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Improving the Quotation Process of an After-Sales Unit

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The purpose of this study was to model and analyze the quotation process of area managers at a global company. Process improvement requires understanding the fundamentals of the process.

The study was conducted a case study. Data comprised of internal documentation of the case company, literature, and semi-structured, themed interviews of process performers and stakeholders. The objective was to produce model of the current state of the process. The focus was to establish a holistic view of the roles and overall composition of the process. The analysis of the current state utilized principles of business process management. The identified challenges were evaluated by their criticality to produce a condensed body for the analysis. Each challenge was addressed individually against theories of process improvement. The study progressed iteratively. The output was a list of suggested improvement points with appropriate methods of achieving the desired changes.

It was found that processes are utilitarian and effective, but require planning and continuous improvement. The intra-connectedness of multiple processes forms complex entities, thus validating the need for business process management. The transformation of business strategy requires reformations in the everyday functions and processes. This study aims to bridge the successful processes of today with those in the strategic scope of the future.

The study has use as an informative document to communicate the purpose and structure of the process. The findings of the study received confirmation from the results of a yearly customer survey and a concurrent operational improvement project.

Keywords	BPM, quotation, process improvement

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Insinöörityön tarkoituksena on kuvata globaalin yrityksen aluepäälliköiden tarjousprosessi. Prosessikehittämisen ensiaskel on nykytilan ymmärtäminen.

Työ tehtiin tapaustutkimuksena. Tieto kerättiin yrityksen sisäisistä dokumenteista, kirjallisuudesta sekä puolistrukturoitujen teemahaastattelujen avulla. Työn tavoitteena oli tuottaa prosessikuvaus nykytilasta. Painopisteenä oli luoda kokonaiskuva ja tarkentaa rooleja. Nykytila-analyysi hyödynsi prosessijohtamisen perusperiaatteita. Nykytilan haasteet asetettiin tärkeysjärjestykseen tiivistetyn aihealueen rajaamiseksi. Haasteet käsiteltiin yksitellen prosessikehityksen teorian avulla. Tutkimus eteni johdonmukaisesti. Lopputuloksena oli lista suosituksia kehitystä varten ja toimintatapaehdotukset niiden ratkaisemiseksi.

Tutkimuksen aikana ilmeni prosessien hyödyllisyys ja tehokkuus. Edellä mainittujen hyötyjen saavuttaminen vaatii kuitenkin suunnittelua ja jatkuvaa kehittämistä. Lukuisista toisiinsa kytkeytyneistä prosesseista syntyy monimuotoinen kokonaisuus, jonka hallintaan tarvitaan prosessijohtamista. Liiketoimintaprosessien muutos vaatii muutoksia jokapäiväisissä toiminnoissa ja prosesseissa. Tämä tutkimus yrittää silloittaa nykyiset menestyksekkäät prosessit tulevaisuuden strategisessa näkymässä oleviin.

Tutkimusta voi käyttää informatiivisena, prosessin tarkoitusta ja rakennetta viestittävänä dokumenttina. Tutkimuksen löydökset korreloivat vuosittaisen asiakastyytyväisyyskyselyn ja erään samanaikaisen kehitysprojektin tuloksien kanssa.

Avainsanat	Prosessijohtaminen, tarjous, prosessikehitys

Contents

Abbreviations and definitions

BPM	Business Process Management A process-oriented, holistic approach to business management.
ERP	Enterprise Resource Planning. Systems that integrate the management of information across an organization.
RFQ	Request for quotation. Synonym for RFP – Request for proposal
PO	Purchase order.
OTD	On Time Delivery. Measures the reliability of delivery of a supply chain.
SAP	Systems, Applications, and Products in Data Processing. The leading supplier of enterprise resource planning software.
SOX	Sarbanes-Oxley act. A United States legislation act that defines the length and scope of mandatory company records.
CIOS	Company in-house ordering system.
SWOT	Strengths, Weaknesses, Opportunities and Threats. A structured evaluation method of a subject.

1 Introduction

Quotations are an essential part of the sales process. Quotations document and provide details about an agreement between parties. They function as the legal representation in an exchange of commodities and provide disclosure. A proposal aims to convince the reader of the superiority of a particular offering. An ideal proposal can turn over to a contract or purchase order from its original form. (Pugh and Bacon 2005: 24)

1.1 Research context

The commissioning company is a global supplier of power and automation technology. This thesis involves the Sales & Marketing and Operation departments of the aftersales unit of a factory. The unit provides spare parts, repairs, warranty services and technical support for a certain product group.

1.2 Business problem and objective of research

The supply chain and operations are performing excellently. The majority of the business consists of spare part supply. However, a shift towards service business is in progress. The demand for more comprehensive and versatile services and products is increasing. The unit also seeks to find growth from the service business. The current operational processes do not support service delivery at the desired level.

Expanding and growing the business to new areas requires new processes and offerings. The practices and activities that make the current business a success need to be transformed and implemented to the more recently introduced service products. Currently, increasingly complicated customer-oriented offerings cannot be produced at the desired effectiveness and volume. **Deploying systematic approaches and increasing the efficiency of business processes** can be expected to 1) enable growth 2) increase internal and external satisfaction and 3) lower transaction costs.

Objective

The objective of this thesis is to provide the sales team with a documented model of the quotation process.

1.3 Research method

This research used the qualitative case study strategy. Interviews were the main method for data collection due to their flexibility. Interviewing allows repeated questions, the possibility to rectify misunderstandings, clarified answers and open discussion with the interviewee. The object of an interview is to gain as much information about the subject as possible. (Tuomi, Sarajärvi 2006: 75)

A themed interview is semi-structured and advances in certain pre-determined and agreed themes. If necessary, this method allows introducing additional questions conveniently. Themed interviews should seek purposeful answers against the business problem layout. According to Tuomi and Sarajärvi, interviews enable representing the current state in its pure form. (2006: 77-78)

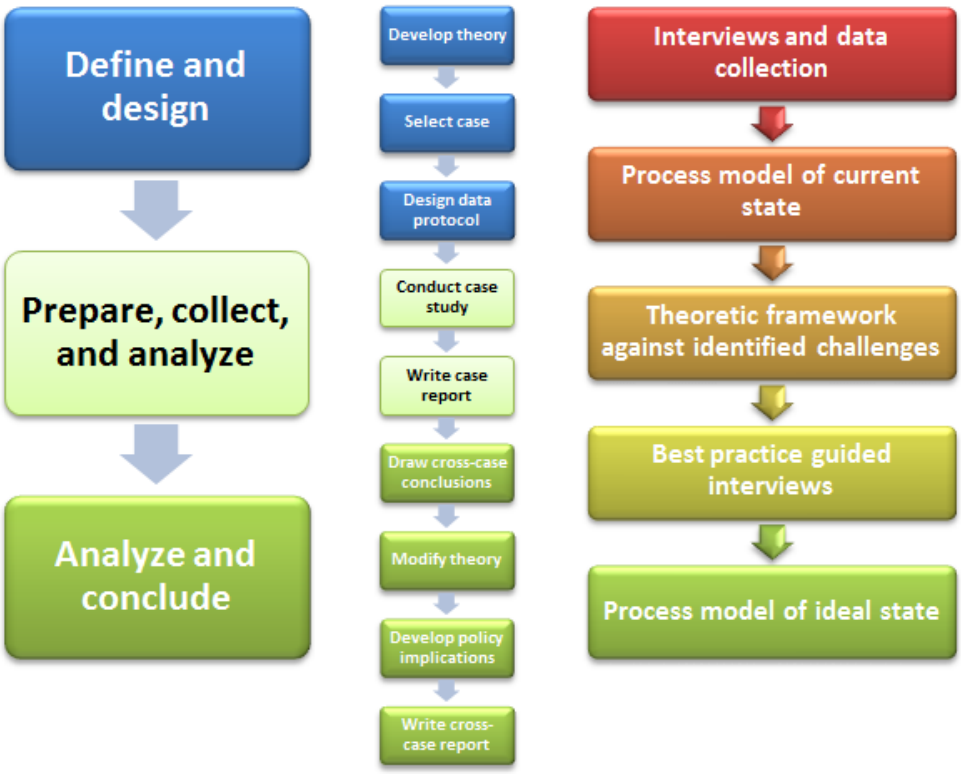


Figure 1: Progression of research (adopted from Yin 2009:57)

Figure 1 visualizes the progressive phases of the thesis execution process. The left and center columns represent an adoption of Yin's view of conducting a case study. (2009: 57) The right column represents the progression of this research. In this study, company data and interviews merge to depict the current state. Modeling the current state provides the framework for literature and improvement practices. The theory is applied to another round of interviews to construe a desired state. The final product, based on the findings, is a process model of the desired state.

The coverage of this thesis is limited to the quotation process of Area Managers of the case unit. This thesis does not include implementing the model or the suggestions provided.

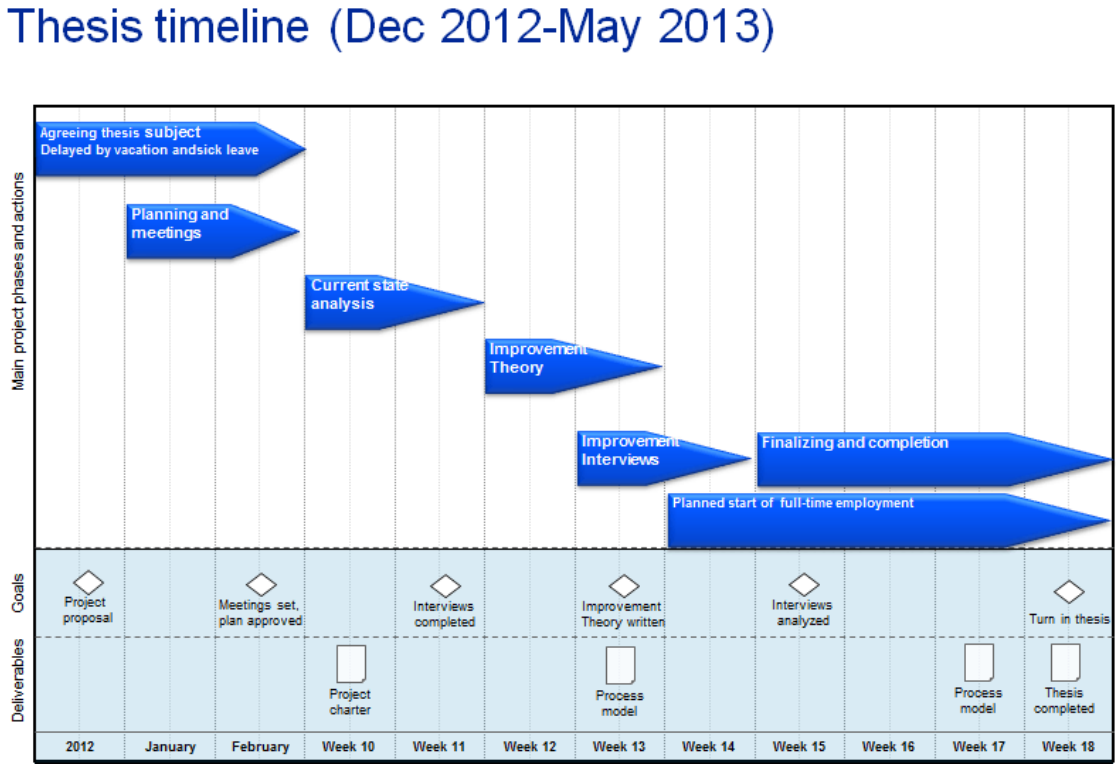


Figure 2: Phases of thesis execution

Figure 2 illustrates the chronological progression of the thesis work. Discussions started in October 2012 with considerations of possible topics. The deadline for the research proposal was the end of year 2012. The thesis work execution was carried out between February and May 2013. Interviews and the major part of the writing was completed during March. Final adjustments and completion took place in April.

1.4 Research credibility

To establish credibility and academic validation, the researcher should be able to argue and rationalize the choices in method and data collection. However, as Tuomi and Sarajärvi note, the final consideration is up to the reader. Qualitative research aims to describe a phenomena or event, understand a certain action or give a theoretic interpretation of an event. The broadness of the material should not be the most significant criteria. This thesis contains literature and empirical data against the framework established by the original business problems identified. An elite sample comprising of the area sales managers was chosen, since it is assumed that they possess the best knowledge and most experience about the subject. Each interview was summarized

into minutes, which were approved by the interviewee to confirm that their input had been accurately documented. (2006: 87-88)

According to Yin, (2009: 41) a case study is a form of empirical social research. Yin emphasizes continuous evaluation during the study. Initial plans may need redesigning. The study advances in a logical set of steps, linking the empirical data and literature to the business problems. (Yin 2009: 26) The reliability of the study is established by proper documentation of the data, data collection, research methods, and participants. All appointment information, interviews, questions and data are available and the study could be repeated. The actions seek to minimize errors and biases. (Yin 2009: 45)

2 Processes

This chapter covers processes by focusing on the basic principles, modeling, and improvement of processes. The purpose is to introduce the topic and link the research context to literature.

2.1 Process fundamentals

A process is a sequence of value-added tasks that utilize organizational resources in order to produce products and services. A process is a recurring undertaking of tasks that restarts once completed. Fryman (2002: 120) claims that the quality of the process has a direct effect on the quality of the product or service. Business Process Management (BPM) consists of designing, executing and monitoring processes in order to manage a process that meets the demand. This starts with designing processes that can forecast demand and set capability accordingly, thus being capable of meeting the demand. Stevenson acknowledges that even in such a process, a pre-requisite of effectiveness is the ability to deal with variation and change. (2009: 11)

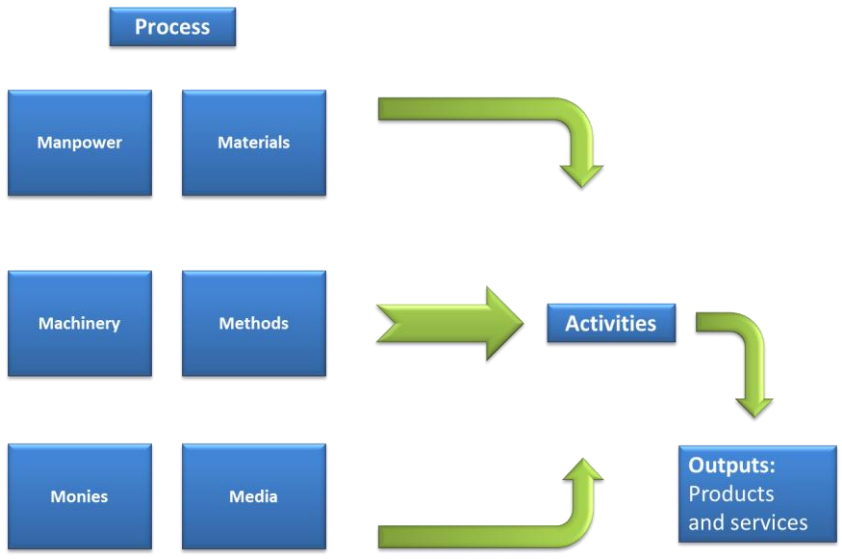


Figure 3: Conceptual process (adopted from Fryman 2002: 121)

Figure 3 describes the six inputs, or resources. The output can be adjusted by alternating the quality and quantity of the inputs. (2002: 121)

Manpower represents the performers and employees associated with the process. **Methods** describe performing the tasks and actions required while **Machinery** are the machines and equipment utilized to execute the process, such as a computer. Monies signify the financial requirements of the process and **Media** are the communication methods and vehicles needed to market the output of the process.

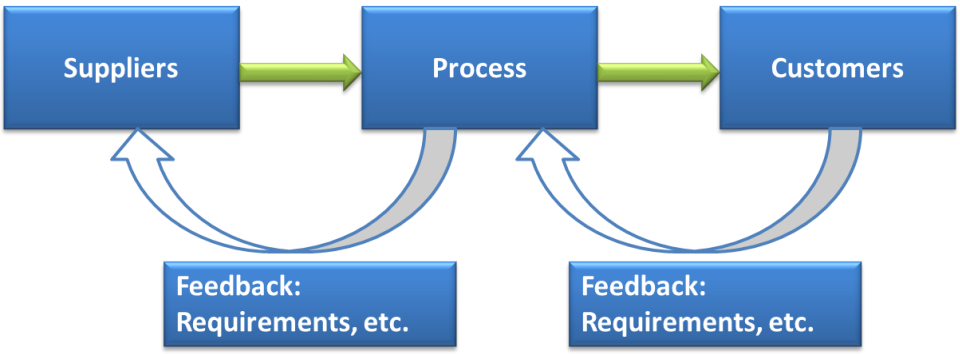


Figure 4: Feedback loop of a process (2002: 122)

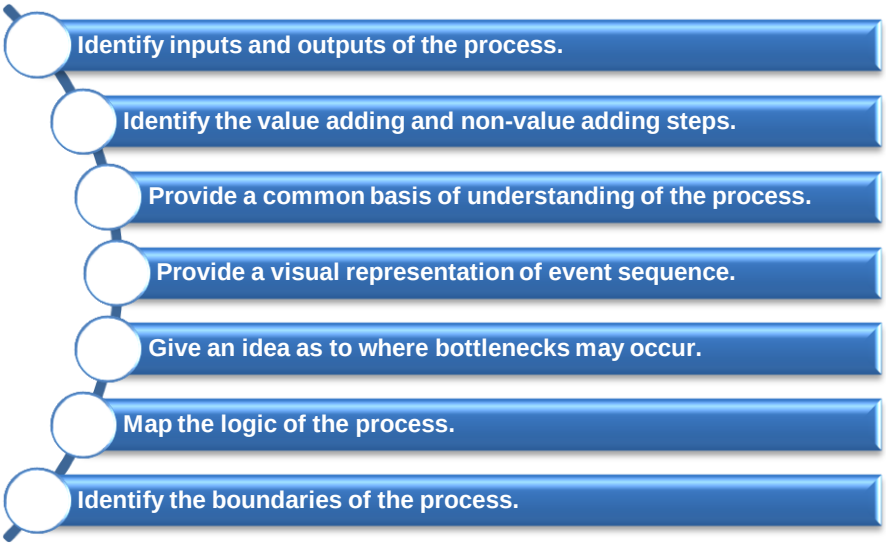
Fryman further elaborates on the concept of a process in Figure 4. The depicted feedback loops act as quality control gates that enable the supplier to compare the output against the goals and objectives of the process. Processes should be measured and monitored at different points to confirm that the desired outputs are realized. If feedback signals that the output differs from the set objectives, corrective action should take place. (Stevenson 2009: 5) The importance of understanding the structure and factors of a process is mandatory before making improvements. Fryman insists that process improvement should breed from analysis rather than random, arbitrary grounds. (2002: 123) A value-adding process is one that has a greater output than input. (Stevenson 2009: 6)

One way to introduce logic and form an analysis of a process is the Process Checklist. A simplified checklist of questions produces documentation to generate a vision of the actual state of the process. The ability to answer this checklist is a prerequisite for understanding the process. **Understanding the process is imperative before the process can be changed or improved.** (Fryman 2002: 123-124)

2.2 Documentation and representations of processes

A model represents a simplification of a concept in reality. Schematic models, such as the flowchart, are visual tools that resemble the abstract equivalent of the reality. A flowchart visually represents the logical and sequential progression of tasks in a process. (Fryman 2002: 169) Models represent the complex phenomena in a simplified way, containing only the minimum depth of details necessary. (Stevenson 2009: 18) Process modeling, as a form of process thinking, enhances organizational performance by enabling a holistic understanding of the process entity, questioning the status quo and relationships, and implementing a new improved process. (Brock, Rosemann 2010a: 168)

Table 1: Benefits of using a flowchart



Fryman identifies the benefits of using flowcharts in Table 1. (2002: 169) The realization of the above listed benefits demands that the flowchart is constructed with accuracy and integrity. Assumptions and hesitation of informants lead to distortion and false portrayal of the reality. (Fryman 2002: 169) Brocke and Rosemann define the semantic quality of a model as the truthful depiction of the current or future process. This is further broken down to validity and completeness. The statements of the models need be correct and relevant to the problem to attain validity. For completeness, all relevant statements must be contained. (2010a: 175)

2.3 Flowcharting processes

Fryman (2002: 172) describes the best flowcharts as tools that aid in collecting and communicating information about the process. They also provide the performers and authorities with comprehension and realization of improving that process. Constructing a flowchart begins with the theoretical portion that is usually based on instructions, policy, or accustomed procedures. Mapping how the process "should" function represents the Method of the 6Ms introduced in the beginning of the chapter. (Fryman 2002: 172)

The "actual flowchart" builds on top of the theoretical chart, depicting the actual, true state of actions and operation of the process. Fryman fears that this step is the most vulnerable to deception since often people tend to hesitate or assume. (2002: 169,174) Processes are often not operated according to manuals or instructions, and admitting the use of shortcuts can lead to a fear of retribution and loss of integrity. Withholding information due to any reason, leads to a distorted process flowchart. (Fryman: 174)

Constructing the "best flowchart" gives the creator benefits such as a detailed knowledge and complete view, hence providing a better position to recommend improvements to the process. Fryman describes a "best flowchart" as one that construes a chart on the process expertise of the whole group of the people involved in the process. A best flowchart should present increased quality and efficiency towards external and internal customers through improvements in the process. (Fryman 2002: 176)

The flowcharts of this study were constructed with Microsoft Visio 2010. The company database contains detailed guidelines in process analysis and modeling.

2.4 Successful processes

This chapter looks at the fundamental building blocks and characteristics of excellently performing processes. Even though different processes and companies have their particularities, there are some common acknowledged best practices.

Michael Hammer, a pioneer in business process management (BPM), defines five requirements for a sustainable, high-performance process. These five critical enablers are illustrated in Figure 5.

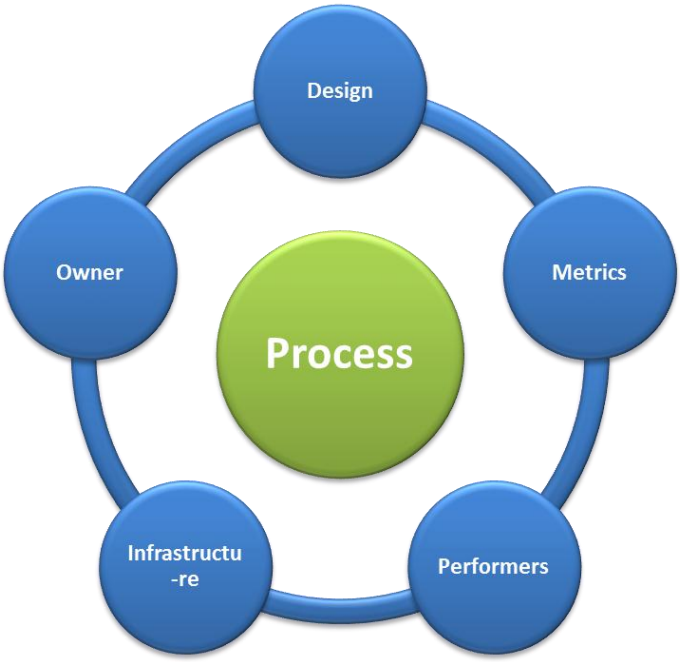


Figure 5: The Five Critical Enablers of Processes by Hammer (Brocke, Rosemann 2010a: 8-9)

Process design specifies the most profound process building blocks: what are the tasks, performed by whom, when, where, in what context and degree, and so on. The design coordinates the activities and information of the organization.

Process metrics should spring from customer needs and goals of the enterprise. Once a target of metrics is set, the performance of the process is monitored against it in terms of costs, time, quality et cetera.

Process performers are the people who undertake the tasks of varying requirements and expertise. In order to reach the full potential of end-to-end entity, everyone must understand the process and goals.

Process infrastructure enables performers to accomplish their respective responsibilities. Integrated systems such as the ERP, support the process by providing coherent and relevant information necessary for process integration.

Process owners manage the entirety of a given process. The owner acts as the authority and responsible from end-to-end.

According to Hammer, a process that does not possess all of these enablers is ineffectual and unable to perform successfully for long. Implementing the above listed process enabler is dependent on four main organizational capabilities: leadership, culture, governance, and expertise. (Brocke, Rosemann 2010a: 8-9) This study excludes the organizational capabilities to focus on the particular five enablers of the quotation process.

Business Process Management considers a multitude of aspects concerning both processes and management. The previous paragraph provided a general understanding of the design and principles of process design and management. To utilize the immense versatility of BPM, the concept expands to six core elements. These elements act as the framework for the structuring and implementation of BPM. The complexity is broken down via the framework to provide a holistic approach, as illustrated in Figure 6. The six elements are key success factors of BPM. (Brocke, Rosemann 2010a: 107,112)

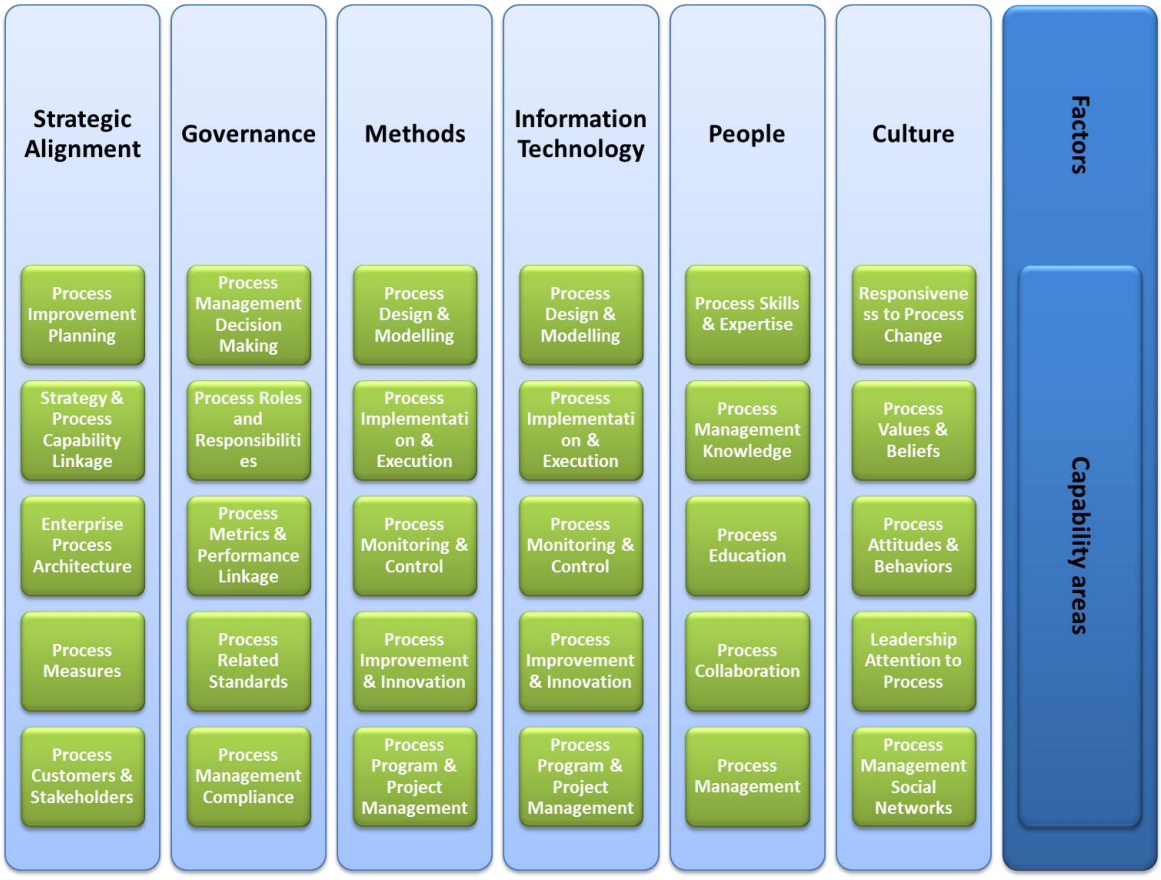


Figure 6: The six core elements of BPM (Brocke, Rosemann 2010a: 112)

Strategic alignment aims to synchronize strategy with priorities and processes within an organization. Processes are assessed strategically from design to execution, managing and metrics. Iteratively, strategies guide processes, which can eventually lead to new strategies enabled by those very processes.

Governance ensures responsibility and task allocation. Decision-making layout and actions required by the process define the roles, tasks and responsibilities of process stakeholders and performers.

Methods are the tools and techniques that provide processes with the ability to act. Methods enable and ease modeling, analysis, or improvement.

Information Technology is an important facilitator of BPM implementations. IT enables statistics, analysis and modeling. Process-awareness is the ultimate intelligent form of IT in BPM. Awareness is achieved when a process input is explicitly understood and executed by software.

People are the performers who improve business performance by increasing their expertise and skills in order to improve processes. People are described as the BPM potential possessed by an organization and its domain.

Culture integrates the values of an organization to those of BPM. Studies indicate a correlation between culture and BPM success. Culture is slow and the most difficult to change.

The six core elements described by Brocke and Rosemann deduce from broad literature. The elements each contain five capability areas, as illustrated in Figure 6. Further elaboration is available in the handbook. (2010a: 112-114)

3 Current state analysis of the quotation process

The sales team of the company is responsible for the core sales process. As a sub-process, the Technical quotation team provides them with technical support and expertise for customer specific approaches and requirements. The Technical Quotation process has an owner and a documented current state model. The aforementioned processes are parallel and interconnected.

Several departments within the unit can issue quotations. The authorization level dictates the values, effectively pricing, or any changes to the sales documents. The values have to be in the ERP and approved. After being approved, appropriate roles are allowed to handle the tasks within their value range. If the prices are in the system, the amount of possible documents handlers increases exponentially. The authorization levels have a hierarchical structure that reduces the amount of signatories as the value increases.

The role of area managers is to lead, educate, and support the local sales organizations in the service offering of the company. In many cases, this unit is only one of many product groups that local subsidiaries and partners around the world provide to the end customer. This creates a challenge considering the resources and expertise the dealers have of our products.

The company has working instructions and organizational directives in databases. The company has also defined hierarchical levels for processes. The sales process has outdated and unorganized written instructions. This thesis will exclude the roles and instructions of the local sales organizations.

Table 2 lists the interviewees for the current state analysis. The employees are producers or stakeholders of the quotation process.

Table 2: Interviewees

Date	Interviewee	Subject	Duration
March 6st 2013	Customer Service Team Leader	Interview of current state	64 min
March 6st 2013	Sales Manager	Interview of current state	73 min
March 11th 2013	Area Manager 1	Interview of current state	93 min
March 14th 2013	Area Manager 2	Interview of current state	64 min
March 20th	Area Manager 1	Interview - improvement	61 min

3.1 Challenges of the process

Spare parts account for the majority of the unit's business. The company performs excellently at providing spare parts and services by the measures of customer satisfaction and On Time Delivery (OTD). The core processes of the company fare well in metrics. **The main challenges identified in the quotation process were process variability and inefficiency in communication.**

The main challenges discovered in the current state of the quotation process were:

1. Laborious and complicated retrieval of information needed, consuming more time when quoting certain products and services.

2. Unlisted material is at times difficult to provide, even if it is physically available via company network. Flexibility to deviate from logical processes is limited.

3. Quotation information is not always explicit and fully distributed.

Resulting in:

1. Prolonged lead times in order confirmation and handling, caused by both internal and external factors.

2. Difficult and manual order status tracking and estimation. Prolonged lead times of quotations.

3. Prolonged delivery time.

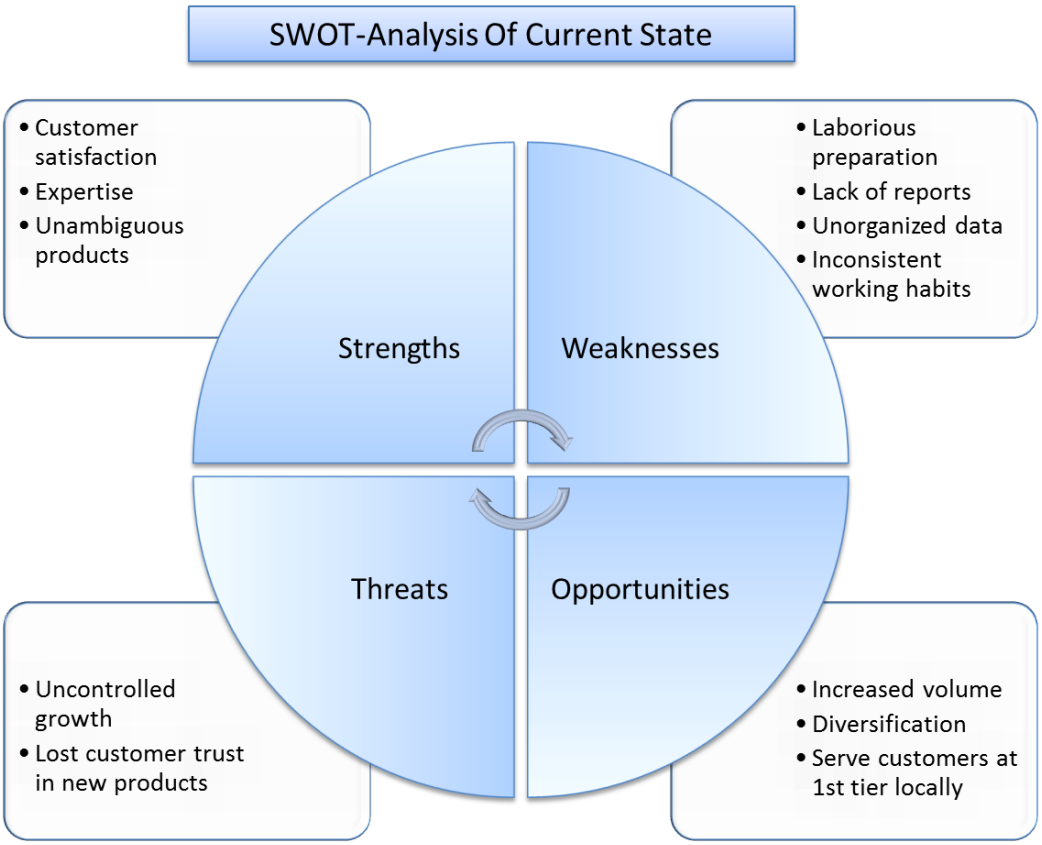


Figure 7: SWOT-analysis of the quotation process

Figure 7 examines the process by a SWOT-analysis.

The **strengths** of the process are in the expertise and customer-oriented approach of the performers. Established products perform excellently to provide a sound business.

The **weaknesses** are fragmented information and working habits, and at times resource-consuming tasks that could be handed over to other performers. The information and reporting could be utilized to improve efficiency.

The **threats** derive from the weaknesses. If the new products are not introduced with sufficient control, service delivery and quality may risk being impaired.

The **opportunities** are in new business areas and models that are not yet applied. Increasing the offering and revenues from the new products and services has great potential. This would also diversify the portfolio, while addressing new market needs. The majority of the process could also be transferred to the local sales organizations, thus releasing company resource to managing the global sales.

The quotation process design currently best supports standardized items and products ordered via CIOS. The process is not currently measured. Data is available in fragmented and incoherent form. Reports and summaries are unobtainable. This study excludes metrics since they are not applicable until the process is structured.

Unlisted items are not stocked material, but rare or single purchase orders (PO). Unlisted items are more prone to lead to 1) unclear and inexplicit communication and 2) longer lead time due to laborious research. The quotation process is formed by multiple offerings. The smaller ones can be divided into ambiguous and unambiguous material and services. This study defines this division of these two by the material code. If the material code exists in the ERP, the material is unambiguous, and vice versa. Figure 8 compares the quotation and ordering process of unlisted and listed items. The unlisted, on the right, require extensive preparations and specification, while the ambiguous parts are relatively straightforward to purchase. The materials that have their delivery time and availability stated in CIOS, are not quoted unless specifically requested by the local sales organization, except for example in case of discounts.

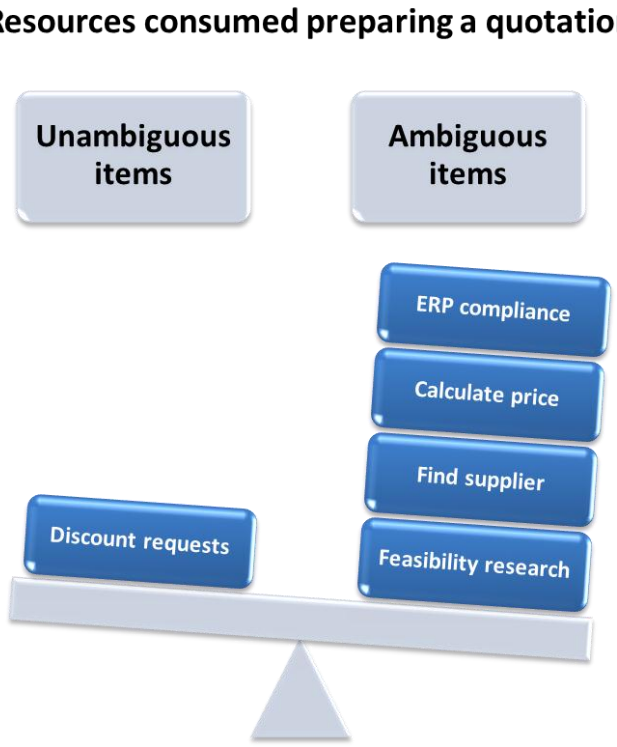


Figure 8: Comparison of preparing quotations

The dependability of processes on each other can be measured in time and money. The failure of the dependability of supply, for example, translates into delays in the next phase of the operation. If an operation is halted by any phase, costly rescheduling, not to mention the fixed costs that occur whether or not anything is being done, can translate into both lost revenues and excess costs. In addition to costs saved, dependability creates stability that allows operation phases to improve their own responsibility, trusting that the other phases will deliver. (Slack et al. 2010: 44)

The quotation process acts as an input to the subsequent process of order handling and fulfillment. If the quotation process makes a customer promise that the underlying processes cannot provide, the result can be a customer disappointment from the operational aspect.

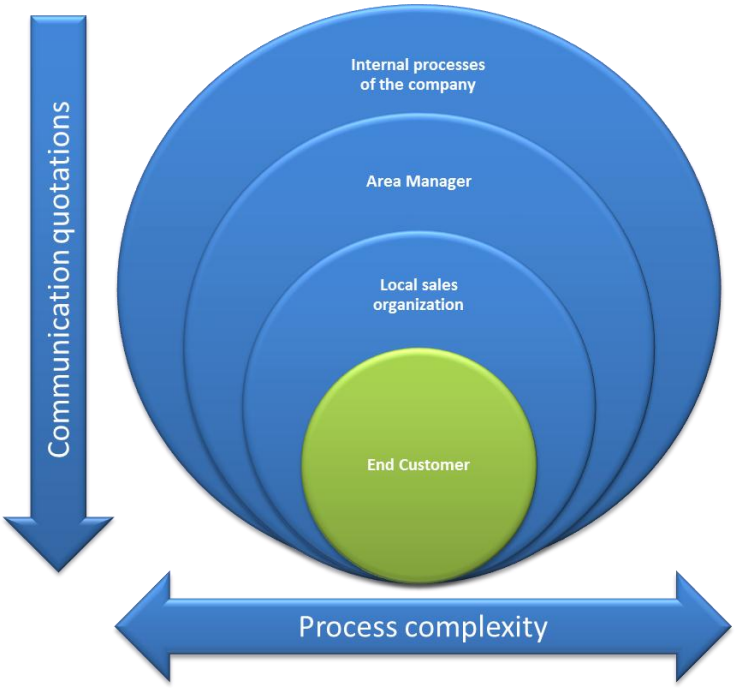


Figure 9: Stakeholders and channeling of quotations

Figure 9 demonstrates the internal and external stakeholders of the quotations of the unit. Internal processes begin by defining the products and prices. Understanding the real end-customer needs is vital to ensure the correct execution of the whole process. The length and complexity of the chain requires effective communication in all phases. Input from the end customer, displayed in green, should be as minimal and clear as necessary. The failure of internal processes to provide the required information at once, displayed in blue, results in ineffective and costly rework. **Currently, certain internal processes are vague to stakeholders. Improving their effectiveness would naturally also benefit the quotation process in both stages, and ultimately the customer.**

3.2 Internal communication and roles

Local sales organizations are responsible for direct end-customer contact. Area Managers participate in their sales process with visits, and provide quotations to the local sales organizations. The final quotation is delivered in written form via information systems, mainly CIOS or e-mail. The template in CIOS is often bypassed due to complexity of the tools in use. Communication on the road is mainly performed by e-mail on a

mobile device or laptop. Using company systems requires the use of Virtual Private Network (VPN) and browser capability. A PC and a functioning VPN are required for the efficient utilization of tools outside of the office. Quotations that are not communicated via CIOS are only available to those that are included in the exchange. **This increases the risks of leaving relevant stakeholders without information, resulting in restricted workflows, duplicate work, and hence delayed turnaround.** If the requirements for a process phase, such as the transfer or information, are not complete, the process will not proceed. This can also lead to overlapping or unnecessary actions as the performers are not aware of the intentions and actions of each other. Transferring information efficiently plays a vital role in shortening the turnaround and reducing workflow restrictions.

Most of the products and services offered have customer-specific prices available from the information systems or pricing tools. This section considers the services and products that require case-by-case evaluation and quotation of prices. The sales process produces a scope of customer needs that may lead to numerous quotations. Options for replacement, repair, or maintenance are numerous. This leads to numerous types of quotations requiring different experts and tools.

Service products are not clearly described or performed. Clearer definitions would benefit the quotation process and overall organization. Knowing who has to do what at what stage, or who to contact would be important. Small checklists and minimum customer requirements are in use to issue indicative quotations with preliminary information.

The importance of explicit and lucid quotations is supported by the results of order handling lead-time analysis from January to April. More than one in every four delays in order handling, from arrival to order confirmation, was the result of obscurity in quotations. Acknowledged here is that these statistics are also often contingent on the customer response time.

The customer survey results published in March 2013 support the findings. Area Managers were rated the second highest. The satisfaction with service products was from low to moderate in two service products. The familiarity of those two products also received the lowest scores. **The data supports the business problem described in 1.2**

The quotation process and its performers are affected by certain products and services that are challenging to provide.

The roles and levels are at points vague and undocumented. The process functions but clarity would ease, expedite, and increase transparency. This would also translate into saved time, and thereby costs.

3.3 Quotation preparation

The products and services offered vary greatly in complexity, price and substance. Quotation values range from tens to millions of euros. CIOS has a built-in form, a feature that allows a congruent chain from Request For Proposal (RFP) to Purchase Order for certain items. An inquiry can be copied directly to a quotation, and a quotation to a purchase order. This functionality is seldom used. Some products, such as care contracts, inventory access, or suitcases cannot be converted or handled in CIOS, but in the Enterprise Resource Planning (ERP) system. Inserting them into CIOS would be beneficial for information collection and sharing.

The multitude of products and services has created a scattered and complex collection of tools and systems used for quotations. **Inevitably, due to the extensive base of supported products, complete elimination of complexity is quite impossible.** Process performers tend to have their own ways of seeking out the information they need.

The customer survey results resemble the internal factors as well. **The unfamiliarity of the products and their assembly within the organization inevitably affect the communication to customers as well.**

3.4 Process variation

This section sums up the challenges. The main operations are established and processes are coherent. However, it offers limited flexibility and deviation from norm. **Stakeholder roles and responsibilities are not explicitly defined**. Handling anomalies would benefit from sequential and simple assignment of tasks and responsibilities. Brocke and Rosemann also acknowledge that **"the differences in products and services may require variation in the processes that create, deliver and maintain**

them." Knowledge work is difficult to model. This difficulty causes variation due to lack of structure, measurement and repeatability. (2010b: 314)

Strategically, a certain degree of customization needs to be decided upon. At times, the products and services require components or solutions that are in the supported lifecycle of the product, but the desired parts cannot be quoted. As concluded before, the process for listed items functions quite well. Introducing unlisted items to that same process is quite challenging. The flexibility is limited working instructions, responsibilities, or organizational patterns. Researching new or alternative solutions is time-consuming and inefficient for the area manager. There are separate processes for items of different availability classes, but no bypass process. The transaction costs of certain actions, if followed by the process, increase dramatically. Hence, a "wild card" process could prove beneficial in cases that require walking the extra mile.

Process variation occurs for various reasons. Listed below are the four main sources of process variation according to Stevenson. (2009: 11) The quotation process is more or less affected by all of the below sources. Currently, the spare part business (unambiguous) functions very effectively. Structural and random variation are not in the scope of this study. Ambiguous and single purchase order are identified as the variety of offering. Variety often results in miscommunication and excess labor and follow-up.

1. The variety of goods or services being offered

   "The greater the variety of goods or and services being offered, the greater the variation in production or service requirements."

   The company's growth objectives are shifting to new service products that lack definition and standardization.

2. Structural variation in demand

   "These variations, which include trends and seasonal variations, are generally predictable. They are particularly important for capacity planning."

Fluctuation of customer orders occurs. The channel structure potentially leaves the unit dependent on the quantity and quality of information received from the local sales organizations.

3. Random variation

   "This natural variability is present to some extent in all processes, as well as in demand for services and products, and it cannot generally be influenced by managers."

   Standardizing processes reduces the percentage of individual order preparation, freeing resources to serve the remaining variations.

4. Assignable variation

   "These variations are caused by defective inputs, incorrect work methods, out-of-adjustment equipment, and so on. This type of variation can be reduced by analysis and corrective action.

   Process design and effectiveness have an effect on assignable variation, as the processes are not self-explanatory and structured. This thesis serves as the aforementioned analysis.

Variations cause disruption, preventing the operations and supply chain processes from functioning ideally. Disruptions can lead to excess costs, unnecessary labor, delays, inefficiency and quality fluctuation. Quality deficiencies, delays and shortages can damage the organization's reputation and image through customer dissatisfaction. Stevenson hence underlines the importance of the managers' abilities to deal with variations. (2009: 11)

3.5 Limitations and restrictions due to authorization levels and roles

The allocation of tasks is not always evident. The organization consists of numerous experts and responsibilities. Setting clear roles and escalation levels of tasks would help each performer to know his or her responsibility. Brocke and Rosemann argue

that effective processes require the effective performance of several key roles. Although process owners are appointed, they prefer to refer to the ownership as shared and collaborative work to remove non-“owners” that can distance themselves of responsibility. The whole value chain is affected by those roles. If there is no agreed process architecture, governance is futile due to lack of consistency. Without measurements, the results cannot be assessed and accountability of performers can be avoided. (2010b: 29-31)

The considerable size of the organization sets certain restraints and demands for roles and functions. A vast number of tasks require a vast number of duties and responsibilities. Special expertise and tools used vary greatly. Horizontal organizational levels have hierarchical authorization and approval limits and employees with assigned responsibilities. The quotation process relies on the area managers for monetary approvals at certain values. Area managers, then, rely on the higher management. Company processes are also subject to laws, internal policies such as the Sarbanes-Oxley act (SOX). The company complies with SOX, which sets constraints and regulations to both monetary authorization levels and task allocation. A quotation has many stakeholders: the issuer, the customer, and the order handler. Each task that involves a monetary transaction must have a different performer. The area sales managers have the necessary levels of authorization as the assigned performers of the sales, and ultimately quotation process. (Securities and Exchange Commission)

The matrix organization creates control points for processes. The controls are further refined to type and value of transaction. Essentially, each transaction has a responsible that must approve the task. Process design should consider this to reduce unnecessary lag caused by authorization requests. The authorization is carried out by signing on paper, e-mail, or ERP. Pending approvals cause non-value adding lag and waiting time. The performer must communicate the case to the signee clearly. Since it requires documentation, unified working habits would be expected. The authorization levels are available via databases to find the proper party for each type of transaction. The quotation process requires authorization for sales transactions. The technical team, however, does not have authorization, which results in approval requests. **If the prices and products are not standardized, the required authorizations may create bottlenecks and affect the actions of performers to find the least path of resistance and lead-time.**

3.6 Evaluation of current state

The current state of the process is evaluated against the six core elements of BPM, introduced in chapter 2. The six core elements contain six capability areas. Figure 10 describes the state of the quotation process with traffic lights. Green is used to depict the well-performing areas while orange is used to illustrate those areas that need consideration. The color red represents the identified challenges.

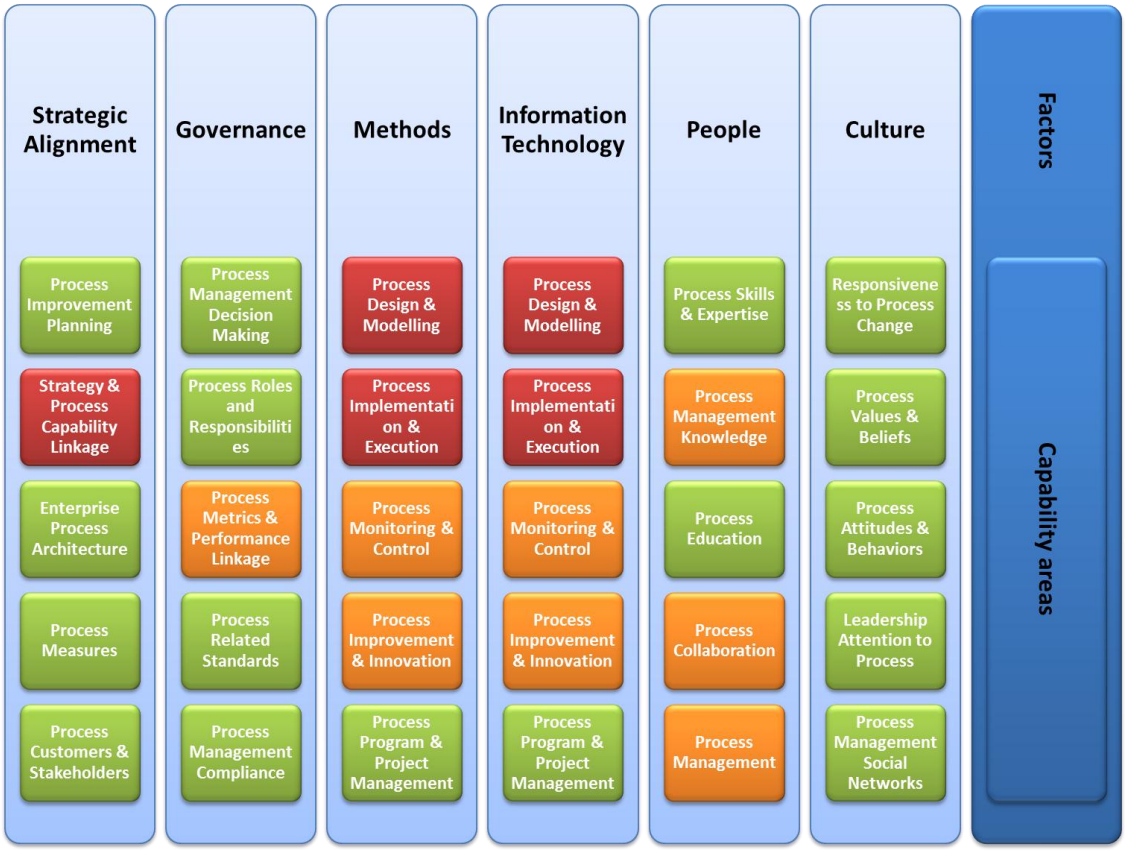


Figure 10: The six core elements of BPM evaluated (Adopted from Brocke, Rosemann 2010a: 112)

Strategic alignment should provide an improvement plan from the organizational strategy. **The current growth objectives towards a service business orientation are not supported by current BPM design.** This thesis does not cover that and focuses on the quotation process. According to Brocke and Rosemann, linking the strategy to process capability should be able to answer these questions: (2012a: 114-115)

- Do the business processes directly contribute to the strategy?
- Do organizational strategies explicitly incorporate process capabilities?

- Do we know which processes are impacted by a change of strategy?
- Which processes could become a bottleneck in the execution of the strategy?
- How should scarce resources be allocated to the competing process?

The methods and roles of the quotation process are not clear to the performers or stakeholders. The design and implementation have individual approaches and process monitoring has been implemented on a high-level. Process improvement is carried out by this thesis and another similar project.

Information technology is a prerequisite for an organization of this magnitude to function effectively. The usage and knowledge of tools are both fragmented. Databases and their functionalities should be documented.

The overall evaluation is illustrated below in Figure 11. Most of the areas are in good condition. The research revealed some improvement areas to consider which will be excluded from this study. Instead, this thesis approaches the “challenge” areas identified.

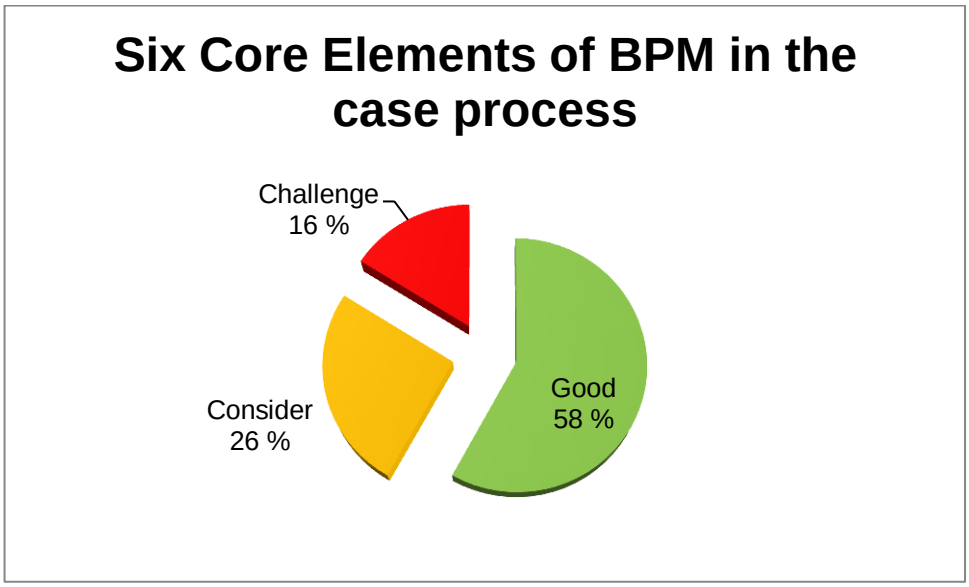


Figure 11: Simplified analysis of current state

3.7 Process model of the current state

The model in Appendix 1 visualizes the quotation process on a high-level, focusing on the main workflows and control points. This model does not address individual products or services. The quotation process is only the culmination and visible apex of an extensive sales process. The two are interconnected and proceed iteratively as a dialogue.

4 Focused best practices of process improvement

This chapter pursues to deliver relevant and appropriate literature and knowledge to address the challenges described in Chapter 3. The term “customer” applies to both external and internal customers. Stevenson names improved quality, reduced, costs, and reduced time as the main benefits of process improvement. (2009: 28) Productivity improvements can be gained by reducing or improving the inputs. Internal effectiveness is one of the best ways to improve performance, and all performance objectives affect costs. (Slack et. Al 2010: 51)

> “High quality operations do not waste time of effort having to re-do things, nor are their internal customers inconvenienced by flawed service.”
>
> “Fast operations reduce the level of in-process inventor between and within processes, as well as reducing administrative overheads.”
>
> “Dependable operations do not spring any unwelcome surprises on their internal customers. They can be relied on to deliver exactly as planned. This eliminates wasteful disruption and allows the other micro-operations to operate efficiently.”
>
> “Flexible operations adapt to changing circumstances quickly and without disrupting the rest of the operation. Flexible micro-operations can also change over between tasks quickly and without wasting time and capacity.”

4.1 Reducing transaction costs via customer integration

The transaction cost theory provides a framework to analyze the relationship of processes between a service provider and the customer. Transaction costs result from the coordination of economic activities and consumption of resources, such as personnel or time. A service process requires both internal and external inputs by integrating the customer process into the production of the service. Since the service process includes both the customer and the service operator, the entity can be viewed as a single, larger process. They need to be aligned and synchronized to achieve efficiency and coherence. (Frauendorf 2006: 54-55)

Successful service processes derive from successful customer integration. The level and quality of customer involvement and input have an effect on the output of the whole customer process. A service cannot create value without customer participation. The supplier needs at least the requirements of what the customers sought. This form

or “co-production” is especially important in sophisticated industrial partnership trade. The most important external factor is information: no service transaction cannot be made without some level of information transfer. Customer integration should be implemented before the transactions: be it service improvement or providing the prerequisites for the service process. (Fraudendorf 2006: 11-22)

“Customer integration competence describes the ability of a company to integrate customers into the production process of customized goods and services. Customer integration refers to the material configuration of goods and services, to customer communication and to controlling for efficiency under result from a presence of appropriate organizational resources, to the extent of appropriate labor qualification and experience made in appropriately fulfilling corresponding tasks. (Frauendorf 2006: 22)

Configuration competence requires that the processes that comprise the service combine the internal and external resources and align each service transaction to produce a smooth service process. The provider needs to involve the customer by aligning its process with theirs.

Communication competence is the service provider’s aptitude to get the necessary information from the customer to provide a solution. Then this information needs to be internally transferred. Promoting process transparency is important. The provider must motivate the customer to deliver the resources, or information, to form the service transaction.

Control competence describes the efficiency of the service process, emphasizing the role of the customer as a co-producer. Hence, process efficiency is affected by the customer’s input. This competence demands documentation and analysis of the process.

Frauendorf argues that a successful service requires all three dimensions. (2006: 22) Customer integration aims to **ease process usability** for both customer and provider, and reduce **transaction costs**. Consequently, **successful customer integration** results in a **more productive and effective process**.

The production of a service process consists of all the transactions on both sides, which both are motivated to reduce. Avoiding and reducing unnecessary communication, or coordination activities, is desirable. To achieve this, both sides need to under-

stand the opposing process structure and expectations. The provider is responsible for certifying that the customer know what to do, when to do it, and why. Essentially, transaction and action costs can be reduced by agreed operations. (Frauendorf 2006: 23-25)

4.2 Increased flexibility by new methods and tools

Slack et al. define flexibility as the ability “to change the operation in some way”. This means changing the what, who or when of an operation. Customer requirements urge the operations to be able to: (2010: 46)

- Introduce new or modified products.
- Produce a wide range or mix products and services.
- Change its level of output in terms of quantities and volumes.
- Change the timing of the delivery.

The flexibility inside operations has three distinct advantages according to Slack et al (2010: 48)

- Shorter response times
- Time saved
- Maintained dependability

The unit develops new and modifies existing products and services to ensure service levels for each product, for example the retrofit products and service contracts.

Flexible operations have multiple value offerings to both internal and external customers. Mass customization enables operations to perform different things to different customers. Essentially, high variability is associated with high costs and low volumes. Regarding the service and service product side of the business, the implementation of such a process would be a natural part of a service delivery. Some benefits of the learning curve could be expected. (Slack et al. 2010: 47)

4.3 Applying best practices for quotations of area managers

The unit is an established and reputable spare part provider. However, the strategy is moving the business towards a customer-oriented service delivery, requiring ever more complicated and flexible offering. Figure 12 visualizes the transformation of business processes. Green depicts the current, excellently performing operations. Red represents the future growth areas. The sizes show the respective division today, with the gap expected to shrink. This thesis serves the blue, or transformation phase, by utilizing the successes of the green to build the red.

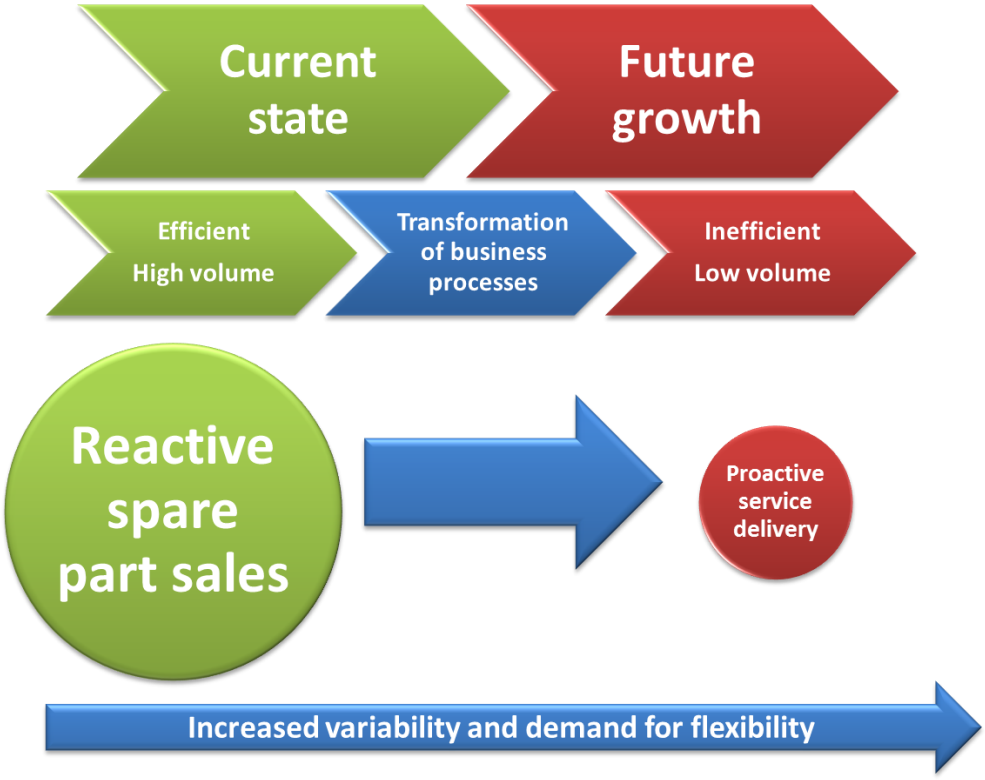


Figure 12: Roadmap to growth objectives

Degree of Customization

The degree of customization in the products and services has a profound influence on an organization. Customized products and services are more labor intensive and resource consuming than standardized. Producing customized products and services also requires more time, flexibility and competence. Customization leads to higher pric-

es and lower process output volumes. (Stevenson 2009: 20) An increased degree of customization affects the intensity and volume of required customer interaction. (Frauendorf 2006: 19) This is important to consider in the design of the organization since it will affect the entire business.

5 Improving the quotation process

This chapter introduces the suggested process model produced by a collective input from the most important stakeholders and performers. These findings reflect against the business problems and align with the company's strategic objectives.

The quotation process in its very nature does not need to be overhauled. However, the purpose and design need to be documented and communicated to the stakeholders. The process should define the factors of what, who, where, and when, including the customer. Once everyone knows his or her responsibilities and expectations, it is time for execution.

5.1 Reducing transaction costs

Reducing total transaction costs by improving the efficiency and communication requires:

- **Creating a process description and with defined roles.**
- **Commitment of process stakeholders to improvement.**
- **Clear responsibilities of the performers.**
- **Controls and measurements of the process.**

Everyone should focus on making contributions that develop the system towards one that is effective and lean. A system that solves the customer need when they need it, with minimal waste. While this issue is important for any department, especially the material management should take note. (Flinchbauch, Carlino 2006: 128-129)

Common wastes for service organizations are waiting, motion, over processing and service. Over processing is not always obvious, since it means doing more than the customer actually values without providing any added benefits. The most important asset of a service organization is time. Organizations should concentrate on solving the

problems, rather than creating workarounds. This of course, requires transparency and visibility to take up those problems. (Flinchbauch, Carlino 2006: 133-135)

A service organization should focus primarily on creating value to the customer. The nature of service requires customer involvement at least in the beginning and end of a process. This links the process directly to value. Designing the process around the customer is important in order to give them what they want. Inspecting the whole process is more important than focusing on just the outcome. Flinchbauch and Carlino look at removing wasted customer time by asking: (2006: 137-138)

- How much of the customer's time does an organization waste by making them wait for service or rework?

- How many times does an organization ask its customer to provide the same information repeatedly?

Each individual should evaluate what is the work that adds value. Lean thinking begins with the question: "What does my customer value?" Identifying and understanding that need for each customer, and fulfilling it at just the level necessary, is lean. Customer focus can help to assess whether the work performed does or does not add value. Time is the most valuable resource of all stakeholders. (Flinchbauch, Carlino 2006: 145-147)

5.2 Standardization and mass customization

Standardization is impossible to achieve completely, but it should be pursued as long as customer needs are met. Variation occurring in the inputs of the process (see 2.1) tends to affect the output. Changing and controlling the inputs to produce the same output, means changing the effectiveness. Changing the inputs (supplier), guides (policies), and enablers (systems) make standardization possible. (Brocke, Rosemann 2010b: 309-310)

Standardized processes could provide consistent customer experience, enhanced partner participation, reduced IT costs, and common execution throughout the organization. Standardization eases the identification and readiness of the exploitation of op-

portunities in multiple areas. Generally, management becomes easier and more transparent. (Brocke, Rosemann 2010b: 310)

The difficulties and trade-offs cannot be completely prevented. Setting the standards is equivocal and subject to company policies. Setting the standard at the proper process depth enables the professionals to adjust to those necessary tweaks and deviations from the process. That depth must then be defined and relayed well.

The organization is highly capable. Doing everything, everywhere might not be sound and profitable business and thus focusing on certain areas of expertise is quite logical. **These products and services should be defined so that 1) customers know what value is available for what compensation 2) the organization can provide that sensibly**. The products should have a uniform high-level structure that can be tailored to fit specific needs.

Variant configurators

The systems are massive and sophisticated, containing large numbers of data and connections. Certain variant configurators are in use, which are advantageous in many ways. For example, easing or automating repetitive tasks. Variants can also establish baseline product definitions that adjust to specific customer needs. This would require major investments in both infrastructure and personnel. Information is available but difficult to harness.

- Design the process to function with certain minimum requirements from customer.

- Increase the amount of information available to the local organizations.

5.3 Suggested consequent actions

The findings of the study suggest that the following topics are addressed when the process is evaluated.

- Developing new and modifying current tools to better support the activities. Assessing and taking inventory of the tools in use. Evaluate the tasks and functions of the process.

- Clarify the roles and responsibilities of process performers. Model the process with detailed descriptions, hand-over points, and authorization levels.

The area managers should reduce their participation in quoting standard spare parts and concentrate on the service products. This would enable both them and the technical quotations team to focus on their strengths. Collaboration and information sharing should remain constant.

The working instructions and process models should be communicated to the local sales organizations to increase their self-reliance. This requires that they are first developed in-house.

6 Conclusions

The objective of this study was to produce a process model of the quotation process. The objective was achieved.

Due to the iterative nature and individuality of the study, the objective was reviewed and updated. The process was described on a high-level since a detailed process model is underway in another project. That allowed this thesis to look at the general principles and working habits of the process. The renewed objective was to provide a document to communicate the purpose and design of the quotation process to the stakeholders. Business process management and improvement should connect stakeholder value with strategic intent.

Prioritizing processes

Increasing performance through priority ranking seeks to find the processes that have the potential and worst performance against the planned future of that process. Stakeholder values should be assessed by "how well will today's process design, and its current supporting capabilities, be able to meet the future stakeholder performance need?" (Brocke, Rosemann 2010b: 33) The service products have potential and worst performance at the moment**. Prioritizing or investing in processes is a strategic choice for the management.**

Communication and roles

The explicit division of tasks and responsibilities should be defined to ease the questions of responsibility and accountability. The roles should not be absolute, but rather guidelines for executing daily work. Understanding the effects and association between processes is important throughout the organization. Increasing the responsibilities and expertise of local sales organization requires internal coordination of activities and assigning of tasks in a definite manner before applying that to subsidiaries. This means mapping out the processes before handing them over. **This is one of the tasks of the process owner.**

System usability and effectiveness

Listing and evaluating the tools and systems in use would begin with a more detailed process study that looks at what is needed to 1) provide customer value 2) what is necessary for effective work. Organized and available information leads to shorter preparation times and less manual work. All performers may not be aware of the capabilities or usability of the tools in use, or even the existence of those tools. **Collaboration and communication systems are developed in another intranet project that can be expected to relieve the communication challenges.**

6.1 Evaluation of thesis

This thesis is an informative document aimed to increase internal and external awareness and transparency of the quotation process and service products. The research was supported by data from other ongoing improvement projects. The customer service results published during the research support the findings and identify the same challenges for the whole organization. The direction of the findings of this thesis was correct, but the analysis and modeling could have been deeper.

6.2 Key important findings outside the scope

Current processes of certain services and service products will not able to sustain the growth objectives set. Improving the design and efficiency of these processes is mandatory to withstand the increased volume. Strategic alignment, described in 3.6, should be reviewed to support objectives.

The service products are vague to internal stakeholders and customers. Productization of services and service products would assist in providing quotations and operations. The better the internal and external stakeholders are informed, the less support is necessary back and forth.

Local sales organizations need training in order to increase their capability to serve customers in the first tier. The better trained and self-explanatory the products and services are, the less rework and support will be needed.

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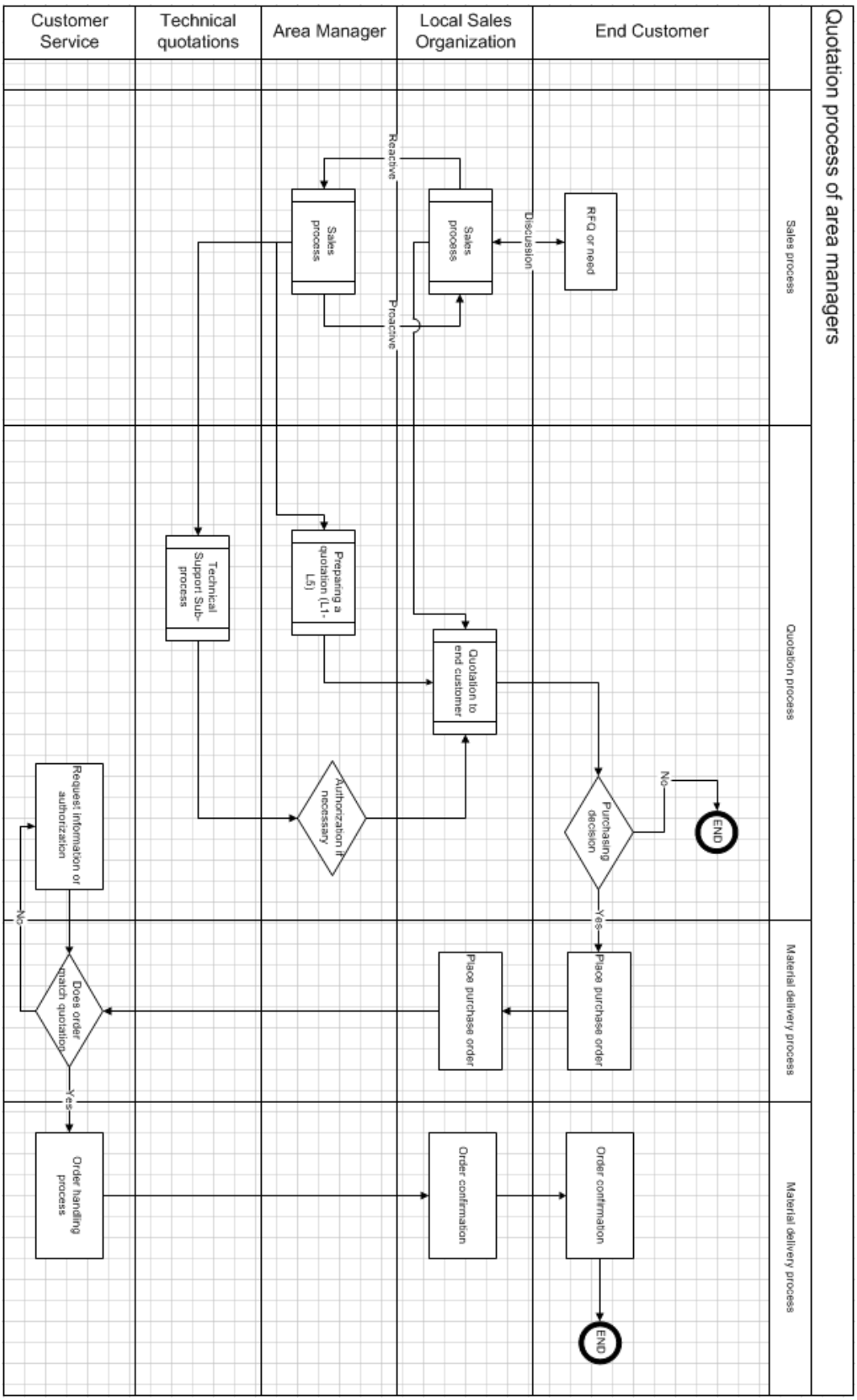
Appendices


Quotation process of area managers
Customer Service
Technical quotations
Area Manager
Local Sales Organization
End Customer
Sales process
Quotation process
Material delivery process
Material delivery process
RFQ or need
Discussion
Sales process
Reactive
Sales process
Proactive
Technical Support Sub-process
Preparing a quotation (L1-L5)
Quotation to end customer
Purchasing decision
No
END
Yes
Authorization if necessary
Request information or authorization
No
Does order match quotation
Yes
Place purchase order
Place purchase order
Order handling process
Order confirmation
Order confirmation
END