53 min	MS Teams	Field notes
Final Improved Material Pricing Process							

The third and final data collection stage of this study, Data 3 as shown in Table 3, is dedicated to validating the Initial Proposal through a presentation of the findings and feedback session with the Vice President and Product Director of the Case Company's BL. The findings from the current state analysis and the validation were carried out with one interview with the Vice President of Quotation Support and were conducted via Teams. The proposed improvements to the pricing process constitute the Final Improved Material Pricing Process.

The next section of this study gathers the insights from the Data 1 collection as well as an analysis of the current state of the Case Company's pricing models and processes.

3 Analysis Of Current Pricing Models and Processes

This section presents an overview of the Current Pricing Models and Processes within the BL C3, with a focus on its strengths and weaknesses. The analysis describes the overall business situation and characteristics on this specific BL.

The goal of the analysis is to evaluate the effectiveness of the commercial material pricing within the GQS Pricing Process, identifying its principal strengths and weaknesses, and pinpointing opportunities for enhancement. This analysis will serve as a foundation for the subsequent sections, where an Initial Proposal for a Pricing Process will be developed. Although the focus is primarily on one GQS team and commercial spare part components, it is important to acknowledge that various similar and differing pricing activities exist across the BL and at the company level globally. The process in question was chosen to represent the most typical pricing process by volume within the BL.

The current state analysis will encompass a detailed examination of the specific pricing process in question, including a description of the current pricing organization, policies, and systems in use. It will highlight the strengths and weaknesses identified during the evaluation and outline the Internal Pricing Needs of the existing pricing framework. The culmination of this analysis will be a summary of the key areas for development and the issues that have been identified, providing a clear direction for potential improvements in the pricing process.

The methodology used for data collection was outlined in the previous section.

3.1 Overview of the Data Stage

This section provides a summary of the organizational structure and process flows within the Case Company's Business Line (BL). It also outlines the organization of pricing ownership and management. Subsequent sections will present detailed problem identification based on concrete data and insights from interviews.

Data for the Current State Analysis (Table 1) were primarily collected from the Case Company's ERP, Pricing System, Quality Portal (QPR), and SharePoint. The collection of predictive data enabled the creation of a comprehensive information base on the number of commercial components, pricing logics, and the official pricing process flowchart before conducting stakeholder interviews.

Engagements with stakeholders involved in the BL Pricing Procedures were undertaken. The selection of interviewees aimed to capture as diverse a perspective as possible. The interviewees included three product management representatives from each product group, two GQS team leads to support the overall process flow view, one GQS member to provide an operational perspective on pricing matters, and one sales representative from Quote and Order Management. Each interviewee is closely involved in the BL Pricing Procedures and in different stages of the Pricing Process.

The interview structure followed the questionnaire detailed in Appendix 1. During the interviews, the process flow chart was used for support, and questions were correlated with the respective Figure 6 diagram. The interview questions varied, covering stakeholder role descriptions in relation to the pricing process and their perspectives on its strengths and weaknesses.

The semi-structured nature of these interviews allowed for the adjustment of questions based on the interviewee's area of expertise, role, and job description in relation to the pricing process. However, all questions were covered in the same format, resulting in a list of strengths and weaknesses.

3.2 Description of the Current Pricing Process

The Case Company's pricing procedures and ownership were established as a key outcome of the Process Way of Working Program in August 2021. The SVS Pricing Process, which was deployed globally, resulted in several crucial deliverables. These include process flowcharts and work instructions, detailed descriptions of roles and responsibilities, data storage locations along with their definitions, and the key metrics to measure process efficiency and effectiveness.

The existing guidelines outline a general pricing procedure which defines the common terminology for pricing governance across the organization globally. Process flowcharts illustrate the overarching process flows, identifying stakeholders and essential steps required throughout the procedure.

The BL C3 Pricing Instruction provides even more comprehensive step-by-step working instruction detailing all roles, data sources, systems, and responsibilities within the BL. The Table of Contents for these instructions is presented in Figure 4 below.

Contents

1. Purpose and objective.....	3
2. Scope and interfaces with other processes	3
3. Definitions and abbreviations	4
4. Responsibilities	4
5. References.....	5
6. Products & services pricing.....	6
6.1. Collect required available info	6
6.2. Categorize the product/service	7
6.3. Define entry pricing strategy.....	7
6.4. Define long term pricing strategy	8
6.5. Quantify relevant benefit for customer.....	8
6.6. Calculate pricing	8
6.6.1. Non-price listed products/services	8
6.6.2. Price listed products/services.....	9
6.7. Define applicable premium and discount.....	10
6.8. Record and communicate prices	10
7. Periodical price list reviews	11
7.1. Collect required available info	11
7.2. Identify items to be included/excluded.....	11
7.3. Update pricing data, costs and margins	11
7.4. Evaluate and propose GLP changes.....	12
7.5. Review and update regional pricing components.....	12
7.6. Review applicable premium and discount	13
7.7. Record and communicate prices	13
7.8. Periodical price review frequency.....	13
8. Combine BL products & services pricing	14
8.1. Collect all already available info	14
8.2. Calculate end-customer price.....	14
8.3. Agree end-customer price and discounts	14
8.4. Record and communicate prices	14

Figure 4: Pricing instructions for BL C3 – Table of Contents

The BL C3 Pricing Instruction, shown in Figure 4, offers a thorough overview of different pricing variations and encompasses instructions for the GQS CTO (Configure To Order) Pricing Process, which is under review in the Current State Analysis.

3.2.1 Commercial Component Product Hierarchy

The Commercial Component Product Hierarchy comprises common materials utilized across multiple products of the Case Company. According to data from Power BI reporting and the Pricing System extract, this hierarchy encompasses approximately 53,000 items. Of these, 23% are included on the valid GLP list.

In terms of volume, the Commercial Component hierarchy accounted for roughly 3% of the total Business Line C3's order intake for the year 2023.

To illustrate the quantity of commercial components in the GQS queue (GQS CTO Pricing Process) and the time spent on them, the Table 4 below has been created based on throughput times and the number of tickets.

Table 4. Percentual volume of Commercial Components

Material Type	GQS Tickets	GQS Time Spent	Tactical Sourcing portion of tickets
Commercial Components	12,88%	12,69%	20,13%
BL C3 Components	100%	100%	24,80%

As illustrated in Table 4, commercial components constitute over a tenth (12.88%) of the GQS tickets in terms of the whole Business Line volume.

3.2.2 Process Overview

The GQS CTO Pricing Process under discussion is exclusively dedicated to managing commercial component CTO case tickets that originate from the Quote and Order Management system, as illustrated in Figure 5, Market and Sell Process.

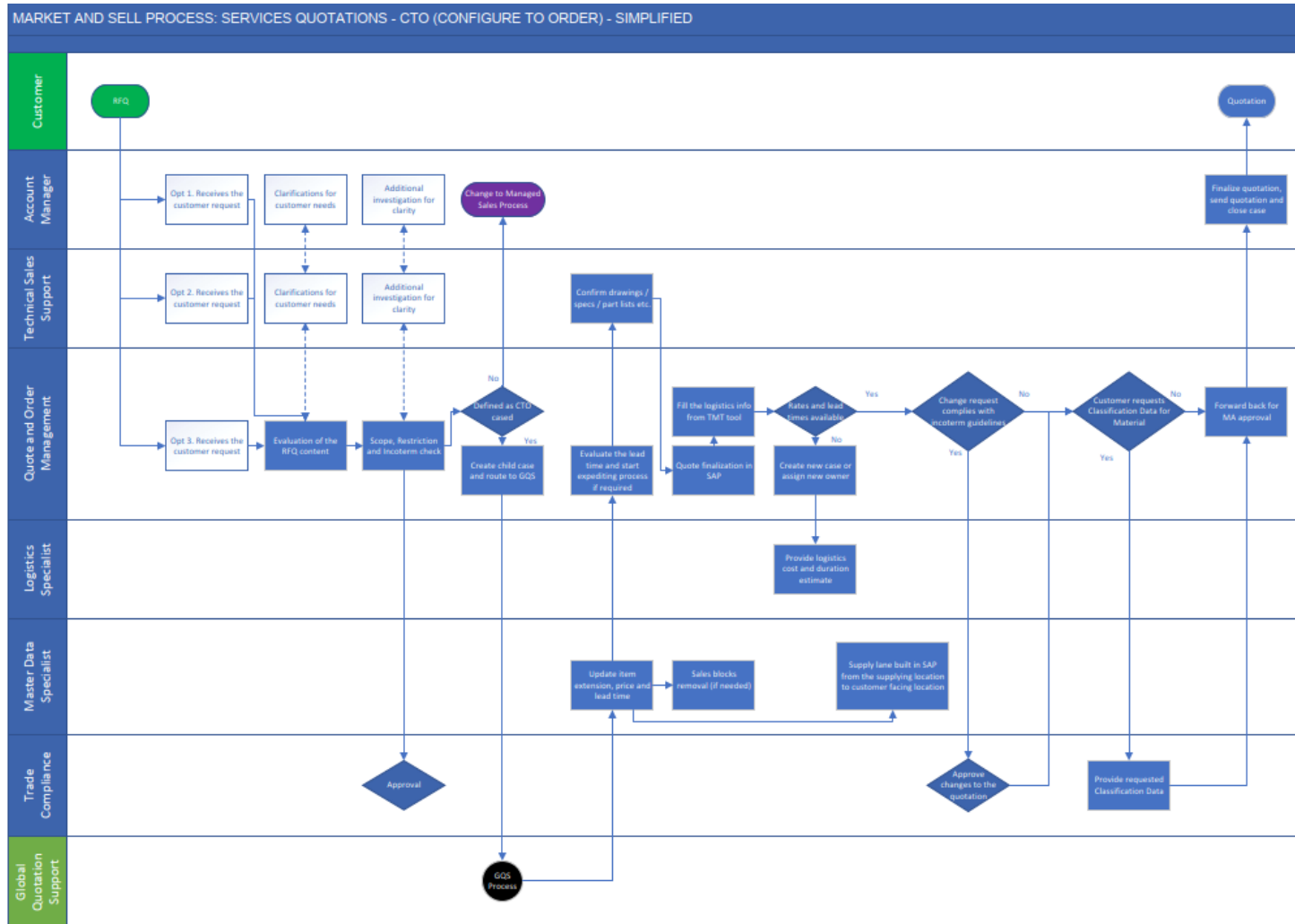


Figure 5: Market and Sell Process

The Pricing Process in question, known as the GQS CTO Pricing Process, is specifically designed to accommodate CTO items. The process in question is directed from the bottom of Figure 5 to a more detailed subprocess.

The GQS CTO Pricing Process, shown in Figure 6, is initiated once the Quote and Order Management identifies a sales opportunity as a CTO case and issues a ticket to the GQS team via Salesforce.

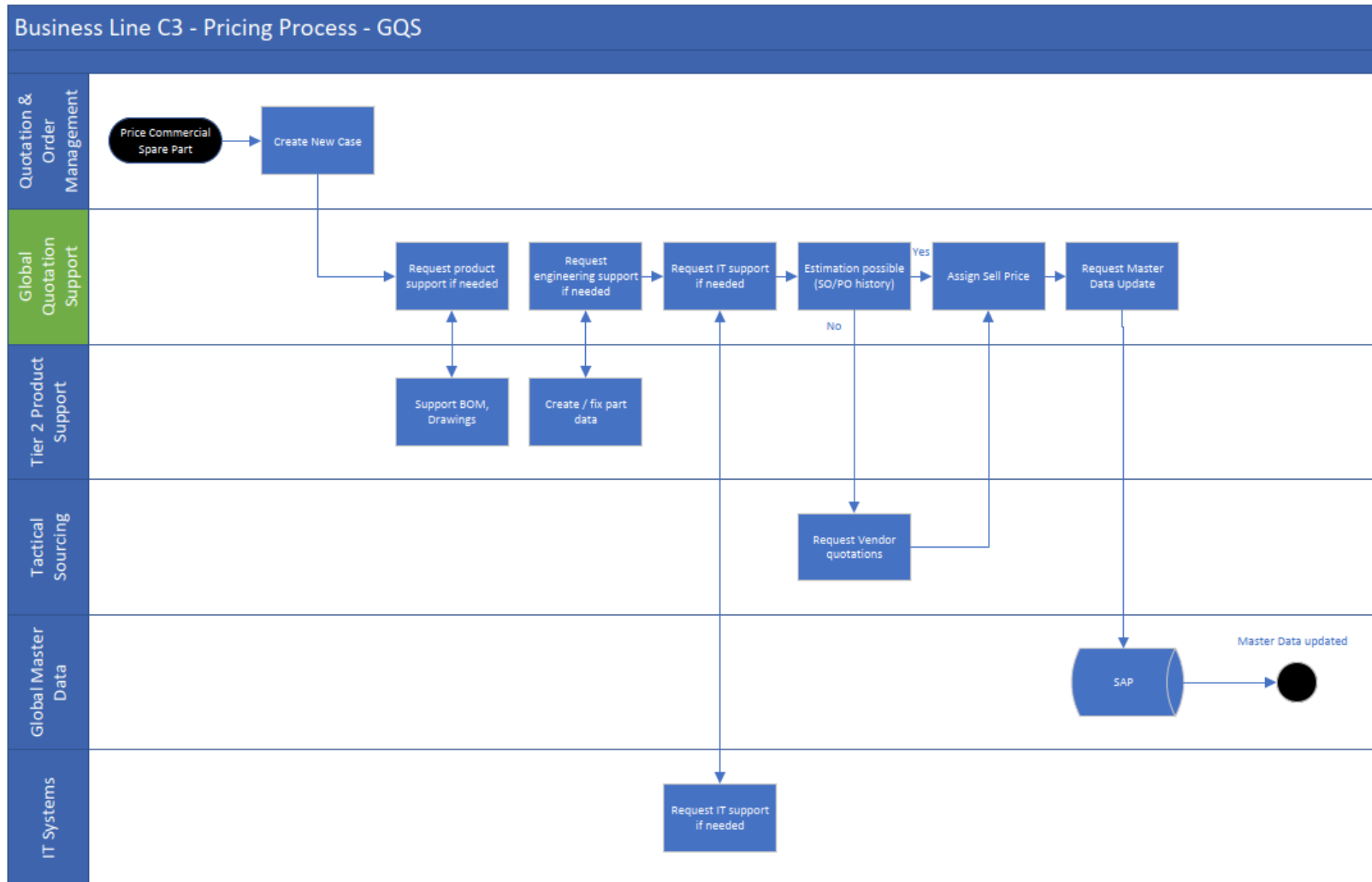


Figure 6: Simplified GQS Pricing Process

The initial phases of the GQS Pricing Process, outlined in Figure 6, involve verifying the scope of requested spare parts items. This includes assistance in itemizing items, when necessary, as well as ensuring that the item parameters are accurately set to show the item is active in the system, and that the required plant level extensions are properly established in the ERP (SAP) system. Furthermore, the history of purchase orders is carefully reviewed to verify the accuracy of cost information. Should there be an absence of valid cost data for the item, Tactical Sourcing is approached to ascertain the latest vendor price levels, ensuring that the pricing process is based on the most accurate and current cost information available.

After the cost validation, the item is priced within the pricing system by determining the Global List Price (GLP). This process step begins with selecting the correct product family, a critical step because the chosen product family includes predefined pricing keys. These keys include the actual price formulas necessary for establishing the GLP. The application of these formulas is vital for ensuring that the item portfolio within the same product family aligns with the product manager's pricing strategy and logic. This alignment is key to maintaining consistency and coherence in pricing across the company's product range.

Exceptions to the standard pricing procedure arise, for example, when specific item price levels are surpassed or when sensitivity factors outlined in the pricing instructions are triggered. Under these circumstances, it becomes obligatory to consult with the Product Manager to secure the correct margin. Consequently, items meeting these criteria must be clearly excluded from any pricing family group. Implementing these protocols guarantees that pricing strategies are adaptable and attuned to the distinct attributes and market conditions of items that are either of high value or subject to particular sensitivities. This approach ensures a tailored and strategic pricing methodology that accounts for the complexities and nuances of various product categories.

With the GLP determined, it is possible to simulate and establish a Market Area List Price (MALP) in the relevant local currency. This step enables the adjustment of prices to suit specific market conditions effectively.

The concluding steps of the process, culminating in the ticket's closure, involve the maintenance, facilitation, and unblocking of materials in SAP. This includes extending the item to the necessary supply chain routes and supplementing any missing information in SAP. These actions ensure that the item is fully integrated and operational within the supply chain framework, allowing for seamless transaction and distribution processes. By addressing these final aspects, the process not only finalizes the pricing and product setup but also ensures that the product is ready for sale and distribution, effectively closing the loop on the item's pricing and logistical setup.

This methodical approach guarantees a strategic and systematic alignment of pricing, along with the coordinated upload of price and data for quoted items. This ensures that all aspects of the pricing strategy are consistently implemented across the supply chain, enhancing efficiency and accuracy in the company's pricing operations and coherence in pricing across the company's product range.

3.2.3 Pricing Procedures in BL C3

Within BL C3, numerous exceptional cases concerning spare part pricing necessitate distinct approaches. These approaches vary based on the case's position within the flowchart and the specific actions required for individual item pricing. Figure 7 portrays a streamlined depiction of the primary process flows commonly encountered in these scenarios.

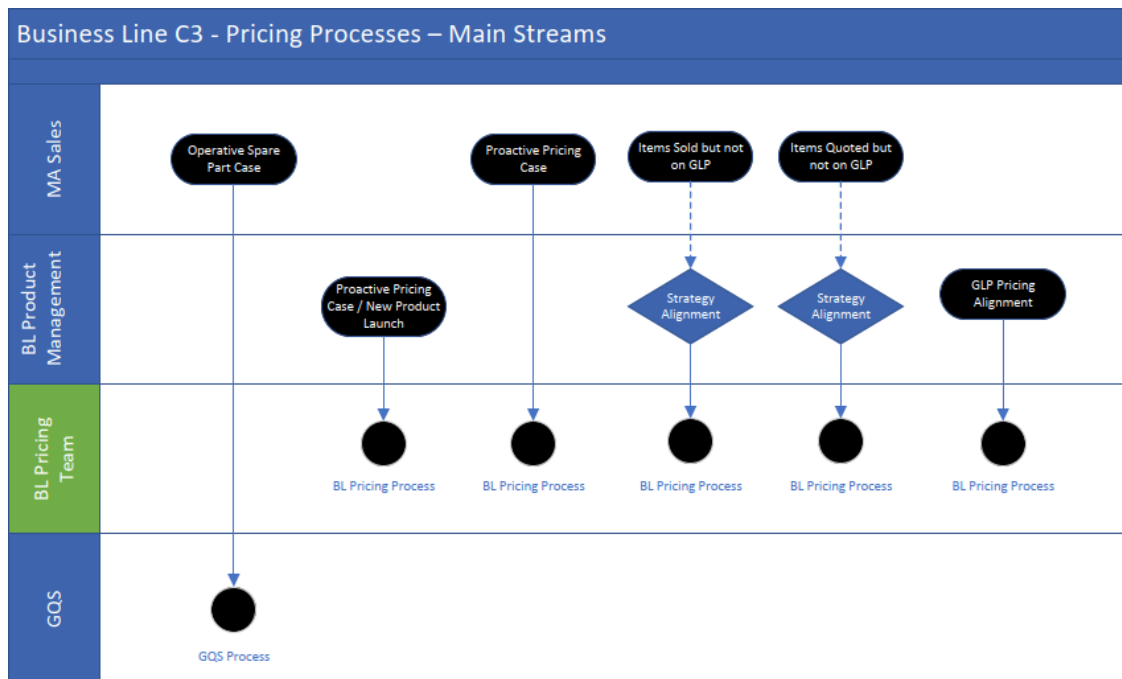


Figure 7: Pricing Streams of BL C3 – Simplified

The bulk of operational pricing inquiries are routed to the operative spare part pricing stream, adhering to the GQS (Global Quotation Support) process depicted in Figure 7.

The forthcoming section provides a comprehensive overview of the sales process, with a particular emphasis on detailing the GQS process, which was the central subject of the analysis of the current state within the Case Company.

3.2.4 Pricing Ownership at the Case Company

To thoroughly understand the results of the current state analysis, it is essential to first examine the structure of pricing and ownership within the Case Company, as detailed in Figure 8. This is followed by a detailed overview of the existing pricing processes, principles, and strategies.

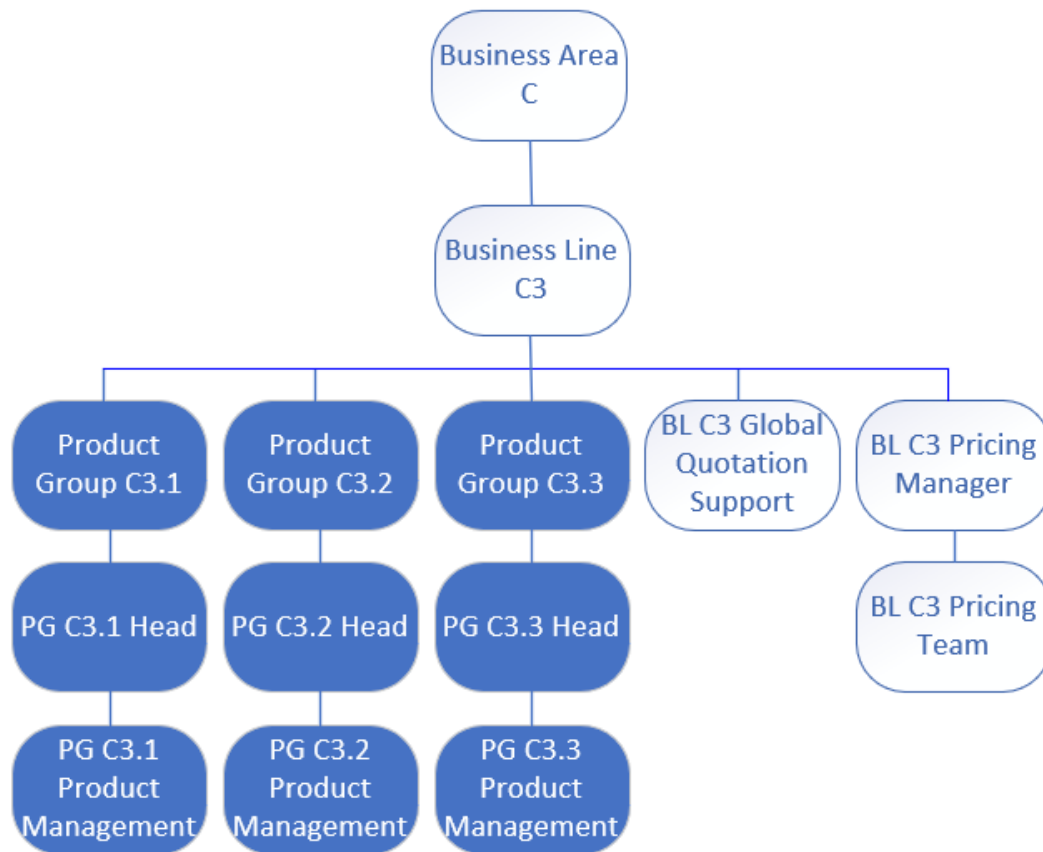


Figure 8: Pricing ownership of the Case Company and BL C3

Pricing ownership is centralized inside the BL at the Case Company. The pricing ownership at the Case Company is illustrated by Figure 8, which shows in a simplified way how the pricing ownership and responsibility is held within the company's BL.

The responsibility for pricing decisions rests with the Product Groups of the Business Line, each tasked with overseeing a distinct product segment and accountable for its profit and loss outcomes. Within BL C3, a specialized Pricing Team (BL C3 Pricing Team) exists to assist product management with pricing strategies. This team operates under the guidance of the Pricing Manager.

Within the BL C3, the ownership of pricing is distributed as follows: The Head of the Product Group sets the target margins for the products within the Product Group. The Product Manager formulates the pricing guidelines, categorizes products, and devises strategies for the product portfolio. The Pricing Manager offers support by facilitating processes, providing tools, and assisting with the generation of insightful PBI (Power BI) reports. The BL Pricing Team actively offers support, undertakes data cleansing activities, and is responsible for the development and maintenance of BL-specific reporting.

Market Areas and other stakeholders contribute important information regarding market price levels and customer feedback to the BL decision-makers.

However, the BL retains ultimate authority over pricing decisions, ensuring that final pricing strategies align with overarching business objectives and market dynamics.

The Case Company designates its (baseline) price index as the Global List Price (GLP), with each BL determining the GLP based on financial objectives. The GLP undergoes adjustments to formulate the Market Area List Price (MALP) for individual market areas (MAs). These adjustments are influenced by factors such as local pricing, competitive landscape, exchange rates, and product availability. For instance, if the price level in a specific MA needs differentiation from the GLP, the MALP might be reduced accordingly.

The BL is responsible for setting both GLPs and MALPs. The Case Company has established an approval grid that allows the MA sales personnel to apply a maximum discount of 5% on the GLP for a duration of up to six months, known as the discount approval grid. Should the discount exceed this threshold, BL authorization is required. This structured approach in Figure 7 delineates the decision-making hierarchy and underpins the governance of pricing authority within the company.

3.3 Analysis of the Current Pricing Process Strengths and Weaknesses

During the interviews, the greatest strength identified in the existing Pricing Process was evidently the process's ability to handle large volumes of items throughout the process. The existing pricing logics were clear and easily understandable for the stakeholders involved, and the existing historical sales and purchasing data were readily accessible when available.

Regarding the existing process flow chart and specifically concerning the commercial component product family, the process was perceived as generic but very understandable. In total, 14 different strengths were identified during the interviews (Table 5).

Table 5. Identified Strengths

Description
Product Management support channel and ability to respond to approvals.
Improved PBI reporting - easier to make decisions on pricing levels.
GQS and BL Pricing team handle the pricing masses well.
Quarterly GLP reviews - Ability to maintain the overall price levels.
Pricing Process effectively tackles a large mass of quotations.
Pricing System has valuable historical data inside of it.
Historical purchasing data is easy to access.
Existing, well-operating pricing rules in the Pricing System are easy and efficient.
Tactical sourcing cooperation works well.
Employees handling the pricing tasks are experienced and knowledgeable.
Tactical sourcing function is operating well and reducing workload from GQS.
Normal cases are rapidly executed from request to quotation.
Support from the BL contacts is reliable.
GQS prices and delivery time information are correct and trustworthy.

During phase 1 of the data, both strengths, according to Table 5 and weaknesses, according to Table 6 were identified. Regarding the identification of areas for development, a total of 30 weaknesses were observed.

Table 6. Identified Weaknesses

Description
Pricing logic for commercial components would require more resources.
MA price level tool does not exist. Additional communication and reviews are needed.
Legacy company pricing logics differ - there is too much variety and complexity.
There is no visibility or ability to focus on impact analysis.
General level strategy and ownership are missing for commercial components.
Cost information requires extensive investigation.
Commercial component families are disorganized.
Replacement cases deviate and require additional tickets for tactical sourcing.
Approval and price estimating limits are undocumented.
Feedback and impact reports are missing.
GQS approval and estimating limits are unclear.
Job roles within the process are unclear (PM has many additional tasks).
There is no room for unconventional pricing cases (GQS members are on their own to resolve responsibilities).
There are too many and overly complicated price rules.
No market level price indication tool is available.
Harmonized and simplified pricing logics need to be documented and implemented in the systems.
Defining the correct family group for items without history is challenging.
Required initial data from the ticket is sometimes missing or insufficient
Complexity arises when choosing the right supplier cost information
Expired item prices and price rules are problematic
Material BOM and master data opening take time
The systems lack the ability to price individual MA price levels for commercial components
There are no tools to evaluate local market prices for commercial components
Long process cycle times are a problem, particularly in item identification
Price validity check process is missing
There is uncertainty in choosing the correct pricing family in the Pricing System
There is inflexibility in producing individual MALP prices based on local price ranges
GQS has no ability to impact prices despite having the latest cost intelligence from the quotations
GQS lacks authority to transfer prices to GLP - the same item can be triggered 5 times in a year
Line-level price changes sometimes require a new quotation from sales if there are significant increases.

The variety and complexity of the commercial component family make it challenging to provide a more detailed process description. All interviewees agreed that while large volumes are processed quickly, the process encounters difficulties and bottlenecks with more challenging materials, which cause many of the weaknesses listed in Table 6.

The biggest weaknesses were identified in parts of the process where additional information, confirmation, or support was needed. Especially in the selection of the correct product family for the material, in obtaining quick cost information, or in receiving authorization to override the outdated pricing information.

The summarized results of the Current Pricing Process and Internal Pricing Needs are detailed in Table 7, which provides a categorized listing of the identified strengths and weaknesses.

Table 7. Summary of Strengths and Weaknesses

S / W	Description
Strength	Product Management support channel and ability to respond to approvals.
Strength	Improved PBI reporting - easier to make decisions on pricing levels.
Strength	GQS and BL Pricing team handle the pricing masses well.
Strength	Quarterly GLP reviews - Ability to maintain the overall price levels.
Strength	Pricing Process effectively tackles a large mass of quotations.
Strength	Pricing System has valuable historical data inside of it.
Strength	Historical purchasing data is easy to access.
Strength	Existing, well-operating pricing rules in the Pricing System are easy and efficient.
Strength	Tactical sourcing cooperation works well.
Strength	Employees handling the pricing tasks are experienced and knowledgeable.
Strength	Tactical sourcing function is operating well and reducing workload from GQS.
Strength	Normal cases are rapidly executed from request to quotation.
Strength	Support from the BL contacts is reliable.
Strength	GQS prices and delivery time information are correct and trustworthy.
Weakness	Pricing logic for commercial components would require more resources.
Weakness	MA price level tool does not exist. Additional communication and reviews are needed.
Weakness	Legacy company pricing logics differ - there is too much variety and complexity.
Weakness	There is no visibility or ability to focus on impact analysis.
Weakness	General level strategy and ownership are missing for commercial components.
Weakness	Cost information requires extensive investigation.
Weakness	Commercial component families are disorganized.
Weakness	Replacement cases deviate and require additional tickets for tactical sourcing.
Weakness	Approval and price estimating limits are undocumented.
Weakness	Feedback and impact reports are missing.
Weakness	GQS approval and estimating limits are unclear.
Weakness	Job roles within the process are unclear (PM has many additional tasks).
Weakness	There is no room for unconventional pricing cases (GQS members are on their own to resolve responsibilities).
Weakness	There are too many and overly complicated price rules.
Weakness	No market level price indication tool is available.
Weakness	Harmonized and simplified pricing logics need to be documented and implemented in the systems.
Weakness	Defining the correct family group for items without history is challenging.
Weakness	Required initial data from the ticket is sometimes missing or insufficient
Weakness	Complexity arises when choosing the right supplier cost information
Weakness	Expired item prices and price rules are problematic
Weakness	Material BOM and master data opening take time
Weakness	The systems lack the ability to price individual MA price levels for commercial components
Weakness	There are no tools to evaluate local market prices for commercial components
Weakness	Long process cycle times are a problem, particularly in item identification
Weakness	Price validity check process is missing
Weakness	There is uncertainty in choosing the correct pricing family in the Pricing System
Weakness	There is inflexibility in producing individual MALP prices based on local price ranges
Weakness	GQS has no ability to impact prices despite having the latest cost intelligence from the quotations
Weakness	GQS lacks authority to transfer prices to GLP - the same item can be triggered 5 times in a year
Weakness	Line-level price changes sometimes require a new quotation from sales if there are significant increases.

Strengths and weaknesses gathered from the interviews were consolidated under similar headings in Table 7 to streamline the list and make it more concise.

3.4 Analysis of Internal Pricing Needs

The most significant internal need identified during the Data 1 stage was the clarification of roles and the optimization of process flows for the most challenging items. The semi-structured nature of these interviews facilitated the identification of other internal needs. Recognized as critical areas for improvement, these needs will be addressed and further developed beyond the scope of this thesis. Based on the stakeholder interviews, the internal pricing needs of the organization can be categorized as follows:

- The organization requires a clear definition of roles and responsibilities, particularly for Product Managers and GQS Coordinators, who currently face an unsustainable number of tasks and case tickets. Additional resources and support are needed, especially for the GQS, to effectively utilize cost intelligence in pricing decisions.
- There is a need for a general-level strategy for pricing commercial components, with clearly defined ownership to streamline decision-making and enhance the authority of GQS in transferring prices to GLP.
- The complexity arising from various legacy pricing logics indicates a need for a unified and simplified pricing system that is easy to understand and apply across different cases, thereby reducing complexity and cycle times.
- Undocumented approval and price estimating limits should be formally recorded. Harmonized and simplified pricing logics must be properly documented and integrated into existing systems to prevent deviations and ensure consistency.
- There is a need for organized and accessible data management for commercial component families. Visibility and analytical capabilities are essential for focusing on impact analysis and adjusting pricing strategies accordingly.
- The organization requires advanced tools for evaluating local market prices, which include developing a tool to handle individual MALP levels and introducing systems to manage expired item prices and price rules.
- There's a need for mechanisms that facilitate communication and review processes for MA price levels, ensuring alignment with market conditions and strategic goals.

3.5 Summary of the Current Pricing Processes and Internal Pricing needs

The identified weaknesses were further analysed and organized based on their thematic relevance and similarity. This organization process led to the formation of distinct categories that encapsulated the identified weaknesses. These categories, together with the identified strengths, are outlined in Table 8.

Table 8. Categories of Strengths and Weaknesses

S / W	Category	Description
Weakness	Roles and Responsibilities	Job roles within the process are unclear (PM has many additional tasks).
Weakness	Roles and Responsibilities	Pricing logic for commercial components would require more resources.
Weakness	Roles and Responsibilities	General level strategy and ownership are missing for commercial components.
Weakness	Roles and Responsibilities	GQS has no ability to impact prices despite having the latest cost intelligence from the quotations
Weakness	Roles and Responsibilities	GQS lacks authority to transfer prices to GLP - the same item can be triggered 5 times in a year
Weakness	Roles and Responsibilities	GQS approval and estimating limits are unclear.
Weakness	Roles and Responsibilities	There is no room for unconventional pricing cases (GQS members are on their own to resolve responsibilities).
Weakness	Process Reengineering	Approval and price estimating limits are undocumented.
Weakness	Process Reengineering	Legacy company pricing logics differ - there is too much variety and complexity.
Weakness	Process Reengineering	Price validity check process is missing
Weakness	Process Reengineering	There are too many and overly complicated price rules.
Weakness	Process Reengineering	Complexity arises when choosing the right supplier cost information
Weakness	Process Reengineering	Required initial data from the ticket is sometimes missing or insufficient
Weakness	Process Reengineering	Long process cycle times are a problem, particularly in item identification
Weakness	Process Reengineering	Defining the correct family group for items without history is challenging.
Weakness	Process Reengineering	Replacement cases deviate and require additional tickets for tactical sourcing.
Weakness	Process Reengineering	Commercial component families are disorganized.
Weakness	Process Reengineering	Harmonized and simplified pricing logics need to be documented and implemented in the systems.
Weakness	Process Reengineering	There is uncertainty in choosing the correct pricing family in the Pricing System
Weakness	Process Reengineering	The systems lack the ability to price individual MA price levels for commercial components
Weakness	Process Reengineering	Feedback and impact reports are missing.
Weakness	Process Reengineering	There are no tools to evaluate local market prices for commercial components
Weakness	Process Reengineering	No market level price indication tool is available.
Weakness	Process Reengineering	Expired item prices and price rules are problematic
Weakness	Process Reengineering	Line-level price changes sometimes require a new quotation from sales if there are significant increases.
Weakness	Process Reengineering	There is inflexibility in producing individual MALP prices based on local price ranges
Weakness	Process Reengineering	Material BOM and master data opening take time
Weakness	Process Reengineering	Cost information requires extensive investigation.
Weakness	Process Reengineering	There is no visibility or ability to focus on impact analysis.
Weakness	Process Reengineering	MA price level tool does not exist. Additional communication and reviews are needed.
Strength	Strength	GQS prices and delivery time information are correct and trustworthy.
Strength	Strength	Employees handling the pricing tasks are experienced and knowledgeable.
Strength	Strength	Support from the BL contacts is reliable.
Strength	Strength	Normal cases are rapidly executed from request to quotation.
Strength	Strength	Tactical sourcing function is operating well and reducing workload from GQS.
Strength	Strength	Pricing Process effectively tackles a large mass of quotations.
Strength	Strength	Pricing System has valuable historical data inside of it.
Strength	Strength	GQS and BL Pricing team handle the pricing masses well.
Strength	Strength	Product Management support channel and ability to respond to approvals.
Strength	Strength	Improved PBI reporting - easier to make decisions on pricing levels.
Strength	Strength	Quarterly GLP reviews - Ability to maintain the overall price levels.
Strength	Strength	Historical purchasing data is easy to access.
Strength	Strength	Existing, well-operating pricing rules in the Pricing System are easy and efficient.
Strength	Strength	Tactical sourcing cooperation works well.

As detailed in Table 8, the foremost category is "Roles and Responsibilities", which impacts numerous other process-related weaknesses. Following this, the "Process Reengineering" category encompasses a wide array of weaknesses related to instructions, communication, and system issues.

In summary, the internal pricing needs are focused on creating a more structured, transparent, and responsive pricing process. This involves clear roles, unified strategies, integrated systems, better data management, sophisticated tools for market responsiveness, and robust communication channels. Addressing these needs will lead to a more agile, precise, and competitive pricing capability within the organization.

The focus on "Roles and Responsibilities" was selected as the pivotal area because addressing these issues is essential for the implementation of further improvements. Moreover, resolving roles and responsibilities will aid in mitigating other identified weaknesses, thus streamlining the Pricing Process, and enhancing overall efficiency.

In the following section, improvement ideas and the Conceptual Framework will be explored through the literature. The search will focus exclusively on the "Roles and Responsibilities" weakness identified in the section 3.

4 Ideas for Improving Material Pricing Process from Literature

This section initially outlines and examines the basics of processes and solution models, broadly speaking. Subsequently, it outlines strategies based on literature insights to address challenges identified in the Current State Analysis. The discussions in these segments cover several key areas: Pricing Process, Process Solution Model, Clarifying Roles and Responsibilities, and offering examples of DMAIC (Define, Measure, Analyze, Improve, Control) process tools. The final part of this section consolidates the insights from the literature into a visual representation in the Conceptual Framework.

4.1 Pricing Process

A process means progress. Processes involve creating a set of logically related activities, resources or actions that produce a desired outcome. Implementing these requires a set of inputs, which are transformed into outputs.

Smith (2016: 2) states that pricing is a continual process and pricing cannot be done in isolation. The decisions in pricing affect every part of the organization. They shape how the firm competes with its rivals. Viewing pricing as a process necessitates its definition. This process should consistently and reliably facilitate pricing decisions that are the most effective possible, given the information that can be cost-effectively collected within the necessary timeframe. Pricing is a cross-functional activity that capitalizes on the expertise of pricing professionals to bring analytical precision to insights and information obtained from sales, marketing, finance, and other key senior executives within the company.

According to Laamanen & Tinnilä (2009:102), processes delivering direct value to external customers are called 'core processes' or 'business processes'. With these processes, it is characteristic that the products and service are delivered to external customers. In this thesis, the business process represents the situation depicted in Figure 5, in section 3.2.3 and the outcome is the spare part quotation received by the customer.

Processes which enable these customer value bringing processes are called 'support processes'. If a large process needs to be split into smaller processes instead of activities, these are called 'subprocesses' as the GQS process, presented in Figure 6.

'Process description' presents the critical activities and other definitions that are important for an understanding of the process. A process description, often called a process chart, also includes a graphic presentation of the activities, information flows (persons involved and their roles). Sometimes the term 'flowchart' is used, in which often only the activities and information flows are presented. (Laamanen & Tinnilä 2009:102.)

4.2 Process Solution Model

"The process improvement methodology works within the framework of an established quality management system (QMS). There are many types of QMSs that are in place today, unique to different industries, for example, ISO 9001 for a business/service organization. Two of the components of a robust QMS are corrective and preventive action (CAPA) and continuous improvement (CI) that are driven by analysis of data. There are many types of continuous improvement methodologies, such as: Plan–do–check–act (PDCA) methodology, Lean manufacturing principles or Toyota Production System (TPS) implemented through kaizen and Six Sigma implemented through Define–Measure–Analyze–Improve–Control (DMAIC)". (Shankar 2009:19.)

In this thesis, the DMAIC methodology has been chosen as the development framework because it provides a systematic, data-driven approach to identifying and addressing inefficiencies, thereby ensuring continuous improvement in the process. DMAIC fosters a culture of continuous improvement and quality enhancement, closely aligning with Lean principles to eliminate waste and increase efficiency. Its adaptability across various industries and processes further establishes it as a versatile tool for achieving operational excellence and enhancing customer satisfaction.

4.2.1 DMAIC Methodology

The Six Sigma methodology selected for the process improvement is the DMAIC methodology. DMAIC stands for Define, Measure, Analyze, Improve and Control, representing a systematic, data-driven approach for optimizing and stabilizing business processes and designs. This methodology addresses identified organizational issues by applying a structured suite of tools and techniques to achieve a sustainable solution. The aim is to significantly reduce or eliminate the problem, thereby enhancing the organization's competitive edge. Figure 9 depicts the DMAIC process.

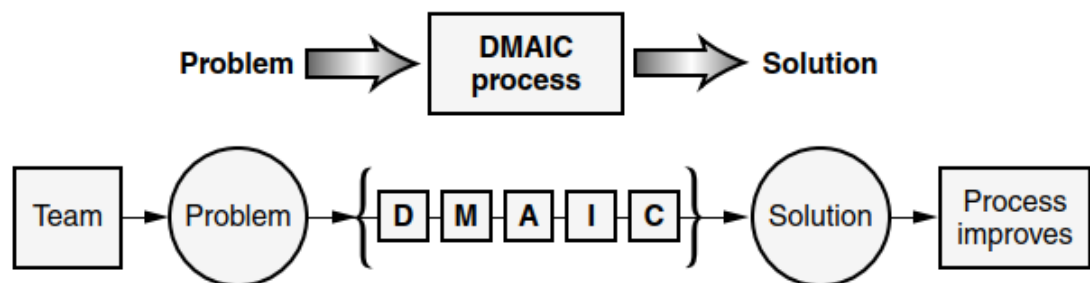


Figure 9: The DMAIC Process (Shankar 2009: 18)

As seen in Figure 9, by navigating the problem through the Define–Measure–Analyze–Improve–Control phases, with a collaborative team effort, the resulting solution effectively targets the root cause.

The Define phase involves identifying the problem or project goals within a specific process. It includes establishing the scope, objectives, and defining team roles and responsibilities. The primary aim is to clarify the issue at hand and understand its impact on business performance.

In the Measure phase, data is collected to establish baseline metrics and quantify the current state of the process. This step is crucial for understanding the extent of the problem by gathering and analyzing relevant data, which helps in measuring the performance of the process accurately.

The Analyze phase is dedicated to examining the data collected in the Measure phase to identify the root causes of defects or inefficiencies within the process. Using statistical tools and analysis, the team dives deep into the data to uncover the underlying reasons for process variations or failures.

After identifying the root causes, the Improve phase focuses on developing and implementing solutions to eliminate these causes. This may involve process redesign, the introduction of new tools, or workflow adjustments to enhance the process's efficiency and effectiveness.

The final phase, Control, ensures the sustainability of the improvements made. It involves monitoring the improved process to ensure that performance remains at the desired level over time. Control measures include setting up control systems, documenting the process, and instituting training for ongoing process management and improvement.

With the help of the DMAIC framework, organizations systematically identify and eliminate inefficiencies and defects, leading to significant improvements in process quality, customer satisfaction, and overall business performance.

4.2.2 Examples of DMAIC tools

The Six Sigma framework, particularly through its DMAIC model, furnishes a comprehensive suite of tools designed for the systematic enhancement and optimization of business processes. Some of these tools are listed below in Figure 10. This methodology emphasizes data-driven decision-making and employs rigorous statistical analysis to identify and eliminate defects, thereby elevating operational efficiency and quality.

Define	Measure	Analyze	Improve	Control
VoC / VoP	MSA (GR&R)	7 Wastes	Brainstorming	SPC
SIPOC	Process Map	Pareto	DoE	Audit
CTQ Tree	Process Capability	ANOVA	RSM	Poke Yoke
SWOT	Sampling	Hypothesis Testing	Pull / Kanban	RACI
QFD	DILO	Correlation	Pugh Matrix	Management System
CoPQ	OEE	Regression	Piloting	Kaizen Team
Kano Model	VSM	FMEA	SMED	Control Plan
Stakeholder Analysis	RTY	5 Whys	...	Tolerancing
Project Charter	...	Ishikawa		...
...		Transfer Function		
		Benchmarking		

Figure 10: Example of DMAIC Process tools (Quick 2019: 1)

Figure 10 lists various DMAIC process improvement tools. Some tools, like Scatter Plots, are utilized later in Section 5 and are described in further detail subsequently.

Scatter plots, available in most spreadsheet software, are valuable for analyzing the relationship between two continuous variables, X (input) and Y (output). They can be useful, as visualized in the scatter plot example, Figure 11.

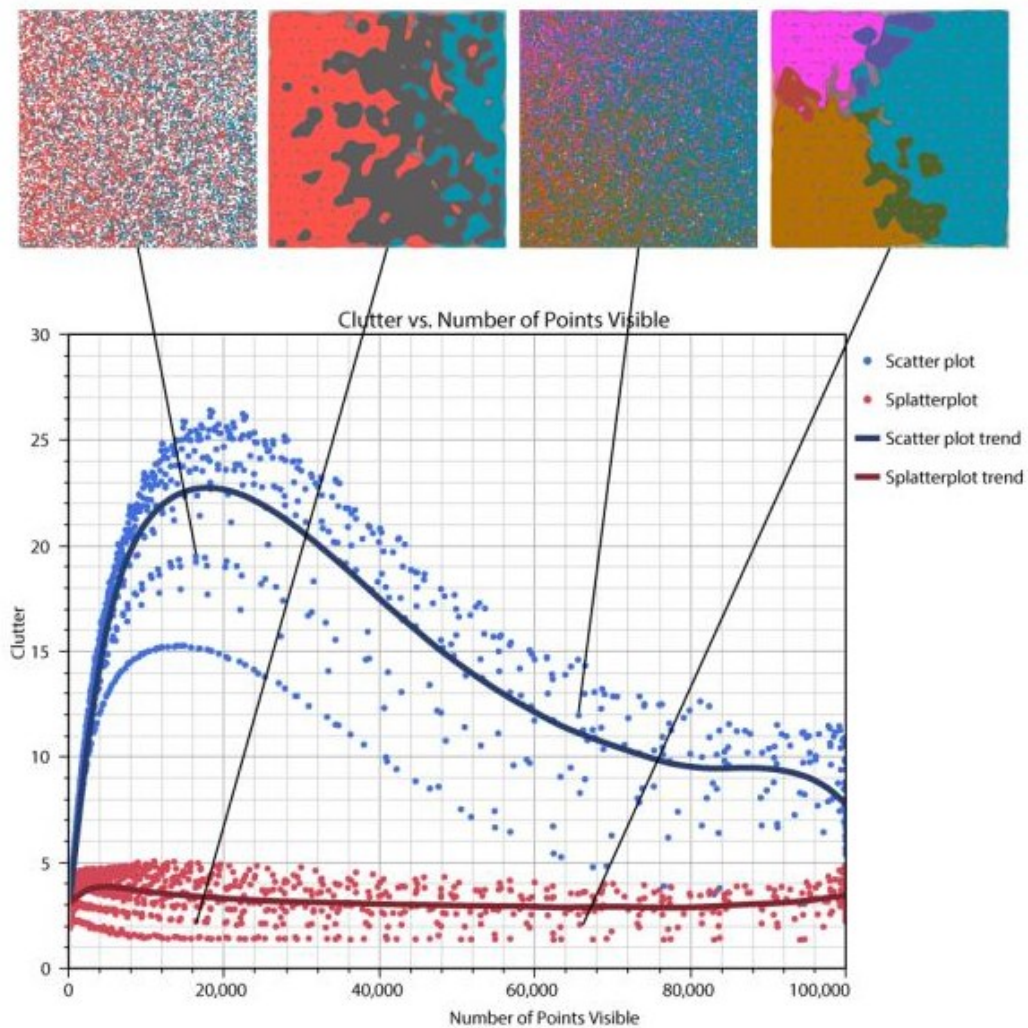


Figure 11: Example of a Scatter Plot (Mayorga & Gleicher 2013)

These plots aid in identifying patterns between X and Y, enhancing our understanding of their relationship. However, observing a pattern, such as a cigar-shaped distribution, does not confirm a root cause; it only suggests a correlation between the two variables, which doesn't necessarily mean one causes the other. Recognizing patterns is a step towards identifying controllable factors that can reduce variation in output.

When patterns appear as cigar-shaped distributions, suggesting a linear relationship, statistical methods like correlation and regression analysis become applicable.

Correlation analysis measures the strength and direction of a linear relationship: positive correlation indicates that Y increases as X increases, negative correlation means Y decreases as X increases, and zero correlation indicates no linear relationship. This analysis is also applicable to ranked data, either discrete or continuous, allowing for the assessment of positive or negative relationships without distortion from outliers or variable distribution. (Sodhi & Sodhi 2008.)

“Responsibility Charting (RACI) is a technique for identifying functional areas where there are process ambiguities, bringing the differences out in the open and resolving them through a cross-functional collaborative effort”. According to Smith et al. (2005: 2), it enables process related discussion and descriptions of the actions that must be accomplished in order to deliver a successful service.

RACI Charts are good practice for establishing standard operating procedures. RACI clarifies the assignment of roles where "R" denotes those who are responsible, "A" indicates accountability, "C" identifies the individuals who require consultation, and "I" designates those who need to be informed.

The individual(s) responsible for completing the task, the “doer(s)” is actually responsible for the action or its implementation. The Responsibility can also be collective one, with the extent of each participant’s responsibility defined by the person designated with the letter A.

The person deemed accountable is the one ultimately answerable for the activity or decision in question. This role includes the authority to give the final “yes” or “no” and holds veto power. It is crucial to note that only one A can be given to an action.

The consult role involves the individual(s) whose input is sought before making a final decision or action. Their advice is deemed necessary and must be solicited as part of the decision-making process.

Finally, the Informed category refers to those who need to be informed after a decision or action is taken. Depending on the decision's implications, they may need to undertake further action in response. (Bicheno & Holweg 2023: 90.)

RACI is not merely a planning tool or a note for documentation; it embodies a mentality for companies to work more efficiently. Cross-functional collaboration between teams is crucial for achieving good results, making RACI an excellent choice for clarifying roles and responsibilities in Improvement Development stage.

A process map is a visual representation that details the steps involved in completing a specific process. It outlines the sequence of actions, decisions, and events from start to finish, providing a clear overview of how a task or procedure unfolds.

Process maps are used across various industries and organizational departments to enhance understanding, identify inefficiencies, and guide process improvement efforts. Key components of a process map include tasks or activities, decision points, inputs and outputs, and the flow of information or materials. Symbols are often used to denote these elements, making it easier to interpret the map at a glance. Laamanen & Tinnilä (2009:102), state that a process map is an aggregate level presentation of the 'business model' and 'revenue logic' of the organisations. A process map can include information concerning the vision of the organisation, along with customer process, and core and support processes. For the Improvement development, process maps provide a visual representation of the process, enabling the identification of inefficiencies, bottlenecks, and opportunities for improvement.

4.3 Pricing Accountability

Nagle et al. (2014) argue that merely having a formal pricing organization does not inherently increase the rigor in the pricing decision-making process. Instead, they advocate for the allocation of formal decision-making authority to managers participating in the pricing strategy. This approach ensures that managers across different levels possess the opportunity to contribute to the decision-making process. Nagle et al. (2014) identify four categories of decision rights, illustrated in Figure 12.

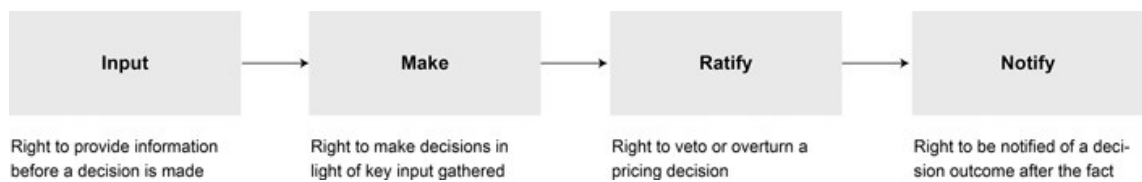


Figure 12: Decision rights in pricing process (Nagle et al., 2014: 165)

Input rights are granted to various managers who are expected to provide information that supports the pricing decision, aiming to collect a diverse range of data from multiple sources to make well-informed decisions.

The 'make' rights should be limited to a select number of individuals or committees, with the goal of establishing clear accountability when pricing decisions are made. This arrangement creates an incentive to adhere to the pricing strategies and choices, ensuring they are implemented effectively.

The 'ratification' rights indicate that senior management has the authority, and is expected to endorse pricing decisions, ensuring they align with the wider organizational goals.

Lastly, the 'notification' rights ensure that members of the organization who will be impacted by the pricing decisions are informed. In practice, the business development function can develop stronger business cases when they have a clear understanding of the pricing function's objectives and direction.

Defining pricing accountabilities is crucial for clarifying roles and responsibilities within the pricing process, ensuring that each stakeholder understands their specific duties and contribution to the overall strategy.

4.4 Clarifying Roles and Responsibilities

Clarifying roles and responsibilities within a business process is a vital step towards ensuring operational effectiveness and accountability. This process involves defining the tasks, decision-making authority, and accountability for each team member involved in the business process.

The objective is to eliminate confusion, overlap in duties, and gaps in the process, thus streamlining operations and improving communication. Once the tasks are clearly defined, they are assigned to individuals, taking into consideration their competencies, experience, and workload. Clear documentation of roles and responsibilities is crucial to ensure everyone understands their specific duties and how they fit into the main process. Clearly defined roles and responsibilities, contributing to individuals' decision rights and organizational roles, will lead to improved performance and outcomes. (Project Management Institute 2021.)

“The way that people are organized into teams, and the way that roles and responsibilities are distributed between teams and individuals, significantly influences the way that an organization performs. There are different approaches, each of which has their own advantages and disadvantages. For example, a structure that is optimized for efficiency will generally be so at the expense of speed and agility in execution”. (Tardieu et al., 2020: 107).

Because the CSA findings indicated a lack of clarity in roles and responsibilities, the Conceptual Framework, which is presented next, was developed within the DMAIC methodology. The tools utilized are described later in Section 5.

4.5 Conceptual Framework

The preceding section detailed the improvement ideas researched in relevant literature and in Figure 13 visually presents these central themes.

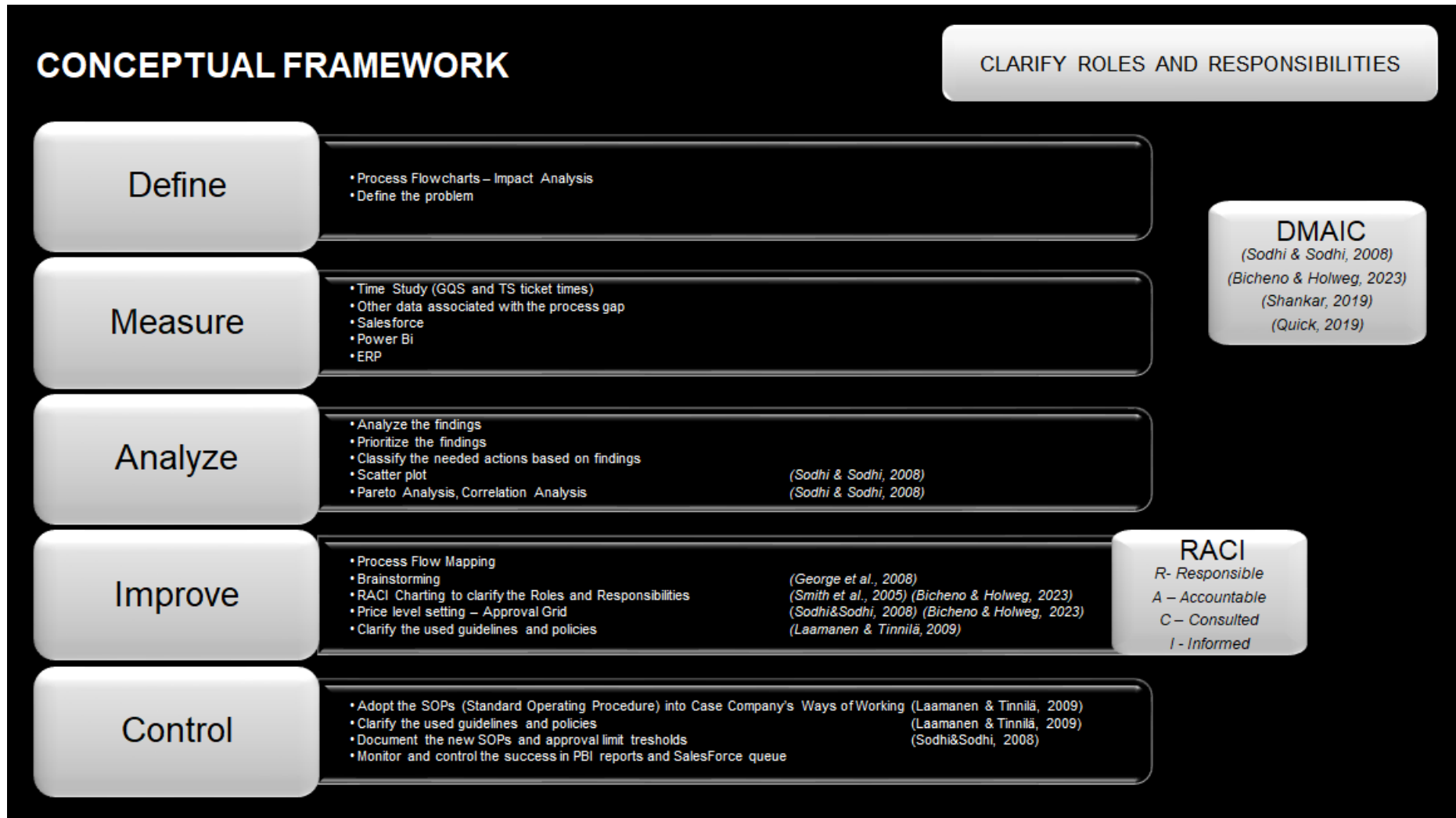


Figure 13: Conceptual Framework

The Conceptual Framework of this thesis is structured around five distinct areas, Define, Measure, Analyze, Improve and Control.

Each step of the Six Sigma DMAIC process improvement methodology functions as a framework for enhancing existing processes and forms the foundation of the Conceptual Framework. Figure 13 illustrates the relationships between the five distinct elements of DMAIC within the Conceptual Framework.

The Define phase ensures the selected process for DMAIC improvement aligns with the organization's priorities and secures management support.

The Measure phase aims to collect foundational data on the process requiring improvement. This phase facilitates a deeper understanding of the process's current state and identifies problem locations.

During the Analyze phase, the team explores cause-and-effect relationships within the process, determining which input factors affect the output. This phase involves refining the collected data by eliminating irrelevant factors, enhancing comprehension of the process, and identifying potential improvement opportunities.

The Improve phase employs tools such as Design of Experiments (DOE) to model relationships, enabling the control of input factors identified in the Analyze phase. This phase aims to apply these insights to enhance the process effectively.

Finally, the Control phase involves implementing controls over all critical input factors that impact the output. Establishing a control plan ensures adherence to continuous improvement principles, maintaining process enhancements even after corrective actions are implemented.

The purpose of the Conceptual Framework is to lay the foundation for improving operational processes within BL. Through the application of the DMAIC phases, this structured approach aims not only to identify and address inefficiencies in the processes but also to implement a culture of continuous improvement within the organization.

In the subsequent section, the Conceptual Framework is employed to develop the Initial Improved Material Pricing Process by targeting the identified strengths and weaknesses within the Current Pricing Process.

5 Developing the Initial Improved Material Pricing Process

This section introduces the collaborative development of the Initial Improved Material Pricing Process, aiming to target the weaknesses found in the Current State Analysis, integrating insights from relevant literature. It outlines the collaborative process, providing a detailed explanation and visual representations of the solutions devised to overcome the identified weaknesses.

5.1 Overview of the Data Stage

The objective of this study was to develop an Improved Material Pricing Process to enable harmonized material pricing in the commercial component context within the Case Company. The collaborative development of the Initial Improved Material Pricing Process was carried out by addressing the roles and responsibilities weakness found in the Current Pricing Process (Figure 6, section 3.2.2), guided by the relevant literature outlined in the Conceptual Framework as well as experiences gathered from working in the Case Company.

The Initial Proposal for the Improved Material Pricing Process was collectively created with key stakeholders in a workshop setting. The workshop session initiated with an introduction to the main topic and a discussion on potential solutions derived from literature, focusing on roles and responsibilities, and examining the current state of process flows and operational guidelines. The recommended tools and strategies were outlined within the Conceptual Framework, with each proposed solution undergoing an individual assessment for its applicability in enhancing roles and responsibilities.

5.2 Developing the Initial Improved Material Pricing Process

Based on the conceptual framework and the findings of the Current State Analysis, the chosen DMAIC development method acted as the framework for development in the workshop. The workflow and selected tools of the workshop are shown in Figure 14.

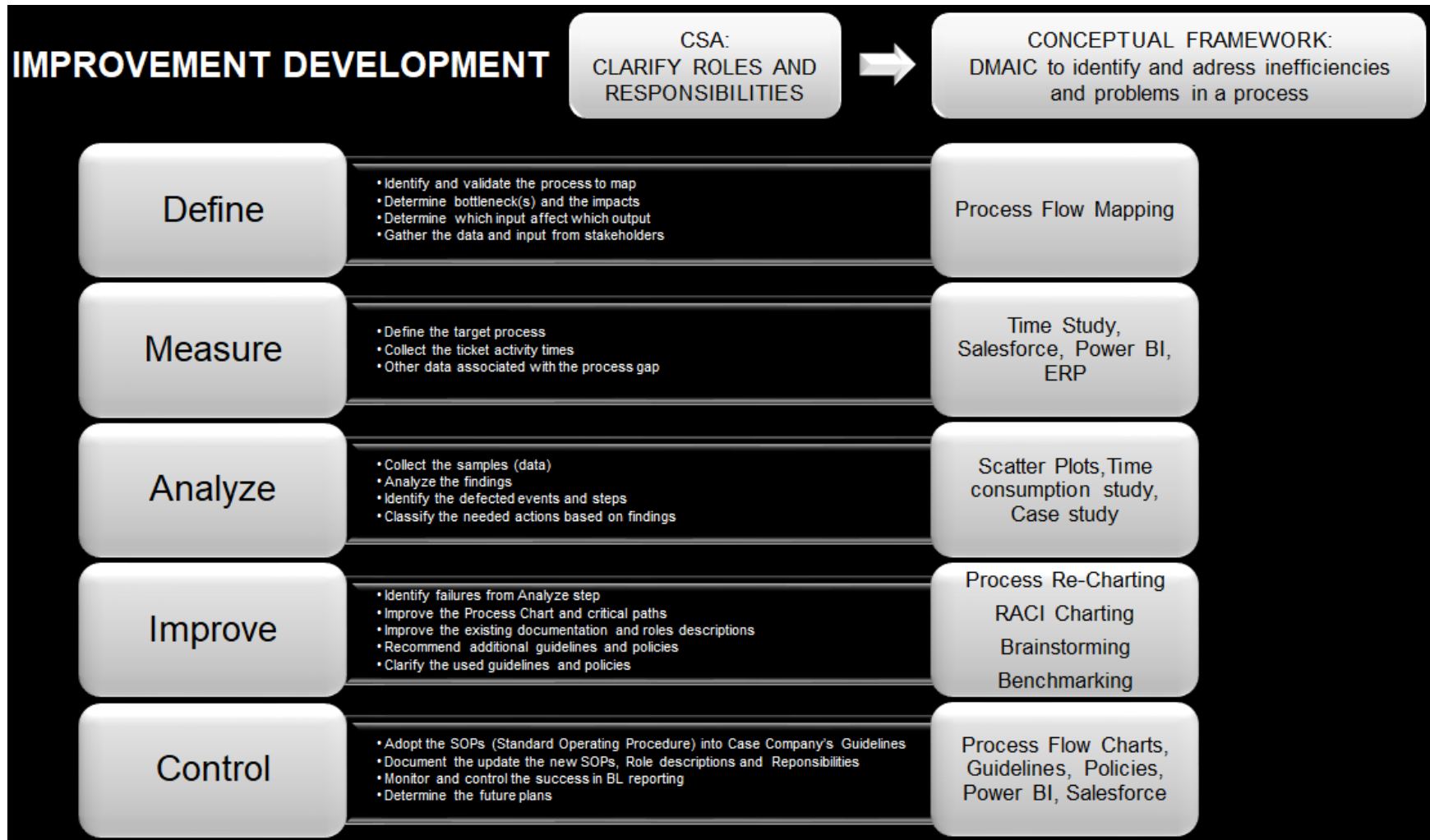


Figure 14: Improvement Development

The Improvement Development workshop was a comprehensive session where the team systematically addressed each aspect of the pricing strategy using the DMAIC methodology as visualized in the Figure 14. In the 'Define' phase, participants engaged in Process Flow Mapping to establish a clear understanding of the current pricing process structure phases. The 'Measure' phase employed techniques like Time Study and data analysis tools from Salesforce, Power BI, and ERP systems to gather quantitative insights into the existing processes, uncovering areas of delay and discrepancy.

As the workshop progressed to the 'Analyze' phase, tools such as Scatter Plots, Time consumption studies, and Case Studies were utilized to delve deeper into the data collected, identifying inefficiencies, and determining the root causes of pricing issues. This analytical groundwork paved the way for the 'Improve' phase, where the pricing strategy was to be recharted. Here, strategies like RACI Charting were used to redefine roles and ensure clarity in responsibilities. Brainstorming sessions and Benchmarking against industry standards fostered creative solutions and aligned the team's efforts with best practices.

Finally, the 'Control' phase aimed to solidify these improvements. New Process Flow Charts, updated Guidelines, and Policies were introduced and monitored through Power BI and Salesforce to ensure that the improvements are sustained and integrated into the daily operations. The workshop focused on both strategic development and tactical implementation, aiming to leave the team with a robust and improved pricing mechanism that is efficient.

5.2.1 Define

The 'Define' phase sets the foundation for the process improvement project by identifying and scoping the problem that requires a solution. According to Sodhi & Sodhi (2008), identifying or defining the defect is crucial because it establishes how we will measure success, and which process we will improve. Moreover, a business operation may be defective in many ways, with various processes or subprocesses contributing to the problem.

Because the problem definition in the Define stage is significantly built on the numerical definition, team members had already collected analytics and materials in advance for the workshop.

The Define phase began with a presentation of the business case, showcasing the findings of the Current State Analysis and analytical data that described the annual number of defects in the process flow.

This was followed by a collective mapping of the process flow to identify and validate the process that needed development. All the main process steps were discussed, and the phases requiring the most urgent improvements were highlighted in the process flow chart, Figure 15.

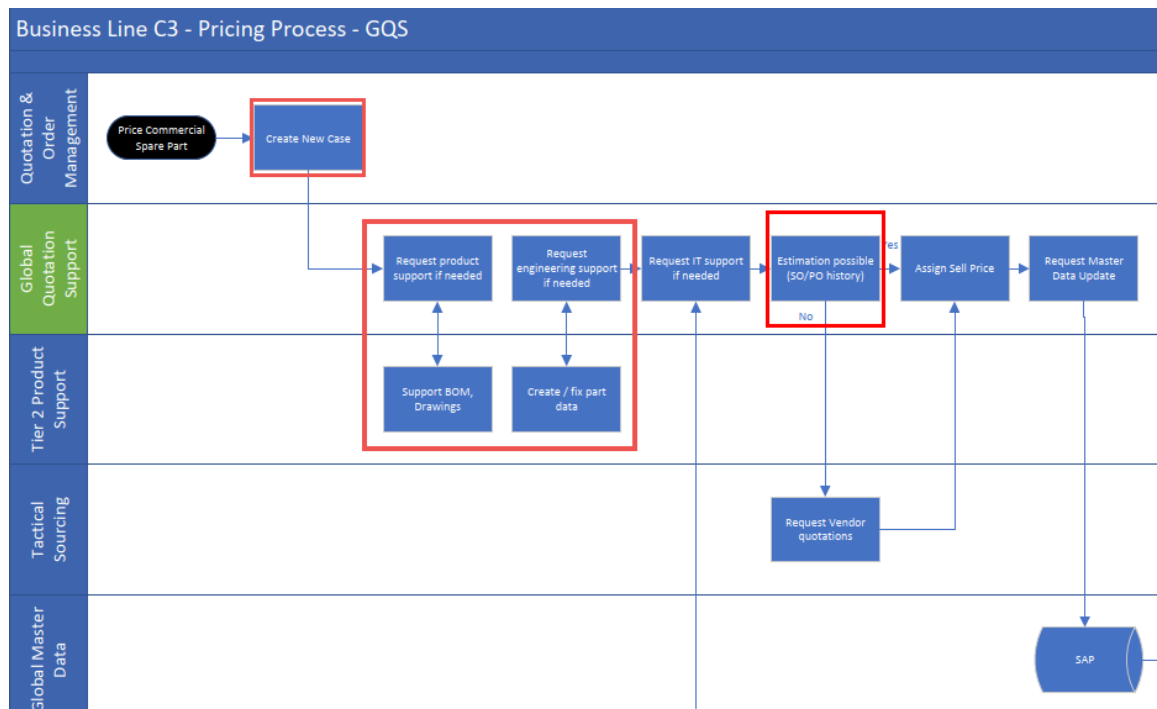


Figure 15: Identified defect steps.

The process steps needing the most improvement, Tier 2 Product Support and cost estimation, are illustrated in Figure 15. Consequently, the team decided to concentrate their tool selection and development actions more on these process steps and these became as a project statement for the next development phases.

The outcome of this phase was the formulation of a problem statement, enriched with numerical data and visualizations of process steps. It established a clear link to business goals, offered an understandable and manageable scope, and clearly stated the estimated benefits.

5.2.2 Measure

Sodhi & Sodhi (2008) state that the Measure phase entails two activities: developing a detailed process map of the 'as-is' process and identifying, collecting, and presenting the data needed for subsequent analysis and the design of controls.

In the Define phase, the necessary data was used to quantify the extent of the problem. Therefore, the process mapping was conducted at a more detailed level to visualize the "as is" status, and a time study to determine the cause of the undesirable variation in the process output, supplemented with some additional supportive data, was presented.

The three greatest defects, as illustrated in Figure 15, were identified in the following steps: "Create New Case," which lacked the necessary item product hierarchy and detailed definition before ticket creation. As the process moved to product and engineering support steps, the question of "who actually constitutes Tier 2 product support" was raised multiple times. Finally, the cost estimation step served as a clear divider, determining whether the case would become a defect.

In the Measure phase, the motivation for collecting data stems from the analysis and design of controls in later project phases, Analyze and Control.

5.2.3 Analyze

“The purpose of the Analyze phase is to identify and understand the reasons for the variation of the output measure and/or ways that this variation can be controlled. Statistics is useful for this analysis but is only a part of this, because there are other ways of identifying reasons for defects” (Sodhi & Sodhi 2008).

The team had pre-emptively downloaded and prepared additional analysis on the ticket activity times for the GQS and Tactical Sourcing teams such as shown in the Figure 16. Furthermore, financial data was gathered to demonstrate the volume and impact of time consumption and defect trends. The team members independently collected their own data from unique sources to decrease the influence of predispositions or partiality.

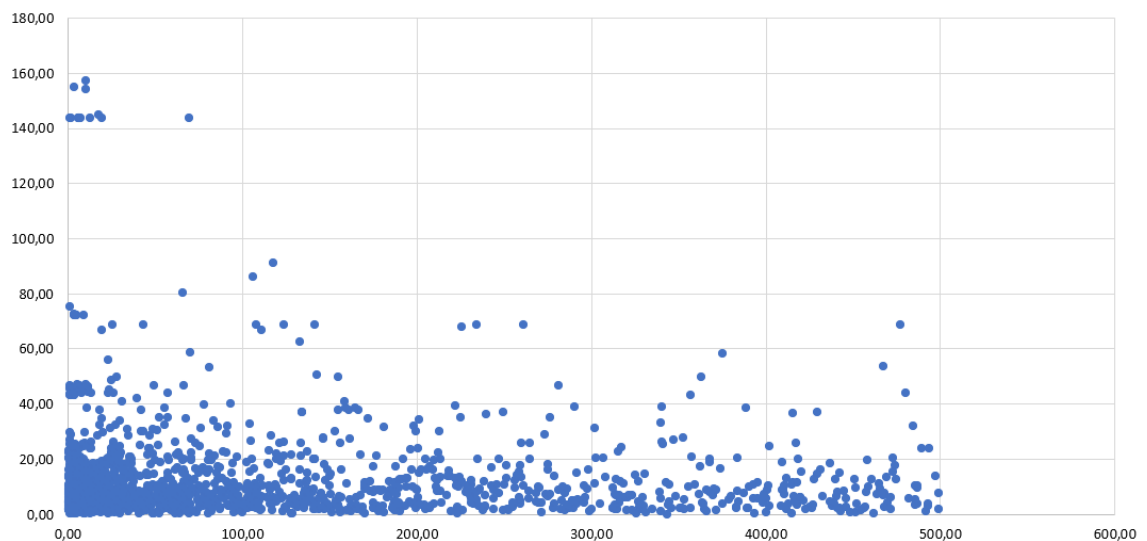


Figure 16: Example of a Scatter Plot

As shown in Figure 16, scatter plots provided an effective means of visualizing the typical item trends in ticket activity times to identify bottlenecks in the activity queue.

Informants F1 and B3 collectively stated that the most time-consuming cases involve replacement item tickets, which require verification to determine if a new item can replace an old, possibly phased-out item.

“In the worst-case scenario, determining whether an item is replaceable and obtaining the supplier quotation and specifications could take ages.” (Informant B3)

“GQS and Tactical Sourcing utilize existing data whenever possible. However, the most time-consuming cases often lack historical data, necessitating the establishment of clearer estimating rules and responsibilities.” (Informant B2)

After completing the process mapping and data collection in the Measure phase, the team was able to conduct data analysis and a partial process analysis. This focus on the defective steps allowed for a deeper understanding of the process failures that result in defective output.

The hypothesis from the Analyze stage was that if we could clarify the roles and responsibilities more accurately in the default steps, as shown in Figure 15, then the overall time and resource consumption would decrease, and the process flow would improve.

5.2.4 Improve

The purpose of the Improve stage is to establish a formal process for listing and prioritizing solutions. The team identified improvements and devised a prioritization scheme for them for the feedback in the Data 3 stage.

As stated by Sodhi & Sodhi (2008), during the Analyze phase, the project team identified and estimated the impact of different sources of variation. “The Improve phase is to create a proposal that takes the analysis to a potential solution to bridge a gap between baseline value and the project target”.

The Improve stage consisted of multiple DMAIC tools. With more detailed Process Flow Mapping and Brainstorming, the team built up additional clarifying steps first into the “Create New Case” step as visualized in the Figure 17. This approach would limit the cases with insufficient product hierarchy information and also introduce an additional check for possible duplicate cases in the ticket pipeline, leading to less duplicative and unnecessary work.

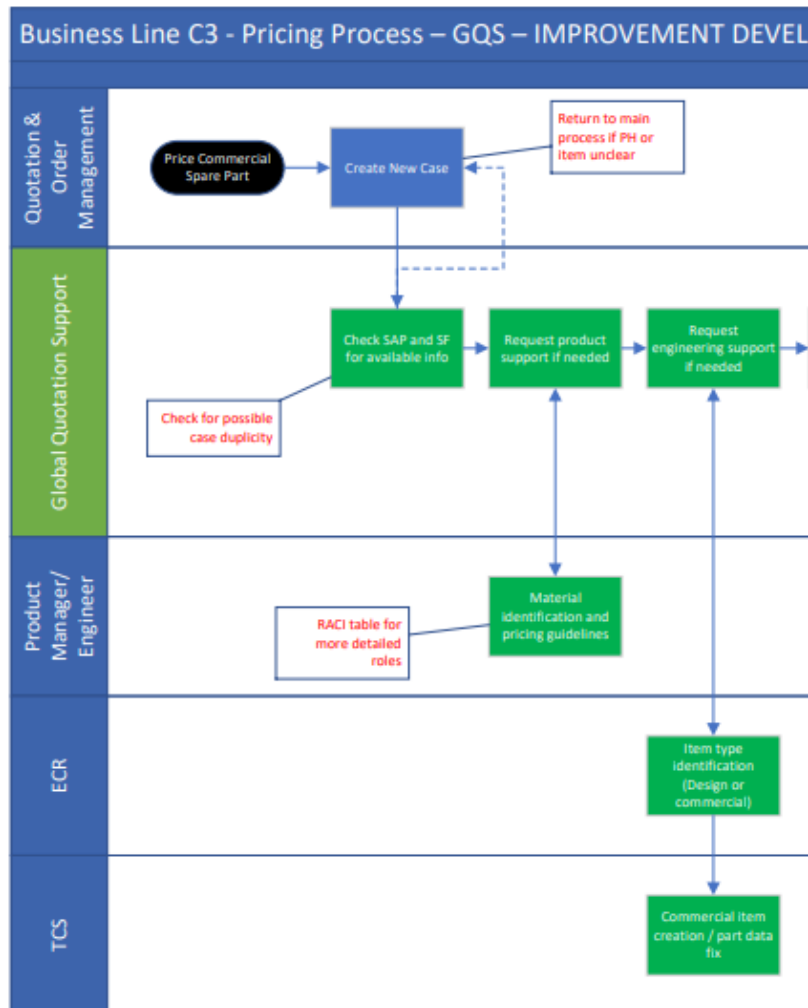


Figure 17: Improvements – New Case and Tier 2 Support

As described in Figure 17, the team was able to add clarifying initial steps to the process flows and able to separate and clarify the Tier 2 roles and responsibilities. At this stage, it was also noted that additional support for the details of the roles could be obtained from a RACI chart.

The team proceeded to the cost estimation step, which, in the worst-case scenario, accounted for the most significant time consumption within the process. They utilized brainstorming and benchmarking techniques in comparison with other related Business Lines. However, given the complexities of the product family, it was deemed necessary to develop a distinct subprocess dedicated to cost estimation and vendor data stage described in the Figure 18. Furthermore, it was suggested that an additional estimating guideline be established outside of the thesis, along with separate guidance to ensure the storage of consolidated supplier data for the use of sourcing teams.

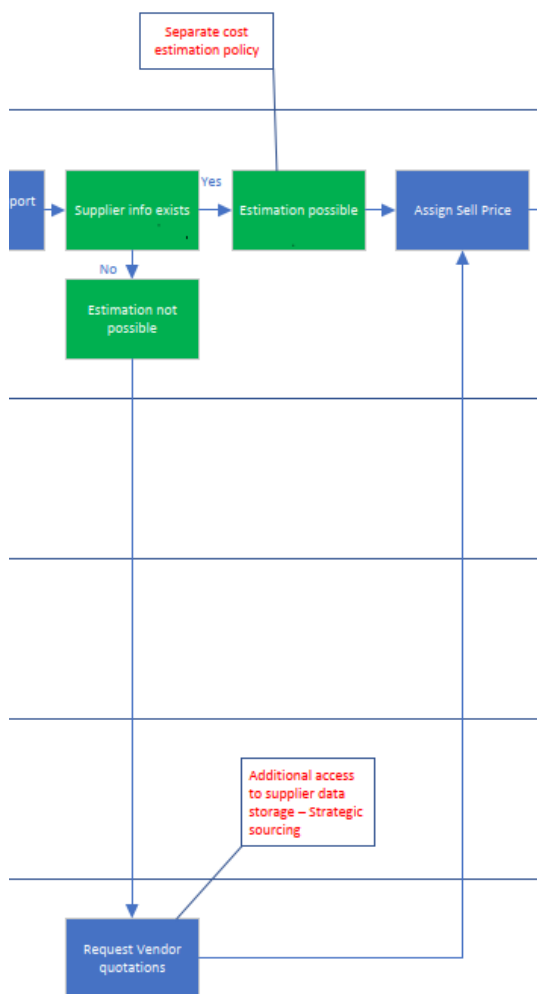


Figure 18: Improvements – Cost Estimation and Supplier Data

Figure 18 visualizes the complexity of roles and responsibilities involved in estimating supplier costs and completing the necessary steps to acquire the required supplier data.

The Improve stage is followed by the Control phase during which the team determines the controls to ensure improvements are implemented and achieved. Control phase creates a tracking mechanism for the improvements.

5.2.5 Control

The controlling tools are used to verify whether the approved recommendations are implemented and to ascertain if the desired outcomes in terms of process improvement are truly being realized.

In the final phase, the team indicated that monitoring the improvements could be accomplished using distinct tools and methods. They recommended updating the Process Flow Charts, Working Instructions, Role Descriptions, and Estimating Guidelines. Additionally, the use of Power BI reporting for monitoring ticket activity time improvements was recommended.

5.3 Summary of the Initial Improved Material Pricing Process

The development of the Initial Improved Material Pricing Process involved identifying the findings from the Current State Analysis. The main weakness that was focused on was roles and responsibilities. The process improvement solution, the DMAIC methodology, was identified and derived from relevant literature and used as a tool in the improvement process. The whole improvement process to create the Initial Improved Material Pricing Process is illustrated in the Figure 19.

The improvements created to address the weakness in roles and responsibilities were clarifying additional process flow steps and providing detailed role and responsibility charting with a RACI chart. The process steps that required special attention were the process initiation step, tier 2 product support, and cost estimation. These were divided into several clarified responsibility and process flow steps to clarify roles and responsibilities.

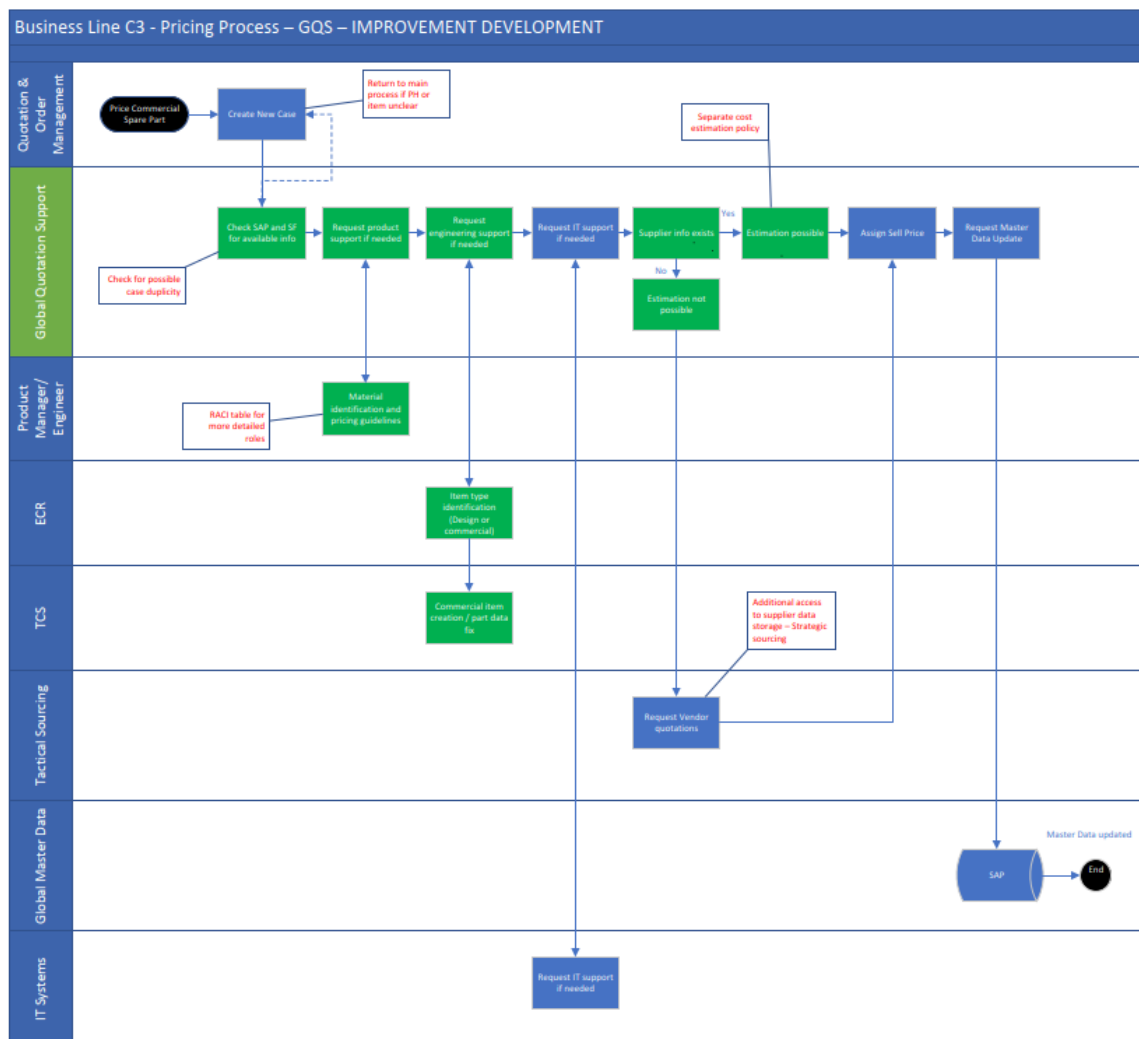


Figure 19: Initial Improvement - Process Chart

As a summary, the outcome of the Initial Improved Material Pricing Process was an enhanced process chart (Figure 19) with expanded descriptions and clarifications of the process steps. Additionally, the RACI table, which defines responsibilities in more detail, is visualized in Figure 20.

Process Step Code	Process Step	Activity Code	Activity	Tier 2 Product Support								Strategic Sourcing	BL Sourcing
				QOM	GQS	TCS	ECR	Product Manager	Product Engineer	Tactical Sourcing	GMDM		
1	Create New Case	1.1	Identify the item	R	R		C	C	C				
1	Create New Case	1.2	Create SalesForce case for GQS	R									
2	Check SAP and SF	2.1	Identify possible duplicate cases in SAP and SalesForce	R	R								
3	Request product support if needed	3.1	Request product support if needed		R								
4	Material identification and pricing guidelines	4.1	Item identification	R	R		C	C	C				
4	Material identification and pricing guidelines	4.2	Pricing guidelines					AR					
5	Request engineering support if needed	5.1	Request engineering support if needed		R								
6	Item type identification	6.1	Design or Commercial item identification			R	R						
7	Commercial item creation / Part Data &	7.1	Item creation / part data &										
8	Request IT support if needed	8.1	Request IT support if needed		R								
9	Clean Item Data	9.1	Clean / change item data		C			C	C			R	
10	Supplier info exists	10.1	Check the supplier data		R								
11	Estimation not possible	11.1	Send ticket to Tactical Sourcing		R								
12	Request Vendor quotations	12.1	Check available vendor data						R				
12	Request Vendor quotations	12.2	Request Vendor quotations						R				
12	Request Vendor quotations	12.3	Store supplier data for common location									R	R
13	Estimation possible	13.1	Estimate according to estimating guidelines		R								
13	Estimation possible	13.2	Create estimating guidelines					C					
14	Assign Sell Price	14.1	Select the product family, input the attributes and price the item		R								
15	Request Master Data Update	15.1	Send to master data update		R								
16	Master Data Update	16.1	Update item master data							R			

Figure 20: Initial Improvement - RACI-table

As described in Figure 20, the developed RACI table details the roles and responsibilities for each process flow step in a more detailed manner.

6 Feedback on the Initial Improved Material Pricing Process

This section begins with an overview of the validation stage, followed by a revelation of the study's outcome, which is the Final Improved Material Pricing Process. It then details the feedback obtained from the validation process and concludes by outlining the modifications applied to the Initial Proposal based on this feedback.

6.1 Overview of the Data Stage

The validation of the Improved Material Pricing Process was established to ensure that the improvements and recommendations would fulfil the Case Company's needs. The objective of this stage was to verify the suitability of the Improved Process for BL C3 purpose. The management's feedback was crucial to determine whether the Improved Material Pricing Process was feasible within the internal guidelines and procedures and if the improvements could be implemented into the BL C3 pricing process.

The Initial Improved Material Pricing Process (Data 2) was co-created in the workshop with stakeholders, and the feedback gathering (Data 3), and validation was conducted through a decision maker interview in a Teams meeting.

The Initial Improved Material Pricing Process was presented to the decision makers, consisting of the Product Director, who owns the commercial component product hierarchy, and the Vice President, responsible for the BL C3 Quotation Support functions.

The meeting began with a presentation of the business challenge and the thesis objective, along with the Initial Improved Material Pricing Process, together with the proposed future improvement needs. The original Pricing Process flow chart was shown and mirrored against the new, Improved Pricing Process to demonstrate the improvements in action.

Finally, the recommendations for the Control phase emphasize strategies for tracking and showcasing the proposed implemented improvements moving forward.

Feedback was sought from the Product Director regarding his knowledge of commercial product hierarchy ownership and manageability, and how improvements from the product line perspective can be implemented in practice. Feedback from the Vice President of Quotation Support was essential to confirm the practicality of the improvements for the stakeholder teams involved in and surrounding the pricing process.

6.2 Feedback Received and Corrections to the Initial Improved Material Pricing Process

Feedback from both decision makers was mainly positive. The complexity of the specific commercial component product hierarchy was acknowledged again, but the necessity of the improvement project was also felt to be important and valuable.

“However, a recurring issue with the original process flow charts is that the GQS is evaluated based on response time. Whenever there's a need for information and the available personnel are incapable of providing answers, the documentation does not clearly address this scenario.” (Informant B4)

“I was able to understand our progress with the RACI table and the process flow chart. A combined visualization would be beneficial to see how these elements integrate and what the end-of-day process and responsibilities would look like. I would make it kind of full of information with all the tools and where the ticket comes and goes.” (Informant A3)

Validation and feedback for all Initial Improvements are gathered in Table 9 below.

Table 9. Feedback received from the initial improvements

Topic	Initial Material Pricing Process	Final Material Pricing Process
Process flow chart	1. Create new case stage - Return to main process if Product Hierarchy not clear	Approved for final version
Process flow chart	2. Check SAP and SF for available info	Approved for final version
Process flow chart	3. Request product support stage - Product Manager as first contact point	Approved for final version
Process flow chart	4. Material identification and pricing guidelines - Additional clarification and separation created	Approved for final version
Process flow chart	5. Request engineering support - Additional clarification and separation created	Approved for final version
Process flow chart	6. Item type identification - Additional clarification and separation created	Approved for final version
Process flow chart	7. Commercial item creation - Additional clarification and separation created	Approved for final version
Process flow chart	10. Supplier info exists - Additional clarification and separate swimlanes created	Approved for final version
Process flow chart	12. Request Vendor quotations - Additional role and instruction clarification	Approved for final version
Process flow chart	13. Estimation possible - Separate cost estimating policy required	Approved for final version
Process flow chart	Basic flow chart	Implement ticketing systems to visualize the ticketing systems included
Process flow chart	Basic flow chart	Implement used data sources to visualize the systems included
RACI chart	RACI-Charting done separately to clarify the roles and responsibilities in the process	RACI chart to be integrated into the flowchart

As shown in Table 9, the validation consisted of verifying each process step for the final version and then incorporating the RACI table into the process flow chart with a more detailed description of the ticketing and data systems used.

6.3 Summary of the Final Improved Material Pricing Process

The objective of this thesis was to develop an improved material pricing process for the Case Company's BL C3. Despite the initial proposal including the fundamental ideology and structure of the final product, as shown in Table 9, the Initial Material Pricing Process underwent many developmental changes along the way.

The difference between the original and final process flowcharts is that the RACI table has been integrated into the process diagram, and at the same time, the stages and types of data sources and ticketing systems are precisely presented. The entire process is thoroughly illustrated in the Final version, Appendix 3, Final Improved Material Pricing Process.

The feedback received did not suggest any structural changes, so the basic flow order remained the same as in the Initial Process. The process diagram was enhanced with all the necessary databases and ticketing systems, as shown in Figure 21 and was completed with process steps and stakeholder responsibilities to accurately represent the actual progression of the process in the chart.

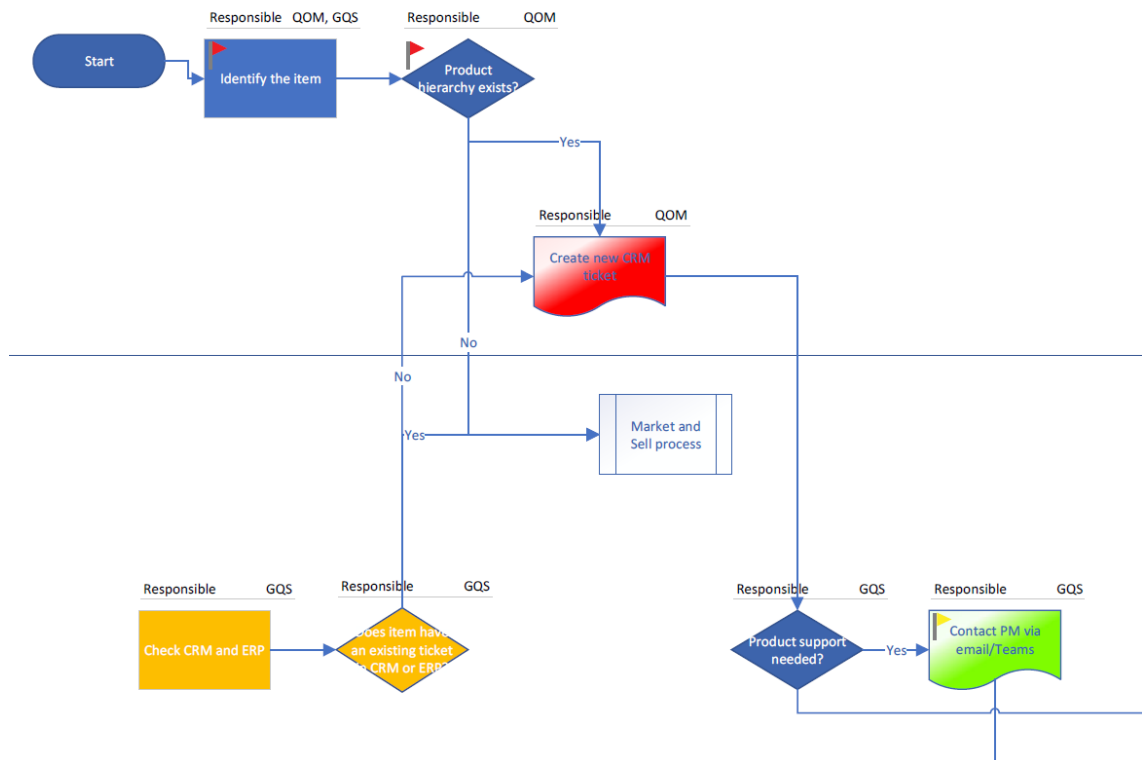


Figure 21: A sample of the Final Improved Process Flow

Figure 21 visualizes a sample of the Final Improved Material Pricing Process with integrated roles and responsibilities.

Overall, the improvement was considered important for future and continuous development. The Improved Process developed from this study fills the expected outcomes by clearly defining the Final Improved Material Pricing Process, detailed comprehensively in Appendix 3.

The last section of the study presents a summary of the project and includes a self-evaluation of the study.

7 Discussions & Conclusions

This final section includes an executive summary of the thesis, recommendations for future steps and an assessment of the study's validity and credibility.

7.1 Executive Summary

The objective of this thesis was to develop an Improved Material Pricing Process for the Case Company's BL C3. Prior to the study, the Case Company's commercial component pricing hierarchy involved a complex and varied method of calculating material costs, which made it challenging to implement material pricing in a consistent manner.

The outcome of this study is the Improved Material Pricing Process and recommendations that will enable the BL to continue to improve its Pricing Process.

The study was structured into four stages to tackle the business challenge. The initial stage entailed a comprehensive analysis of the current state of the Current Pricing Process Strengths and Weaknesses within the case organization. This processes examination was an essential prerequisite for formulating the Pricing Process improvements. The stage summarized detailing the Current Pricing Processes and Internal Pricing needs of the organization's BL.

The second stage focused on the weaknesses identified during the Current State Analysis. This involved a comprehensive literature review of various process improvement strategies. The key insights were integrated into a Conceptual Framework that directed the formulation of the Initial Improved Material Pricing Process.

The third stage focused on creating the Initial Improved Material Pricing Process based on the weaknesses identified in the Summary of Current Pricing Processes and Internal Pricing needs from the Current State Analysis, along with insights from the Conceptual Framework derived from relevant literature. Key stakeholders were gathered in a workshop to collectively work on the solution development. The main weakness, roles and responsibilities, was addressed in the workshop following the steps of the proposed DMAIC methodology, one step at a time.

The workshop commenced with an examination of the Current Pricing Process and the bottlenecks uncovered during the Current State Analysis. Following this, the process improvement methodology derived from the literature was introduced. Based on the advised process and tools, the team selected the most appropriate tools for formulating the recommendations. From these decisions, the initial proposal was developed, and the outcome stage 3 was the Initial Improved Material Pricing Process.

Finally, the fourth and concluding stage of the research design involved validating the proposal through feedback. The initial version of the Improved Material Pricing Process, along with further recommendations, was then presented to decision makers for feedback. The Initial Improved Material Pricing Process was refined and adjusted in response to the feedback received. The result of stage 4 was the Final Improved Material Pricing Process.

The Final Improved Material Pricing Process lays a solid foundation for the Case Company's BL to effectively implement a refined Pricing Process. With this enhanced process in place, it becomes easier to clarify roles and responsibilities, enabling product management to implement pricing in a consistent manner and enhancing process stakeholders' ability to utilize their resources more effectively. Additionally, it aids in reducing process gaps, waiting time lags, and inefficient tasks, ultimately leading to increased profitability.

7.2 Practical Next Step Recommendations

During the thesis validation process, the documents suggesting roles and responsibilities were approved for enactment. The improvements listed in Table 10 are recommended for future implementation beyond the scope of this thesis.

Table 10. Next step recommendations

Topic	Description	Additional Description
Guideline Update	Pricing Process Guideline	Additional guideline GQS on identifying potential duplicate tickets
Guideline Update	Supplier data management Guideline	Guidance and training for sourcing teams to centralize supplier data management
Guideline Update	Cost Estimation Policy	Additional Policy for cost estimation procedures
Guideline Update	Pricing Approval Policy	Policy including the procedure for streamlined decision-making in price approvals. Delegation of authority for price adjustments to GLP
Guideline Update	Commercial Component Pricing Instruction Guideline	Commercial component pricing and identification Guideline
Operating Procedure	Maintain the continuous improvement methodology for the pricing process	Maintain clear delineation of roles and responsibilities as part of the material pricing process enhancement efforts.

Along with the next-step recommendations outlined in Table 10 and based on the thorough review presented in the thesis, the Case Company is advised to implement a series of decisive actions to refine its operational framework. Foremost among these is the commitment to sustaining the continuous improvement methodology, ensuring that the advancements realized during the study are preserved.

A clear definition of roles and responsibilities is imperative to prevent overlap and fatigue, particularly for Product Managers and GQS Coordinators, thus supporting the personnel structure post-study.

The introduction of new guidelines to bolster the material pricing process is essential. Specifically, for the GQS team, the elimination of duplicate tickets will enhance pricing accuracy and operational efficiency.

Sourcing teams are urged to centralize supplier data management, promoting a unified data environment throughout the company. Additionally, a standard policy for cost estimation should be instituted to offer clarity and uniformity in financial assessments.

An update to the pricing approval process is proposed. A protocol designed for streamlined decision-making, with explicit parameters for adjustments to Global List Prices (GLP), will enable the company to navigate market changes with agility.

The development of a detailed guideline for commercial component pricing is also proposed to standardize identification and pricing procedures within the product family framework, ensuring transparency and consistency.

The company is further advised to adopt a general-level strategy for pricing commercial components. Such a strategy will clarify ownership roles and refine decision-making processes, augmenting the GQS's authority over price adjustments.

In addressing the complexity of existing pricing logics, a simplified set of pricing rules for commercial components is recommended. This streamlined logic should be accessible and straightforward to implement, thus decreasing complexity and expediting process times. Documenting all approval thresholds and pricing bounds is crucial for the consistent application of the new simplified logic.

The organization of commercial component family management is essential, with a focus on enhancing data visibility and analytical capabilities. This approach will positively influence the pricing strategy, allowing for adjustments that are more closely aligned with market conditions.

Furthermore, the implementation of advanced tools for local market price evaluation is advocated. These tools should manage individual Market Adjusted List Prices (MALP) effectively and assist in the oversight of expired item pricing and related rules.

These recommendations constitute an integrated plan of action intended to strengthen the Case Company's pricing and data management protocols, steering the organization toward greater operational resilience and market responsiveness.

7.3 Thesis Project Credibility and Self-Evaluation

The credibility of the project was appraised using the framework proposed by Shenton (2004). Shenton outlines four principal criteria for this evaluation: credibility, transferability, dependability, and confirmability. Credibility examines the study's methodologies and analyses, focusing on the importance of its outcomes. Transferability considers the potential for the study's findings to be applied in different contexts, detailing the data collection methods. Dependability assesses the consistency, reliability, and accuracy of the study. Confirmability addresses the traceability of the findings back to their sources, emphasizing the transparency of the research process or the "audit trail."

7.3.1 Credibility

Credibility is achieved through the adoption of well-recognized research methods and strategies, combining qualitative and quantitative methodologies. These research methods were applied to interviews, workshops, and the assessment of systems and documentation. The researcher and the participants, employed by the Case Company in roles related to the Pricing Process, ensured a familiarity with the topic among the participating stakeholders.

The triangulation of different methods and informants was accomplished by ensuring stakeholder representation from all parties related to the pricing process, from various stages of the process flow. Applicable data was retrieved from several different systems, including ERP, Salesforce, QPR portal, Pricing System, and Power BI reports.

The study employed methodological research methods, integrating quantitative and qualitative approaches along with analytical methods. It involved multiple informants at different times, drew on various theoretical perspectives from theory and literature, and gained analytical insights from the co-created end result.

Tactics to ensure honesty among informants included allowing participants to freely choose their involvement in the project. The limited number of workshop participants guaranteed an open and honest discussion forum and the availability of peer scrutiny.

Andrew K. Shenton (2004) writes that “external validity is concerned with the extent to which the findings of one study can be applied to other situations”. This means that the results of the study at hand can be applied to a wider population. Although the study’s context is limited to one specific product hierarchy within a particular BL, further investigation, outside the scope of this thesis, suggests that more product hierarchies could likely implement the same or similar improvements. Given the extensive amount of collected product related data and the diversity of the stakeholder expertise across the BL product portfolio, the transferability is feasible.

Dependability is established through detailed reports of the processes, enabling readers to replicate the study, although identical outcomes may not necessarily be achieved. The research design, detailed in Section 2.2, outlines the practices and execution of the research. The operational details of data gathering, addressing the minutiae of what was done in the field, are specified in the data plan, Section 2.3. A reflective appraisal of the project, evaluating the effectiveness of the inquiry process, is conducted through self-evaluation.

Confirmability emphasizes the importance of ensuring that findings reflect the experiences and ideas of informants, rather than the biases of the researcher. The use of triangulation, discussions of findings, theories, and approaches with the instructor and stakeholders during the study stages ensure confirmability by reducing investigator bias. The detailed methodological description and the data-oriented 'audit trail' are not only documented with the decisions and procedures but also visually represented through diagrams in Section 2.3 and in the appendices, where the results of data collection are presented.

Direct quotes from raw data were utilized in the report to substantiate analytical points, adding depth and context to the findings. The study also addressed potential biases by engaging multiple stakeholders, promoting voluntary participation, and drawing on diverse sources and expertise.

Assadian et al. (2020) state that "a logic is just a set of rules and techniques for distinguishing good reasoning from bad. A logic must formulate precise standards for evaluating reasoning and develop methods for applying those standards to instances". Logic comprises a series of rules and techniques used to differentiate effective reasoning from flawed. A logic framework should establish clear criteria for reasoning and devise methodologies for applying these criteria to specific cases. For this study, the execution was carried out logically, following the progression outlined in the research design. This involved identifying the business case, determining solution methods, developing a customized approach, and validating the effectiveness.

Lastly, the study's findings were benchmarked against existing processes, linking the new insights to the established body of knowledge. This approach not only situates the study within the wider context of the field but also provides a clear audit trail that underscores the quality and reliability of the research.

7.3.2 Self-Evaluation

The primary business challenge was the BL's inability to implement aligned pricing for the commercial component material context. The objective of this study was to develop an Improved Material Pricing Process for the Case Company's BL C3. The outcome of the study was the Improved Material Pricing Process and set of recommendations that was validated with the BL C3 management. Despite the BL might not implement all the improvements and recommendations, the study has reached its objective and expectations.

The Final Improved Material Pricing Process distinctly outlines the distribution of responsibilities pertaining to the steps in the pricing process and guarantees a more streamlined process flow.

A potential improvement in the study's approach was evident in the Data 1 collection phase. Information that could have been uncovered with even more detailed questions about the process gaps themselves was missed and only surfaced during the development (Data 2) stage of the thesis. This oversight could have been avoided by formulating the interview questions from a more insightful and profound perspective. The journey of conducting this study itself was an educational experience, where the necessary information was recognized and pursued as comprehension deepened.

The research design established at the outset of the study served as a roadmap to guide the research process. The study's results aligned with the objectives set at the start. A diverse array of experts was consulted for data gathering at predetermined moments within the study. The sources of literature consulted provided relevant and valuable insights that informed the proposal's development. Consequently, the overall reliability of the proposal can be considered strong.

7.4 Closing Words

This study successfully developed an Improved Material Pricing Process, incorporating detailed process steps and stakeholder responsibilities. This enhancement not only maps out the progression of the process more accurately but also provides significant benefits to the company. The improved visibility of the full process flow allows for a better understanding of existing issues, enabling management to address challenges more effectively. Moreover, the clarity gained from this improvement facilitates resource planning and fosters an environment conducive to continuous improvement.

The impact of these improvements on the company is substantial. With enhanced process transparency, decision-making has become more informed, and strategic planning is now executed with greater precision. This project has not only provided me with a deeper understanding of the pricing process but also of process development in general, highlighting the critical nature of adaptable frameworks in handling varied cases.

Throughout this project, the main challenge was constructing a process improvement framework capable of accommodating multiple varying cases. This was successfully overcome by adopting flexible and dynamic methodologies that allowed for iterative refinements.

Looking ahead, this project lays the groundwork for rolling out additional development tasks and projects. It sets a precedent for adopting a data-oriented approach across other product hierarchies, promising further enhancements in organizational efficiency.

In conclusion, the project has been highly beneficial, setting the stage for continuous development and the adoption of innovative solutions across the company. As we move forward, the methodologies and insights gained from this experience will undoubtedly influence broader strategic initiatives.

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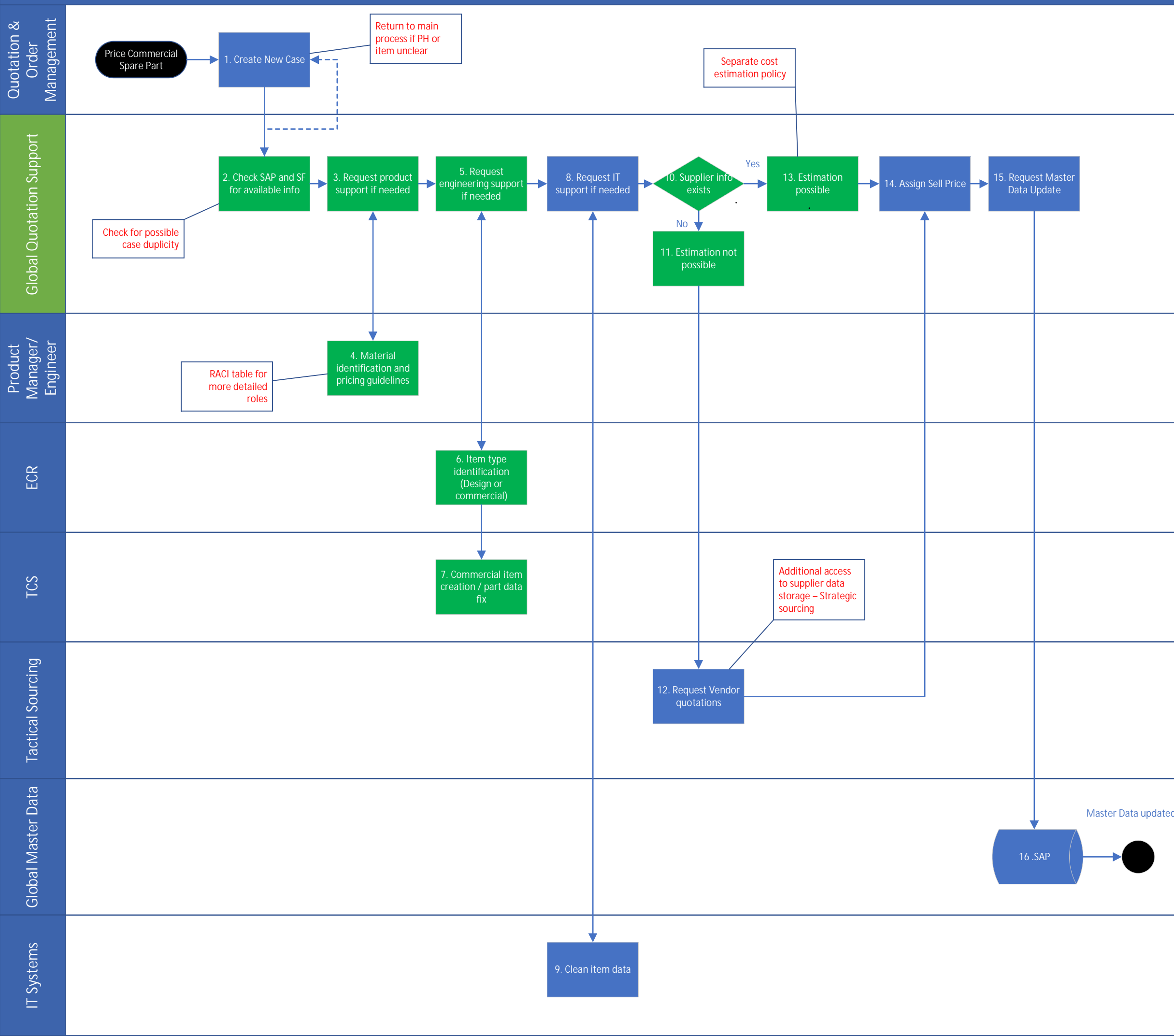
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STRENGTHS AND WEAKNESSES OF THE CURRENT PRICING PROCESS FOR BL C3

COMMERCIAL COMPONENTS

Main questions

- 1. Your role in the organization**
- 2. Your relationship to the pricing process:** a. Are you familiar with the existing process b. are you using this process c. Where do you position in the process?
- 3. Process Overview:** a. What are the primary objectives of this process? c. What are your key inputs and outputs of the process?
- 4. Stakeholder Roles:** a. Who are the key stakeholders for you in this process? b. What are their roles and responsibilities in this process?
- 5. Documentation and Pricing Guidelines:** a. Are there documented pricing guidelines or policies in place? b. How often are these guidelines reviewed and updated? c. Are there any challenges related to pricing guidelines?
- 6. Technology and Tools for Pricing:** a. What software's or tools are used to support pricing process or decision making?
- 7. Performance Metrics:** a. How do you measure the performance and effectiveness of your part of the process? b. Are there any key performance indicators (KPIs) that you track? c. What are the typical turnaround times for this process?
- 8. Challenges and Pain Points:** a. What are the main challenges or pain points experienced in the current process from your perspective? b. Are there any bottlenecks or delays that need to be addressed?
- 9. Process Strengths:** a. What are the strengths in the current process? Any success stories or notable achievements related to this process?



Final Improved Material Pricing Process Item processing

