Author: Villafuerte, Daniel S.

Title: Utilizing Business Process Management Principles to Propose Improvements in the Handling Process of the Product in ABC Truss LLC

The accompanying research report is submitted to the University of Wisconsin-Stout, Graduate School in partial completion of the requirements for the

Graduate Degree/ Major: MS Degree in Operations and Supply Management

Research Advisor: James Keyes, Ph.D.

Submission Term/Year: Fall 2018

Number of Pages: 70


☒ I have adhered to the Graduate School Research Guide and have proofread my work.
☒ I understand that this research report must be officially approved by the Graduate School. Additionally, by signing and submitting this form, I (the author(s) or copyright owner) grant the University of Wisconsin-Stout the non-exclusive right to reproduce, translate, and/or distribute this submission (including abstract) worldwide in print and electronic format and in any medium, including but not limited to audio or video. If my research includes proprietary information, an agreement has been made between myself, the company, and the University to submit a thesis that meets course-specific learning outcomes and CAN be published. There will be no exceptions to this permission.
☒ I attest that the research report is my original work (that any copyrightable materials have been used with the permission of the original authors), and as such, it is automatically protected by the laws, rules, and regulations of the U.S. Copyright Office.
☒ My research advisor has approved the content and quality of this paper.

STUDENT:

NAME: Daniel Villafuerte DATE: 12/7/2018

ADVISOR:

NAME: James Keyes, Ph.D. DATE: 12/7/2018

This section for MS Plan A Thesis or EdS Thesis/Field Project papers only

Committee members (other than your advisor who is listed in the section above)

1. CMTE MEMBER’S NAME: DATE:
2. CMTE MEMBER’S NAME: DATE:
3. CMTE MEMBER’S NAME: DATE:

This section to be completed by the Graduate School

This final research report has been approved by the Graduate School.

Director, Office of Graduate Studies: DATE:
Villafuerte, Daniel S. *Utilizing Business Process Management Principles to Propose Improvements in the Handling Process of the Product in ABC Truss LLC*

**Abstract**

The objective of this paper was to identify, create, and diagram a well-structured process for the selling, design, scheduling, manufacturing, dispatch and handling of products at ABC Truss LLC. Using the principles of business process management and business process improvements, recommendations and enhancements were proposed in order to develop a standardized, more efficient process that supported the organization’s performance and way of doing business. The current project will serve as a base from which the company can engage in positive change that will lead to goal attainment.
Acknowledgments

First, I want to thank my program director Doctor James Keyes for his door has always been open for me to ask questions and get the necessary support since the beginning of my studies to the review of this project. I would also like to thank ABC Truss and its brand manager for allowing me to work with them to develop this study, I appreciate the trust you placed in me.

And finally, thank you to my family, friends, professors and specially my lovely wife for helping me achieve one of my biggest dreams, obtaining my master degree. Thank you for all the support, time and effort you put into having my back.
Table of Contents

Abstract .................................................................................................................................................. 2

List of Figures ........................................................................................................................................ 8

Chapter I: Introduction .......................................................................................................................... 9

  Statement of the Problem ..................................................................................................................... 11
  Purpose of the Study ............................................................................................................................... 11
  Assumptions of the Study ...................................................................................................................... 13
  Definition of Terms ............................................................................................................................... 14
  Limitations of the Study ......................................................................................................................... 15
  Methodology ......................................................................................................................................... 15
  Summary ............................................................................................................................................... 16

Chapter II: Literature Review .................................................................................................................. 18

  Supply Chain Management and Logistics ............................................................................................. 18
  Business Process Management .............................................................................................................. 19
    Business Process ................................................................................................................................. 21
    Process Architecture ............................................................................................................................ 22
    Process Design .................................................................................................................................... 22
    Process Modeling ............................................................................................................................... 23
  Quality Process Management ............................................................................................................... 23
  Organizational Strategy ......................................................................................................................... 24
  Business Process Improvement .............................................................................................................. 26
  Lean Management ............................................................................................................................... 26
  Customer Service ............................................................................................................................... 28
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary</td>
<td>54</td>
</tr>
<tr>
<td>Chapter V: Discussion, Conclusion and Recommendations</td>
<td>56</td>
</tr>
<tr>
<td>Limitations</td>
<td>57</td>
</tr>
<tr>
<td>Conclusions</td>
<td>58</td>
</tr>
<tr>
<td>Recommendations</td>
<td>59</td>
</tr>
<tr>
<td>References</td>
<td>61</td>
</tr>
<tr>
<td>Appendix A: ABC Truss Philosophy</td>
<td>67</td>
</tr>
<tr>
<td>Appendix B: Improvements Based on Customer Focus Structure</td>
<td>69</td>
</tr>
<tr>
<td>Appendix C: Cross-Functional Process in ABC Truss</td>
<td>70</td>
</tr>
</tbody>
</table>
List of Figures

Figure 1: Preparation Phases ...........................................................................................................32
Figure 2: ABC Truss Single Process Flow .........................................................................................34
Figure 3: Flowchart 1 Example ........................................................................................................36
Figure 4: Flowchart 2 Example ........................................................................................................37
Figure 5: Deployment and Cross-Functional Flow Chart Example ................................................38
Figure 6: 5 Why Analysis ................................................................................................................45
Figure 7: ABC Truss, Purpose of Structure and Business Model Implementation ........................46
Figure 8: Sales Department Process Diagram ................................................................................51
Figure 9: Schedule Subdivision Process Diagram ...........................................................................52
Figure 10: Design Department Process Diagram .............................................................................52
Figure 11: Production Department Process Diagram .......................................................................53
Figure 12: Dispatch Subdivision Process Diagram ..........................................................................54
Chapter I: Introduction

Globalization, new tendencies and new technology have led companies to make drastic decisions regarding their daily work and tasks. Engaging in a process of continuous improvement is necessary for organizations to adapt in order to fulfill customer and industry requirements. Two key concepts that companies look at as a way of increasing their performance, value and competitiveness are business process management and business process improvement. Business process management is the actual term that involves a process management approach for companies to enhance their operation and reach excellence, while paving the way for the implementation of business process improvements that are directly related to the modification of practices and standardization of processes. Implementing business process management allows a company to review all the areas related to the business structure and helps maximize performance; as a consequence, creating and sustaining relationships with external and internal customers is possible.

A Building Solutions company’s department of Market Intelligence study of the forecast for construction in the United States for 2018 determines a slightly stronger growth of 5% overall. For the residential market, a 6% growth is predicted with a 9% sustained growth in single-family households; for the non-residential market, growth of 6% is expected, with emphasis on public and educational buildings. For the commercial market, a 2% growth is estimated, with office space leading the way. Overall, the non-residential market and the non-building market are anticipated to grow by 4% (Cavalcante, 2017). The construction field has continued to evolve during the current months of 2018 and will continue to change during the following years, as stated by market research. It is important for a company to know how market dynamics affect current processes and how they can impact future performance. In the present
study, the organization is a production company focused on the development of floor and roof trusses on the northwest side of Wisconsin, in Chetek.

ABC Truss LLC is a supplier of roof and floor trusses, integrated as a branch company of The Lyman Lumber Family, which was acquired by US LBM Holdings, LLC in 2011. It has 35 years’ experience distributing its products to lumber dealers and construction businesses in northern Wisconsin and east-central Minnesota. The company mission reads, “ABC Truss is continually setting the standards for quality and service by providing engineered components for floors and roofs of building structures. The knowledgeable sales and design staff can take care of the entire engineered component needed. A largely automated production floor featuring three fully automated set-up tables keeps trusses moving out the door quickly and efficiently, and a fleet of 26 trucks delivering to jobsite assures meeting building schedules” (ABC Truss, n.d., p. 1). In other words, the company implies that their services are customer oriented, with representatives of the sales, design, operations and dispatch areas being responsible for continuously communicating with the client in order to provide a quality experience. Additionally, the company states that it manages a fully integrated team that supports customers throughout the process, from the placement of an order, to scheduling and the final delivery.

During the summer and fall of 2017, numerous opportunities for growth and improvement were generated in the company, resulting in an increase in production and sales. This event motivated administration of managers to examine the approach of the company with regards to process management. ABC Truss LLC lacks adequate, integrated processes that are aligned with strategic objectives and each department, employee, and practice, which results in a limited business ability to respond to dynamic customer needs, new opportunities, and
unforeseen threats. As an emerging plan of action, the business process approach was transformed in order to repair both developing and established issues within the company.

The nonexistence of designed and standardized management processes has created a fragmented and reactive organization with weak communication among team areas, low productivity, unmet customer expectations, nonstrategic use of resources and technology, poor service quality, high amounts of waste, and a lack of accountability and agility to adapt to change. These inefficiencies in terms of business process management, which can be described as a management process principle that supports organizations to be more effective and efficient, are having a considerable negative economic impact on the company.

Statement of the Problem

The operation processes of selling, design, schedule, dispatch and handling of the product in ABC Truss LLC did not follow the principles and mechanisms of business process management, meaning that the company did not design or possess documentation of the processes performed. As a result, the organization experienced a lack of communication between departments, deficient administration of resources and technology, inefficient performance, and unmet customer expectations.

Purpose of the Study

The main objective of this project was to identify, develop and propose improvements to the current process of selling, design, scheduling, manufacturing, dispatch and handling of the product in ABC Truss LLC. In order to do so, it was necessary to take the following steps into consideration:

Review the organization’s philosophy because it guided the development of the company and the vision of each stakeholder. The organization’s philosophy goes hand in hand with
planning as it gives the company the option to discover what it wants and where it wants to go. Incorporating business process management with business planning into the philosophy would give the company a clearer view of what can happen in the short and long term. The study focused on the organization’s structure as a base from which to make improvements with the implementation of business process management.

Analyze the organization’s structure to identify the business process roles and responsibilities in order to understand how the company works. The main goal was to have all the departments working together in the same direction to reach the organization’s goals, as Jimmy Wales (n.d.) said; Things work well when a group of people know each other, and things break down when it is a bunch of random people interacting.

Analyze and diagram the current process structure in the company and in the involved departments to achieve a graphic representation of the steps that are followed in a sequence of activities, and the necessary related information. A process diagram shows all manufacturing or administration details such as operations, transports, inspections, delays and storage.

To carry out the creation of a process diagram, it was necessary to identify the starting point and the main ideas that would be included to have the participation of those responsible for each of the operations that are carried out. After defining the objective to be achieved, it was necessary to determine the limits and specify the level of detail required. The process diagram allowed for a more transparent vision of the process, making it possible to better understand the relationships and incidents caused during the process, and to observe details more closely. It allowed for the identification of steps, problems, bottlenecks, responsibilities and decision points. Additionally, it showed client and supplier transactions and facilitated the identification of customer need.
By using this approach, analytical thinking was stimulated within the company, since the analysis resulted in the improvement of the processes and operations, allowing new solutions and alternatives to appear, and creating an indispensable starting point for the optimization of the process. The diagram helped with a clear definition of limits of the process, since these were often not clear when dealing with operations and actions that were continually related. It supported the establishment of added value of each operation that is part of the process, and it facilitated the study and application of actions to improve the activity and its efficiency. The process diagram was used as a reference model to control and measure the processes and operations carried out.

Finally, it was necessary to design and propose improvements for the process by using the principles and concepts of business process improvement management. Over the years, businesses have been managed with only limited goals, which have prevented them from seeing beyond their immediate needs. That is, planning only occurs for the short term, which leads to optimal levels of quality not being achieved, and therefore low profitability in businesses. Currently, one of the vital factors of survival for companies is that they are competitive. In order to achieve this, organizations must carry out regular evaluations of their commercial and operative performance, to engage in the continuous improvement of their work practices.

Assumptions of the Study

With regards to this research, several assumptions were made. Firstly, it was assumed that management and employees would fully collaborate to carry out the project. Secondly, that there would be access to the resources needed to elaborate on the study. Thirdly, it was assumed that the project would be implemented within the company, and finally, that the improvements made would lead to a change in the way ABC Truss approaches process management.
**Definition of Terms**

Listed below are some of the terms that will be use in this research, which are specifically related to the topics of Supply Chain Management, Business Management and Manufacturing Engineer.

**Business process improvement.** A systematic approach to helping organizations to achieve significant changes in the way in which they work (Forster, 2006, p. 4).

**Business process management.** The achievement of an organization’s objectives through the improvement, management and control of essential business processes (Jeston & Nelis, 2013).

**Continuous process improvements.** A management philosophy that involves the relentless pursuit of product and procedure enhancement through a never-ending exercise of achieving small wins. It is an integral part of a Total Quality Management system that seeks to eliminate waste and reduce variation (Garcia-Sabater, Garcia-Sabater, & Perello-Marin, 2011).

**Data flow diagram.** Graphic chart that reveals the relationship among and between the various components in a program or system. DFDs are an important technique for modeling a system’s high-level detail by showing how input data is transformed to output results through a sequence of functional transformations. DFDs consist of four major components: entities, processes, data stores, and data flows (Le Vie, n.d., p. 1).

**Define, measure, analyze, improve, control.** Six Sigma methodology can be thought of as a roadmap for problem solving and product/process improvement (Beemaraj & Arun Prasath, 2018, p. 112).
**Just in time.** This is a systematic process approach which minimizes initial and final inventory by having supplies arrive at production and distribution points only when needed the suppliers are needed (Adeyemi, 2010).

**Supply chain management.** A set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantity, to the right locations, and at the right time, in order to minimize system-wide costs while satisfying service level requirements (Simchi-Levi, Kaminsky, & Simchi-Levi, 2000).

**Limitations of the Study**

There were several limitations to the study. Firstly, there was limited access or lack of information and historical data related to the business process management in the company. Secondly, there was an instant aversion to change from part of the organization’s internal stakeholders in relation to the project. Finally, personnel lack of knowledge related to the principles and concepts of supply chain management, lean manufacturing, business process management and business process improvements was evident, and a key challenge to overcome.

**Methodology**

ABC Truss has numerous internal and external processes that can be analyzed, diagramed and improved upon, but the focus of the study was to identify, develop and propose improvements to the process of selling, design, scheduling, manufacturing, dispatch and handling roof and floor trusses to the customers of the company. The project began with the authorization of the brand manager of the firm and a review of the different areas that are involved.
The step-by-step approach or road map using Define, Measure, Analyze, Improve and Control methodology was used in order to define the problem and critical quality characteristics, select the most appropriate output quality characteristics to be improved, and establish what was unacceptable performance or a defect for such characteristics. Preliminary data was gathered to evaluate current process performance and capability, the root causes of defects or errors were analyzed, and improvements to the process were suggested.

The methodology was completed with different tools for information collection; observation on a daily basis and gathering data for every sale and delivery performed helped to understand how the process was structured. The researcher was involved in every one of the five departments in order to comprehend the steps and details of the process that then led to preparing process diagrams, structuring communication channels, and handling information between departments. With help from every manager and a cross-functional team, it was possible to evaluate the current state of the process and propose improvements that would support the organization.

The project seemed complex in the first place, as it involved five divisions in the organization and its subdivisions. However, once the teams understood the purpose of the project, and the benefits that process analysis and improvement would bring in terms of effectiveness and efficiency, progress was smooth.

**Summary**

The study was able to identify, develop and propose necessary improvements to the operational processes of selling, design, scheduling, manufacturing, dispatch and handling of the product within ABC Truss LLC. An integral process that would allow the company to have better communication among departments, foster an efficient administration of resources, and
improve performance to meet customers’ needs, was presented to the managing team for their revision and future implementation. The next chapter will discuss the existing literature on supply chain management, business process management and business process improvements to support the approach taken to this study.
Chapter II: Literature Review

Processes regarding selling, design, schedule, dispatch and handling of products in ABC Truss LLC lack clear design and documentation, which results in the organization experiencing a lack of communication between departments, deficient administration of resources and technology, inefficient performance and unmet customer needs. This impacts the company economically.

Supply Chain Management and Logistics

Hanfield and Nichols (1999) explained that supply chains encompass all activities associated with the flow and transformation of goods, from the raw material stage through to the end user, including the associated information flows. This is a concept that has evolved over time, since the industrial era; individuals engaged in activity that consisted of exchanging goods and services to meet needs, within a specific period of time and in a specific location. With innovation and the rise of different industries came new ways to approach production; nowadays, globalization, technology, knowledge, experimentation and different process improvements have installed the concept of supply chain management as an important part of an organization. According to Kurbel (2016) “…supply chain management is defined as the integrated process design, planning and control of goods, services, and information along the entire value chain since reaching a customer to the operations process of acquiring raw materials” (p. 223). The concept also encompasses “…supply chain management as the coordination of production, inventory, location, and transportation among the participants in a supply chain to achieve the best mix of responsiveness and efficiency for the market being served” (Min, 2015, p. 4).

The concept of logistics cannot be separated as it is the part of the supply chain process that is responsible for obtaining the right product or service, with the right characteristics,
specifications, cost, and level of quality for the customer (Derry, 2015). Both concepts are tied together in every single process that is found in the operation of an organization, and both complement each other to accomplish different goals. As for the main objective of the two concepts mentioned above, supply chains seek to establish a competitive advantage by modifying and improving processes inside the organization; they bring a systematic approach to learning and managing all the activities required to coordinate the flow of products or services in order to achieve the highest possible level of customer service (Min, 2015). As Kondratjev (2015) explains: “Logistics covers activities such as information exchange, transportation service, inventory management, warehousing, cargo handling and packaging. Everyday logistics enterprise is considered a complex process aimed at reducing overall costs”.

Companies have found that the approach of implementing traditional models does not cover the diverse demands, necessities or changes of the new globalized world. The integration of supply chain and logistics results in efficient process management, which allows the organization to accomplish its vision and manage and improve what is needed in relation to the business processes. The concepts of supply chain management, logistics and business process management adapt the functionality of each characteristic of all the processes in the organization.

**Business Process Management**

Business process management is an established discipline with characteristics, methods and tools that integrate different areas of the organization and different sciences in order to improve business processes. It is defined as “…supporting business processes using methods, techniques and software to design, enact, control and analyze operational processes involving humans, organizations, applications, documents and other sources of information” (Patel & Vij, 2013, p. 158). For the implementation and execution of business process management to be
successful, the resistant culture in an organization must be challenged, along with there being a change in the barriers between business process management and its practical use of technologies. It is important to mention that not all organizations use business process management to access an automatic operational functionality, which means that resources are not well utilized, technological tools are limited to specific processes or tasks, and there is no integration of functionalities between processes.

Since the 1970s, management, business and industries have been evolving; access to advancements in technology and new resources are allowing for the acquisition of knowledge and therefore the improvement of processes within an organization, with the objective of creating smarter manufacturing systems. This can be achieved by using different internal and external systems, sensors and networks (Van der Aalst, La Rosa & Santoro, 2016). Not all organizations use or implement business process management concepts or technologies in an integral way; most focus on specific processes, and others continue to run their businesses as usual, without using the available software. There are a few organizations and stakeholders that intend to change the direction of companies by making superficial changes to the operational models; as a consequence, the companies do not experience the desired improvements and ultimately do not benefit. Van der Alst et al. (2016) imply that a better process is thus one that better contributes to meeting the strategic objectives of an organization, and if the level of contribution is not generating expectations, business process management is implemented as a project to improve business process performance.

The objective of business process management is to change and modify the traditional hierarchical structure of management. It alters the activities of the organization as a way of placing the needs of the customers at the base of every business action; every process in the
organization is integrated to accomplish strategic objectives and satisfy the needs of the customers. On the one hand, when a business process management system and structure is already implemented and often controlled within a firm, the process grows along with logistics and supply chain management. On the other hand, if process integration has begun, it can be applied to unique characteristics, while developing or maintaining the best communication practices between business, employees and partners.

**Business process.** Each company has unique and general activities that are performed every day; these activities and tasks move the organization towards the accomplishment of objectives or a specific goal. In some cases, activities are repetitive, performed by different users in the company; when this is the case, activities can be improved and standardized. Business processes are a collection of activities that require one or more kinds of input, creating an output that is of value to the customer by offering a service or product (Hammer & Champy, 1993). They can also be explained as a set of logically-related activities, which are performed to achieve the best possible outcome in terms of customer satisfaction; therefore, creating a customer tie to the company offering the best products and services (Oyemomi, Liu, Neaga, & Alkhurajji, 2016). Davenport (1993) describes business processes as structured, measured sets of activities designed to produce a specified output for a particular customer or market. A process is thus a specific ordering of work activities across a time and place, with a beginning, an end, and clearly identified inputs and outputs, as well as a structure for action. Other authors offer variations of this concept, but the common thread is that a business process is a collection of various tasks that produce an output (Bititci & Muir, 1997). A business process is standardized when it is well defined and documented, which means that any person in the department can perform the process and reach the objectives by following the same steps. However, there are also non-
standardized processes that can vary in terms of their direction. These can be measured, but the results cannot be the same, as the same rules and procedures are not followed; the objectives are accomplished in any way possible.

**Process architecture.** Paul Harmon (2009) explained how all an organization’s processes fit together, outlined a set of enterprise measures that show how processes support enterprise strategies and goals, and detailed how all processes and sub-processes are aligned to achieve those goals. The concept of process architecture itself has the main purpose of accomplishing the strategic goals of the firm, showing value chains integrated with the business process. This model of business process architecture represents the overall structure of all the business processes in the organization from a high-level perspective; additionally, it defines the close relationship between processes (Gonzales, 2016).

**Process design.** In reality, not all processes are structured or known within the organization; some employees complete their tasks as instructed by their department superior or another employee. There is no structure and no formalism when it comes to daily tasks that are critical to reaching the company’s strategic goals. Process design helps everybody within the organization to visualize and understand how every department is linked to deliver the best possible customer service (Hall & Scott, 2017). When processes are not standardized and activities are based on empirical knowledge, it is necessary to design the process from scratch; the best way to design a process is to diagram a work flow, which involves identifying each step and task from start to finish, including who is going to perform each task, and their responsibilities, the outputs and inputs related to the process, and accurate data that will inform problem solving and continuous improvement (Bryce, 2015).
Process modeling. According to Kumagai, Araki & Ono (2016), a business process model is created to describe business functions in accordance with business process flow; the business functions are defined as process elements divided into elementary processing functions and are described hierarchically in a business function hierarchy chart. In other words, the visualization of process modeling represents all the matching and connecting activities (processes) of the organization. Business process management is related to identifying and mapping the regular processes in an organization with the characteristic of aligning operations with the business strategy, improving communications, and increasing efficiency in operations that will lead to a competitive advantage.

Quality Process Management

According to Knowles (2011, p. 11), addressing the integration of the different systems which exist within the organization means “…we are concerned with providing ‘value’ to customers, and considering how we can improve customer value”. Quality is the base from which processes can be made effective; there are many theories that indicate that quality in processes facilitates on-time execution of activities, improves performance in an organization and leads to goal accomplishment. Philip Crosby believed that “…ensuring quality should occur primarily at the design phase, organizations should do a job during the first time by having a established process, rather than spending time, money, and resources in doing the same tasks again and again” (Kachru, 2007, p. 289).

Edwards Deming explained that when building quality into the business process, quality itself is not verified or checked during the inspection (Hunter, 2012). Everything is related to process improvement and to finding mistakes when the business process is being developed or when the organization follows the current process. For example, when a process is fully
structured and the employees both understand it and have the knowledge to perform it, the error count will be reduced to zero. Knowledge and training are key instruments of quality process management; if an organization cannot describe what they are doing in terms of processes, as Edwards Deming explains, they do not know what they are doing (Deming, 1986).

**Organizational Strategy**

Miles, Snow, Meyer & Coeman (1978) explained that “most organizations engage in an ongoing process of evaluation that proposes questioning, verifying and redefining the manner of interaction with their environment, so constantly modifying and refining the mechanisms by which they achieve their purposes” (p. 547). Not only do large corporations need an organizational strategy to reach their goals; even a single-person business needs to establish objectives over time and develop a strategy to achieve success. Strategy is developed by first evaluating the present state and defining where the organization wants to be, followed by working towards that marked point to improve performance and reach the established goals. All strategies are archived and established over time when members of a firm work together as a team (Mintzberg & McHugh, 1985). The organization’s strategy is based on planning in relation to where management and stockholders see the company in the future; these leaders need to feel passionate about the company and the work it does.

Kolbusa (2016) implies that in many organizations there is not a roadmap to follow or a concrete direction, which are mistakes that must be avoided; every member of an organization should follow the same path, and goals and vision are key elements that keep the organization moving forward. The vision of the organization is part of the organization’s strategy. When a vision is established, a company can answer the question of where they want to be in the future. Halvorsen (2015) explains that a vision is an ambitious description and a clear guide for a
company’s long-term future, and what the organization wants to become or achieve. A company’s fundamental self-image is determined by the vision, as it determines how things are viewed and how much focus there will be on value creation.

The mission is a statement of the firm with the core purpose of explaining what the company does daily; it is something that every company needs to establish in order to identify what its principal objectives are. The mission is related to the existence of the company and the tasks and daily customer-related duties, it “…proclaims the organization’s philosophy and values with the intention of guiding attitudes, behavior, and decision-making in the organization. Standards, which are derived from the organization’s philosophy and values, refer to both internal and external actions and are explained within this part of the mission statement” (Braun, Wesche, Frey, Weisweiler, & Peus, 2012, p. 431). The regular operations of the company cannot be performed without a mission statement, since it would be difficult to run and control each process. Management uses the mission statement to lead the organization and establish strategies and actions to achieve goals; additionally, it guides them to make decisions in the internal environment of the company, so the external factors, which are customers, suppliers and the community, can be easily attended to. The difference between a mission and a vision is that the mission refers to the cause, while the vision refers to the effect (Halvorsen, 2015).

Organizational objectives represent the best way for a company to measure achievements, since they can be evaluated in terms of time and performance. They should be aligned with the mission and vision of the organization to provide direction and to keep the company running. Objectives in an organization refer to what needs to be completed over a period of time as a whole in the firm. However, when business process management is involved, each independent process also needs to have its own objectives.
**Business Process Improvement**

Business process improvement is a methodology used by organizations to help redesign current processes or operations in the effort to achieve quality improvement in products and services, elimination of waste, cost reduction, reduction of lead time and increase of both profitability and productivity as a result. In other words, companies implement business process improvement to create a strategic competitive advantage in comparison to the competition in the market in which they operate. Griesberber, Leist, & Zellner (2011, p. 3) explain that “Business process improvement is achieved by changing the state of elements of a business process. Thereby the state after the change exceeds the state before the change in such a way that the degree of accomplishing organizational goals is increased, which improves the performance of the business process”. Business process improvement implementation starts by defining the process, structure and strategy of the organization, then identifying the outcomes that are related to the objectives of the company and that can also add value to daily activities. Finally, it involves finding the correct human resource to control and work on continuous improvements in the organization.

**Lean Management**

The concept of lean management is related to continuous improvement. The core idea is to maximize customer value while minimizing waste and selecting practices to improve processes in all company areas (Herron & Braiden, 2006). Simply, lean management means creating more value for customers with fewer resources; its objective is to maximize value added to the product, reduce extra steps and eliminate waste, time and costs. Lean manufacturing should be extensively deployed, particularly by companies working in stabilized environments producing standard products in high volumes, using the same supplies. It would help companies
to partially alleviate the negative impact of the competition, increasing customer expectations and globalization on competitiveness (Yadav, Nepal, Rahaman, & Lav, 2017). Currently, companies are trying to be more effective in terms of products, services and process improvements, with the least possible use of resources; lean management, lean manufacturing and lean enterprise guide the organization to another level of efficiency and quality by improving all the aspects of the company.

Lean as a concept was born in the 20th century in the Japanese industry; it is based on 5 principles that ensure process improvement through the elimination of waste, and by identifying the operational processes where there is no added value. The principles refer to specify value, identifying the value stream, flow, pull and pursuing perfection.

Specify value can be defined only by the ultimate customer; value is distorted by pre-existing organizations, especially engineers and experts that add complexity which is of no interest to the customer. Identifying the value stream refers to all the actions required to bring a product to the customer; if the melter, forger, machiner and assembler never talk, duplicate steps will exist. Flow is achieved by creating the value-creating steps flow and eliminating departments that execute a single-task process on large batches. Pull refers to the customer pulling the product from the organization; sell, one, make one. And pursuing perfection, meaning there is no end to the process of reducing time, space, cost and mistakes.

As Womack & Jones (1997, p. 1148) describe, “lean is doing more with less. Use the least amount of effort, energy, equipment, time, facility space, materials, and capital – while giving customers exactly what they want”.

The direct relationship between business process management, business process improvement and lean in the organization’s processes serves as key pillars in relation to
continuous improvement (Smith, 2014). Smith also demonstrates that the objective of lean is to reduce the following three categories of waste:

- **Muda** is the most seen waste. This is what is most talked about today when organizations discuss reducing waste. It is also typified by the seven wastes of lean: defects, overproduction, waiting, transportation, inventory, motion and excess processing.

- **Muri** relates to people and processes that are overburdened. One reason they are overburdened is because they are not working to their potential, so Muri is identified as nonutilized workforce potential.

- **Mura** is defined as unevenness or inconsistency. Like Muri, Mura is important to avoid because Mura creates Muda. One way to deal with unevenness is through level loading, or Heijunka. Heijunka involves smoothing demand to make your processes more predictable.

Once all the efforts to eliminate waste in the process have been implemented, the processes of the organization will become more efficient.

**Customer Service**

Customer service is the science of taking care of customer needs, with the action of providing and sharing information, communication and quality assistance before, during and after a person has acquired a product or service from a company. Currently, corporate managers and CEOs believe that customer service is where all efforts need to be focused. Business process management and business process improvement are essential tools that can support organizations to serve their customers integrally. In an interview with Forbes, Jeff Bezos said “We see our customers as invited guests to a party, and we are the hosts. It’s our job every day to make every
important aspect of the customer experience a little bit better” (Greathouse, 2013). Meanwhile, Elon Musk stated, “I think it's very important to have a feedback loop, where you're constantly thinking about what you've done and how you could be doing it better” (Ulanoff, 2012). The Zappos CEO was also quoted in an interview as saying, “Customer service shouldn't be just a department, it should be the entire company. If the culture of the organization is right everything else in the organization will fall into place (King, 2012). Robert Reiss (2014, p. 1) also mentioned in his article for Forbes that Walmart’s founder Sam Walton believed about customer service and clients, “There is only one boss. The customer. And he can fire everybody in the company from the chairman on down, simply by spending his money somewhere else.”

Customer service exists internally and externally in organizations; it is related to how well customers are treated, and how often they return to do business because of that. Standardized and improved processes will lead the company to provide the best customer service experience, which will give the organization a competitive advantage in the industry. The foundation of any improvement needs to be the focus on customer service.

Summary

The main concepts of supply chain management, business process management, improvement and quality management, and how they drive organizations to goal attainment, customer satisfaction, and overall efficiency were used to analyze and develop this research project, which relates to the identification, development and proposition of improvements to the process of selling, design, scheduling, manufacturing, dispatch and handling of products within ABC Truss LLC. The main concepts that were fundamental to covering the problem statement of the project and reaching the identified objectives, were described in the literature review.
Chapter III: Methodology

The objective of this project was to identify, propose and develop improvements to the process of selling, design, scheduling, manufacturing, dispatch and handling of roof and floor trusses to customers; the objective needed to be reached by implementing the concepts of business process management and business process improvements due to the organization not having a standardized process between the departments involved in the operations of handling and development of products. The present steps guided the project in order to understand how the company managed its processes and who was in charge; additionally, it was important to comprehend what the stages of business process management implementation were and how they could support the organization to focus results in customer service growth.

Different approaches to business process management, lean manufacturing and six sigma can be found in the literature. In this case, the step-by-step approach or road map using define, measure, analyze, improve and control (DMAIC) methodology was used. The definition phase entailed the definition of the problem and the definition of critical quality characteristics which were most important to customers. In the measure phase, a selection of the most appropriate output quality characteristics to be improved was defined, as well as the establishment of what is unacceptable performance or a defect for such characteristics. Once this was complete, the next step was to gather preliminary data to evaluate current process performance and capability. In the analysis phase, the root causes of defects or errors were examined. In the improvement phase, a reduction of the defect rate or number of defects took place, using simple but powerful statistical tools and techniques. For some processes, several rounds of improvements were required to achieve the desired process performance or capability. In the control phase,
sustaining the improvement that was achieved from the improvement phase was key (Antony & Banuelas, 2002).

DMAIC methodology was integrated and adapted to different concepts, other tools and to the personal professional experiences of the researcher.

**Defining**

Before starting the project, it was important to consider the following stages that involve information, processes and data from the organization. It was vital to define the real problem, recognize the critical points and gain both management support in the organization, and the resources needed to solve the problem.

**Support and compromise from management.** The project was related to process and data, meaning that the managers of each department would give the necessary importance, active support and opinions in order to create the best scenario for success in the project. Managers needed to fully understand the problem statement, the goals and the benefits that the project would bring.

**Clear establishment of strategic objectives and project plan.** The objectives of the organization and each department were established in order to have a clear perspective of where the organization was going, and what differentiated it from the competence. Since objectives were vaguely established, the most relevant ones were identified to accomplish the project and its plan.

**Resources.** Management and employees shared the necessary resources in order to conduct the research. The most important resource was time; some events, meetings and activities were arranged and scheduled to gather data in order to develop the research. Data was the other resource required to make comparisons, conduct analysis and outline final conclusions.
Measuring

This stage of the analysis referred to the initial steps of the investigation, the collection of standard data, current analysis of the organization and future responsibilities. Figure 1 shows the sequence that was followed to measurement the current performance of the organization; the sequence was proposed by the researcher based on the information provided by the organization and their own professional experience, using business process management.

![Figure 1. Preparation phases.](image)

**Actual situation of the organization.** It was important to conduct analysis of the organization related to business process management and business process improvement; an evaluation of the actual situation in every department, and a general evaluation of the company. Being that it was the first time that ABC Truss LLC was involved in an evaluation and recognition of business process management, there were three ranges used in order to evaluate the processes. The ranges and grades in which each process could fall under after conducting the analysis were as follows:

- Grade A
  - Lack of action over business process management and business process improvement.
• Absence of processes in the organization.
• Process developed empirically and based on common knowledge.
• No data collected.

• Grade B
  • Medium level of action over business process management and business process improvement.
  • Some identified processes in the organization and in the departments.
  • Some processes were developed using management techniques, and training was involved.
  • Some data available.

• Grade C
  • High level of action over business process management and business process improvement.
  • Structured, defined and diagramed processes in the organization and in the departments.
  • All processes are developed using management techniques; training involved learning about business process management within the organization.
  • All standard processes are documented and easy to understand.

Effective business plan. Once the organization was placed in one of the above grades according to its actual situation, the next step was to find or develop the correct strategy to implement business process management. If the company landed in Grade A, work needed to be done with the objective of building the capacity of the organization to create and implement business process management. If the company did not have any processes, it was important to
start identifying those which were most important in the scope of operations. Grade B required a revision of the current processes and an evaluation of the processes over time, revision of data and checking of continuous improvement as part of the general process of the organization. 

Grade C’s main objective was to achieve excellence in business process improvement over the structured concept of business process management in the organization. In order to achieve excellence, the organization needed to implement a plan and commit to reevaluating each process over time, to assure that processes follow the same strategic objectives of the organization. Those appointed as responsible of controlling the process would be in charge of finding the best way to improve work continuously.

**Sharing information.** When the current process had been assigned a grade and the best strategy to achieve the objectives of the current project had been defined; it was necessary to know what areas were involved to conduct a current evaluation of business process management within the organization. The scope of the current project took another direction and the objectives were focused on a specific or single process, as shown in figure 2:

![ABC Truss single process flow](image)

*Figure 2. ABC Truss single process flow.*

Once all the measurements, data and characteristics implied in the process had been obtained, the objective was to have a cross-functional team and process that helps and improves customer service in the organization. The study focused on improving communication between departments and eliminating waste by using the available tools.
**Organization's personnel involvement.** The active participation of members of the organization was essential in order to ensure that the entity adopts process management. Involvement consists of the entire organization working on the institutional plan of business process management and centering their efforts on operating as a team to reach excellence. Every person needed to be aware of the implications, resources and the support that were present and available so that they could achieve the objectives of the current project. The significance of the project will be reflected in the future through daily work; individuals needed to understand the main purpose of implementing business process management and the final results of business process improvement in order to view the project as a means of becoming effective, rather than being extra work for no gain.

**Analysis**

It was essential to find and determine the root causes and resources that were used to validate the application of business process management, to then establish performance objectives and propose improvements. The following considerations were contemplated in order to identify the current process in the organization.

**Analysis of the firm’s purpose.** To better comprehend the organization as a whole, the mission, vision, objectives, policies, plans, strategies, and institutional purposes were reviewed. It was important to clearly identify the way in which the firm generates and adds value, as well as contributing to the fulfillment of customer service.

**Identification of the customers and their needs.** There are numerous tools to identify the customer and their individual needs. In this case, the fulfillment of customer needs was focused in customer service. Each customer has their own characteristics, so there are different ways in which the company needed to deliver customer service. Customer classification was
largely defined through management insight and looking at the different relationships that
customers have with the company. Meanwhile, historical data provided information on the size,
dollar amount and satisfaction of the group.

**Definition and determination of the current processes.** After the analysis of the
purpose of the firm and the identification of customers, the definition and determination of the
current process was necessary to continue with the research. Process mapping was the tool and
the approach used in order to identify all the phases and processes. As well as a description of
all the work performed in individual tasks, in each one of the analyzed departments, there was a
“…graphic illustration of every activity in the process preformed in order to deliver an output”
(Hall, J., & Scott, 2017, p. 24). Mapping needs to be a teamwork effort; a cross-functional team
worked together to get the best results and manage future improvements. Process mapping
began with the sketching of the process and a description of the sequence of every important task
that adds value to the elaboration or delivery of the product to the customer. In this study, the
following types of charts and techniques were integrated and used to diagram a process:

**Flowchart.** Figure 3 shows an example of an early stage of diagraming processes, with a
basic view of the process by department in the organization. It illustrated the actual process
instead of the ideal process to which the company aspired.

![Flowchart Example](image-url)
A flowchart diagram should contain the following characteristics: who performs the activity, the individual who is responsible for the activity and the process, what is done and when it is done, decisions taken and the flow path that is followed, connections with all the other activities, and a core idea and objective that add value to the product. With all characteristics well defined, the next step was to outline the process inversely and vertically. In some cases, depending on the availability of technological resources, software can be used to identify and diagram tasks and activities. Figure 4 shows an example of how a process can be diagramed:

![Flowchart Example](image)

**Figure 4.** Flowchart 2 example.

**Deployment and cross-functional flowchart.** When individual and department processes had been defined and diagramed, it was time to integrate them to form a deployment and cross-functional flow between departments in the organization. In this case, the flow diagram outlined in the previous step was transferred to a standard flow diagram. The objective was to create and evaluate the current processes in ABC Truss with regards to the departments of selling, design, scheduling, manufacturing, and dispatch, as shown in figure 5:
Figure 5. Deployment and cross-functional flow chart example.

With the diagram and definition of all the processes, any person that is involved in the current flow should have the ability to read and understand its functionality.

**Improvement Related to Processes and Control**

Business process management must be orientated to fulfill the objectives of the organization. Once the current process and its cross-functionality between employees and departments was identified, it was critical to examine its actual functionality and modify or create new processes; meaning the creation of innovative solutions, which also affects business functionality. In other words, the elimination of waste became the new strategy to improve processes in the organization. The first step for process improvement was to identify the opportunities available or the openings for improvement in the current processes, as this would help the organization to implement the best solution. The tools used for identifying causes and converting them to opportunities were brainstorming ideas for changing the current processes and generating more productivity; the 5 Why to push thinking about potential causes down to the root level, by answering every question conclusions can be drawn as to what the best improvements would be; and the fishbone diagram as a format that helps to arrange and organize potential causes while encouraging broad thinking (George & Maxey, 2005).
Examples of performance improvements, with the implementation of the tools, were simplifying the process, innovating within the process, increasing its efficiency, improving its efficiency and reducing time. Finally, with the development of standards and determination of process capabilities, the organization would keep the current project working overtime and would have some control over the processes that are implemented. Covering and controlling the scope of the project triggered more responsibility for implementing business process management and business process improvement across the entire organization.

Limitations

The main concern and limitation when developing the methodology was the required time that each employee in the organization could spare to work with the researcher. Other limitations included not having all data available, having to start completely from scratch, resistance to change and learning the new concepts to proceed with process improvement.

Summary

This chapter defined the methodology that was used at ABC Truss LLC to define, measure, analyze, improve and control the process of selling, design, scheduling, manufacturing, and dispatch. Firstly, it was necessary to evaluate the current situation of the company and understand what the core objectives were. Furthermore, it was vital to identify objectives and establish the methodology for the use of lean tools, such as process mapping, in order to identify and diagram processes. Once the process was structured, the options for improvements were localized and strategically implemented.
Chapter IV: Results

The objective of the project was to identify, develop and propose improvements to the process of selling, design, scheduling, manufacturing, dispatch and handling of roof and floor trusses to the customers of ABC Truss LLC. To do so, it was necessary to implement the concepts of business process management and business process improvements. The researcher used Define, Measure, Analyze, Improve and Control as the main methodology, along with other tools such as brainstorming and the 5 Why diagram to guide the project and accommodate requests made by management.

Defining

In this stage management support, access to resources and the real problem of the organization were outlined. The problem was defined as: the operation process of selling, design, schedule, dispatch and handling of the product to customers in ABC Truss LLC did not follow the principles and mechanisms of business process management, meaning that the company did not have a designed or standardized process to produce roof and floor trusses.

Support and compromise from management. Matt Doyle (2016), Vice President and co-founder of Excel Builders, mentioned in an article published in Inc.com that summer is the best season for construction companies to generate new customers and grow the market share against competitors, but also the most stressful time for employees and future growth. ABC Truss is no exception; management and employees were focused on accomplishing short-term goals, obtaining more clients and accommodating the workload in the organization when the project started. Nonetheless, the branch manager gave the necessary focus from start to finish; he provided ongoing support, as he understood the problem that the project targeted and the
benefits that would result from it. This led to employees collaborating with the necessary information.

**Clearly establish strategic objectives and project plan.** In order to establish the strategic objectives of the company, it was necessary to review the organization’s philosophy and outline the company structure to understand how they performed activities and conducted business, along with the roles and responsibilities of the involved areas. The following objectives were identified and shared by the departments involved in the project, sales, providing creative, accurate and timely solutions for building professionals; design, designing truss systems to meet quality standards and customer needs; scheduling, forecasting, monitoring and controlling the amount of orders flowing into production during the calendar year; production, planning, organizing, directing and controlling the truss production process; and dispatch/shipping, maintaining an efficient and profitable fleet and shipping operation to deliver the final product to the customer, on time and in the right location.

**Resources.** Time and information were identified as the most significant resources needed to carry out the project; management established both as a priority so that the researcher could access data when needed. Time was scheduled with managers and the heads of the involved departments to review information, answer questions and solve problems in a timely manner.

**Measuring**

The initial steps of the investigation began with the collection of primary data, the analysis of the actual situation of the organization, and the responsibilities of the firm.

**Actual situation of the organization.** In order to determine the range in which the company’s processes needed to be placed at, an analysis was conducted to evaluate the
organization’s performance in terms of process management and its principles. It was established that ABC Truss had no diagrams, maps, structures or data that indicated how the process was performed on a daily basis; there was little information on the website, manuals, and standard operation procedures and both managers and the heads of each involved department agreed on the fact that the processes were empirically developed and based on common knowledge. With these findings, the company was placed in Grade A, meaning there was a lack of practices and actions over business process management and business process improvement.

**Effective business plan.** During a series of meetings it was defined that in order to build the organization’s capacity in relation to business process management, the business plan needed to be developed focusing on the main activity of the organization and its relationship with the customer to be effective; therefore it was concluded that the most relevant processes were those directly related to the development of the product and communication with customers. ABC Truss established as a main objective: to provide the best service to customers to meet their needs and expectations. The company views customers as part of the business, so timely responses to their needs and the generation of solutions are fundamental pillars.

**Sharing information.** The company had numerous processes in each department, so it was necessary to narrow the focus of the project. After a meeting management decided to focus on the company’s main process of selling, developing, producing and handling the product to customers. All efforts were concentrated on the main process, which meant working with a cross-functional team from various departments in order to map a clear procedure that enhanced customer service, improved communication, and reduced waste.

**Organization’s personnel involvement.** Members of the organization were actively involved in the project for the most part, which was key to achieving the goal of identifying the
process to then present improvements. The researcher worked with management to communicate with the organization’s personnel and ensure all teams understood the purpose behind implementing business process management and working on business process improvements, as well as the steps that needed to be follow and the commitment that was asked from them.

**Analyzing**

The next step was to analyze the information and determine the root causes and resources used to validate the application of business process management.

**Analysis of the firm’s purpose.** Documents regarding the company’s mission, vision, objectives, values, policies, and plans were reviewed and it was determined that an official institutional philosophy had never been established. ABC Truss operated with a base idea of how to do work, manage clients and treat employees, but no shared mission, vision, values or objectives.

**Identification of customers and their needs.** Through observation, recollection of data and informal interviews with the sales team, customers and their needs were identified. ABC Truss works with three different groups of clients that are a relevant part of business, based on the number of dollars of sales and the percentage of market share that each one can help the company grow by, as follows: national customers, regular customers, and Lyman customers.

National customers refer to the national contractors that work around the area and engage in business with the firm; they have the most powerful workforce and influence the market when it comes to construction. Many work 360 days a year and base their planning on annual objectives and projects. Communication between ABC Truss and this group of clients was ongoing and active; the main goal was to meet deadlines and deliver products on site as agreed.
Both the customers and the company share the idea of working together in an environment of excellence and professionalism.

Regular customers refer to lumberyards, hardware stores, contractors and small clients that have construction projects. Around 90% of these projects are seasonal, marking the spring, summer and fall as the main active periods.

Lyman customers refer to the companies and contractors that ABC Truss and a division of Lyman Lumber located in Wisconsin and Minnesota serve together. This division specializes in lumber and construction stores that present similar necessities as ABC’s national and regular clients. However, in this particular case, the company’s main communication and compromise is with the division of Lyman Lumber, so the focus is on generating economic benefit. Serving this group of clients is at times challenging, since a communication gap exists between the producer, seller and customer.

**Definition and determination of the current processes.** The researcher and the branch manager met to analyze the problem and the root causes that led the company to seek process improvements, specifically defining the current process. The main goal of management was to have a clear process that was understood and shared across departments to align efforts and maximize performance. The 5 Why technique was utilized to push thinking, identify root causes and draw conclusions as to what the best improvements would be; with this information, the process diagram was generated. The following figure illustrates the 5 Why analysis.
Once the root causes were determined, the next step was to identify the available opportunities for improvement. To start, a meeting was held with the department heads to brainstorm activities and tasks that every area carried out to support product creation. This tool helped paint a clear picture of the situation and served as the base for the creation of the process sketches and process diagram flowcharts of the selling, design, scheduling, manufacturing and dispatch departments.

**Improvement Related to Processes and Control**

The first proposed improvement was the creation of an organizational philosophy that could support ABC Truss with the establishment and control of a standardized process. A clear and shared philosophy that was customer-oriented was suggested as one of the main pillars that

---

**Figure 6.** 5 Why analysis.
would guide the company’s direction, decisions, and continuous growth; the proposed company philosophy can be found in Appendix A.

**ABC Truss structure and business model.** It was suggested as an improvement that ABC Truss implements a business model and structure that supports the generalization of the company’s customer focus and orientation. This is a unique structure as it aligns all vertices of the company, people, processes and communication to the customer, resulting on significant internal and external benefits. The first includes better communication, flexibility, increase of work performance, and reduction of response time when it comes to solving customer needs, while the second includes improved customer experience, consistent engagement with customers over time, and increased sales and revenue over time.

Figure 7 illustrates the organizational structure that resulted as part of the proposed improvements for the organization, it was based in the business model of customer focus, where all departments and subdivisions center their activities on the customer.

*Figure 7. ABC Truss, purpose of structure and business model implementation.*
Structural description of ABC Truss. This improvement was proposed because clearly defined responsibilities and roles were needed for the company to move towards a more efficient performance; companies require a structure to grow and be profitable.

Brand manager. The brand manager of ABC Truss is responsible for ensuring that products and product lines that fall under his/her management will reach current, new and potential customers. The brand manager serves as a point person for developing, implementing and executing administration, marketing, and management activities related to the core business of the company. They are also in charge of monitoring profits and losses and carrying out initiatives to drive market growth.

At ABC Truss, the brand manager is responsible for decisions and actions in the organization, as well as for reporting to senior management in the holding company. The following are important activities that would be performed in a regular basis: decision-making, protecting the brand and the company, managing the departments or structures, and focusing on the customer.

Administrative and front desk. This involves the recruitment coordinator, who is responsible for coordinating recruiting processes, recruiting applicants to fill job openings, managing initial on-boarding processes such as orientation and paperwork, posting of jobs in different media channels, managing social media accounts and supporting activities related to human resources. The front desk order receivers, whose main responsibility is to offer administrative support across the organization; followed by employees on the front desk that serve as the connection and communication link between internal and external stakeholders. Other activities that are required are: welcoming guests and visitors, buying and distributing office supplies, circulating correspondence, answering and redirecting phone calls, receiving and
entering orders from the sales department and customers, assigning order numbers to the system; entering, receiving and controlling raw material orders from suppliers, controlling inventory, managing credits, filling orders’ receivables, and issuing invoices for customers.

**Sales department.** The sales department is in charge of building strong relationships with customers and serving as the direct link between clients and products. The department consists of the sales manager, sales coordinator, sales man and sales support/accountant. Each team member is responsible for managing the different kinds of customers that were assigned to them, identifying their needs and supporting them to provide a positive experience.

Personnel in the sales department need to understand the business model and the construction market along with its trends, necessities and demands in order to ensure that the customer gets what was ordered in the right volume and at the correct price. Extending this further, the department promotes business growth. Other activities that are the responsibility of this department are: visiting job sites, receiving quotes, sending quotations to customers, establishing an approximate delivery calendar based on both the client and production schedules, placing orders, entering orders on the system; transferring the information to design, layouts and plans, tracking trends and monitoring competition, transmitting brand values, coordinating efforts with the company’s marketing partners, innovating, and communicating with the rest of the company.

**Design department.** This department is in charge of creating products (floor and roof trusses) in paper or plans; the designer receives the idea from scratch and proceeds to generate a solution based on the economic, professional and technological resources that the company can offer to clients. Its purpose is to achieve customer satisfaction by covering the specific needs of each order and/or project without losing sight of costs, usability or differentiation. Ongoing
communication with other departments and customers is crucial to engineering the correct product and adjusting it.

ABC Truss managed two inventories when a sale was made to satisfy customer needs: Make to Order (MTO) and Engineer to Order (ETO). The company uses this approach, in particular the MTO model, to avoid carrying final inventory and reducing costs; this model is often used when there is a high variation of products and production, in some cases, can get continuous flow for the difference between orders (Rodriguez & Otávio, 2010).

Production department. The production department is the motor of the company. It is in charge of converting raw materials and supplies into finished goods; in this particular case, floor and roof trusses. In order to achieve the final product, the department identifies production targets and capacity by establishing the quantity of raw materials and the machinery/equipment needed to produce the goods. Then, it identifies if there is enough manpower to reach goals and support the process or if more personnel should be requested, while managing inventory levels for raw materials and finished goods, following lean principles that ensure the lowest possible stock levels without interrupting production.

The production process and schedule consist of planning all the activities that must be performed in the production line; among them allocating tasks on the shop floor in each table, saw or in the yard; minimizing production costs by controlling material flow, machinery maintenance, station clearance, conducting research on new technology necessary that could improve problems caused by bottlenecks, and identifying opportunities for cost reduction.

Production works to ensure that roof and floor trusses meet minimum quality characteristics and standards and are ready on time to fulfill customer requirements.
**Schedule.** This is an internal subdivision of the company that works as a channel of communication between the branch manager and the departments of sales, production and design. It is in charge of monitoring the amount of sales and production; looking at trades, statistics, and tendencies in the construction market and monitoring the weather in order to run analysis based on demand planning. Then, presenting potential numbers related to the amount of orders that the company has the capacity to cover daily.

This subdivision must review the information constantly to accurately forecast orders that will be scheduled for production. Forecasting is a decision-making tool that allows the company to predict the future based on past events and data; it helps managers when calculating annual budgets and other departments when planning and estimating future growth.

**Dispatch.** This department is in charge of managing drivers and their schedules, the float of trucks and the necessary resources to transport products to their final destination. Dispatch plan ahead to maintain a smooth delivery flow according to the number of orders. Products should be delivered on time to the right location to meet customer expectations. The head of dispatch must also have knowledge regarding transportation regulations and documentation. Dispatch can impact the entire organization if delays occur, as the flow of operations and its inventory would be affected, as well as sales, schedule and monetary resources.

**Diagram of process flowcharts.** Processes are possibly the most important and widespread element in the administration of innovative companies, especially those that base their management system on quality. As part of the improvement proposal, the researcher created flowcharts to diagram the process of selling, design, scheduling, manufacturing, dispatch and handling of products, both inversely and vertically from a technical point of view, utilizing as a base the process sketches that were previously created. Each of the following figures
represent the structure and combination of activities of each department and subdivision in ABC Truss; figures include who is responsible for the activity and process, what is done and when, decisions taken with the flow path that is followed, and connections between activities. Figure 8 represents the proposed structure and process of the sales department; it shows the flow of activities that need to be performed when an order, customer visit or bid is to happen in the company. These activities need to be followed to have a standard process that allows the department to reduce time and waste.

Figure 8. Sales department process diagram.

Figure 9 establishes the proposed flow process of the schedule department. It outlines the steps that need to be completed since an order is received, given a specific date and confirmed in order to then start production.
Figure 9. Schedule subdivision process diagram.

Figure 10 illustrates a structured process for the design department, which includes how orders are handled following priority, and complexity. Designs go through a review procedure before been sent to batching, then production and dispatch are notified. Communication with the customer must be constant.

Figure 10. Design department process diagram.
Figure 11 represents the manufacturing process, which starts when paperwork is completed, and a date is set for product delivery. Activities include organizing orders by size, picking supplies, building the product following the design and engineering directions, and staking it in inventory.

*Figure 11. Production department process diagram.*

Figure 12 shows the proposed process for the dispatch subdivision, which involves getting the product to the customer. Activities start when dispatch is notified of the finished order; shipping paperwork and requisites are prepared for trucks to transport the product to the specified location of delivery. The company confirms shipping and emits the correspondent invoice to conclude the process.
Figure 12. Dispatch subdivision process diagram.

**Diagram of a cross-functional process in ABC Truss.** Finally, the researcher created the process deployment and cross-functional flow shown in Appendix C, which included the following as proposed improvements: simplification of the process, innovation of the process, increase of process efficiency, and reduction of time. To build the cross-functional process it was essential to analyze the organization and its practices in relation to business process management and collaborate with management and employees. The proposed improvements aimed to help the company move towards an integral system of processes that would support decision-making, performance and continuous growth. Practices and processes should be revised periodically to meet the changing requirements of customers and the market.

**Summary**

In this chapter, concepts of business process management and business process improvements were implemented to achieve the project’s objective of identifying, developing and proposing improvements to the process of selling, design, scheduling, manufacturing, dispatch and handling of products in ABC Truss LLC. The DMAIC methodology served as a
guide to define the real problem, analyze information, and work on establishing clear procedures.

As a result of the project, the company’s structure and philosophy were developed, and an integral, standardized process was diagram. These improvements will allow the company to have better communication among departments, efficiently administer resources, and enhance performance to meet customers’ needs.
Chapter V: Discussion, Conclusion and Recommendations

This study focused on employing principles and concepts of business process management to identify, develop and propose improvements to the current process of selling, design, schedule, dispatch and handling of the product to customers in ABC Truss. The company did not have a design or documentation of the performed processes, which resulted in deficient administration of resources, lack of communication between departments, inefficient performance, and unmet customer expectations.

Chapter I presented the ABC Truss historical context, outlined the problem statement, defined the objective guiding the research, established the methodology to be used, stated the limitations that were encountered, and the opportunities available in the company in relation to business process management. The chapter also listed the definition of terms that were related to the study.

Chapter II reviewed the main concepts and definitions of supply chain management, business process management, improvement and quality management that were used to develop the research project. Additionally, it indicated the tools that were used as process architecture, design and modeling. The reviewed literature supported the approach employed to conduct the study and propose improvements to the company.

Chapter III described the Define, Measure, Analyze, Improve and Control (DMAIC) methodology that directed the project in order to understand the company in terms of business process management, and, most importantly, the process of selling, design, scheduling, manufacturing, and dispatch of products.

Chapter IV presented the results associated with the implementation of the methodology. It was determined that the company did not have an organizational philosophy and structure that
supported its objectives and direction. Additionally, processes for each area involved in the study were not established or documented; neither was an integrated process. As part of the proposed improvements, the researcher created the organizational philosophy and structure, and diagrammed a cross-functional process for the selling, design, scheduling, manufacturing, and dispatch of products to customers in ABC Truss.

Limitations

Limitations included a lack of information and historical data related to the company philosophy, business structure and business process management, as there was no mission, vision or values as guiding pillars, no clear roles for every department, and no defined or documented process for selling, design, scheduling, manufacturing, and dispatch of products. The support of the brand manager was necessary as the limitation of resources such as information and knowledge required the researcher to spend more time gathering data and involving employees in the process. It was concluded that the project would provide the organization with a philosophy, structure, business model and a well-structured diagram of a process.

Another limitation was the personnel’s lack of knowledge of the concepts and principles of supply chain management, lean manufacturing, business process management, and business process improvements, which ultimately led to an initial aversion to change in relation to the project. ABC Truss has employees that have been with the company for more than 20 years as well as newer members. The majority of the professionals that were involved with the study did not have knowledge of the concepts that served as a base for its development. However, over time they understood the purpose behind what was being proposed in terms of management, supply change and improvements and the relationship with business performance and control.
Conclusions

ABC Truss did not have any structured processes, so a diagram of each process was generated for departments and subdivisions with the collaboration of management and area heads. Within the project, the organization was able to review and generate processes for the first time, using the different tools of business process management. A diagram of individual processes was then generated to build a cross-functional diagram that would serve to guide decisions and current activities in the company. Mapping and diagraming the process was the best way to help management and employees understand the business process and how it works, to identify which activities are performed and which ones are more relevant, and to see how communication occurs and where the future opportunities for improvement are.

A company structure and philosophy were proposed as part of the project, since these are the foundation of achieving objectives in business process management. What differentiates companies is their philosophy, as it reflects the environment and organizational culture in which activities are supported, as well as guiding employee’s decision-making processes based on the company values and serving as a tool to share believes and service with the customer. Additionally, the philosophy accompanies planning, as it gives the company the option to discover what it wants and where it wants to go, thereby determining what should and should not be included in the process.

The organization’s structure was created to identify the business process roles and responsibilities in order to understand how the company works. The new proposed structure will clearly outline the work every department is responsible for, facilitate communication across the organization, support the improvement of productivity and employee satisfaction, and lead to a reduction in overhead costs and environmental waste.
The proposed business model, philosophy, and structure will support the organization in the creation of a customer focus approach in which processes are customer oriented, and activities lead to quality services that build credibility and customer satisfaction.

**Recommendations**

The construction market is going to maintain its growth for the next years, meaning that the company needs to keep working on plans and strategies to identify opportunities for improvement in both general processes and ones more specific to each department, in order to adapt and increase results. The identification, development and proposal of improvements to the current process of selling, design, schedule, dispatch and handling of the product in ABC Truss is a starting point for the company, from which it can continuously work on process monitoring and improvement. This will allow the company to reach the objective of standardization, reduction of waste and role management. Additionally, it serves as a base from which employees can be motivated and involved in the construction of more efficient processes and a better work place.

The company knows how a cross-functional team works and how the communication between departments needs to continue to achieve a smooth manufacturing and production process. They also know how to manage a customer who needs more help or has requested new features in an order, as well as managing any unforeseen circumstances.

Since ABC Truss is a branch company, the proposed philosophy needs to be evaluated with the senior managers of the holding company for approval and publication. Several meetings need to be arranged with the heads of departments to review, modify or approve the new organizational philosophy. Once it is approved, it must be shared with all members of the
company so that it can be adopted as a pillar to reach objectives and accomplish the company mission and vision.

Finally, with a customer-oriented business process model, the organization will work to satisfy customer needs and create lasting relationships. The proposed structure for ABC Truss needs to be analyzed, modified or approved so that employees and stakeholders understand and follow what each department is responsible for. The implementation of the structure will be the next step.
References


doi:10.1108/13683040210451679


doi:10.1108/01443579710159950


Appendix A: ABC Truss Philosophy

The philosophy’s pillars were defined as outstanding customer service, quality products and employee compromise with the firm.

**Mission.** We are a leading manufacturer of engineered-to-order roof and floor truss packages, as well as a full line of other wood processed products in northern Wisconsin, East Central Minnesota and the Twin Cities Metro area. We are dedicated to providing high-quality components and custom solutions for commercial, residential, and agricultural projects with a fully integrated team of professionals that bring experience, knowledge and commitment to serving our customers.

**Vision.** Become the premier engineering and construction branch organization by providing high quality customer-oriented services and solutions; while giving our employees fair opportunities to build their professional career.

**Objectives.** Continually improve customer service to offer a unique and satisfying experience, by increasing the competence of our team, reaching higher safety standards and ensuring quality from the source.

- Produce floor and roof trusses in the right quantity, using the best materials at a predetermined time and at the best possible cost.
- Design, develop, analyze and test architecture and engineer solutions using the latest software in the industry.
- Reach 100% production capacity.
- Enhance relationships with customers and provide guidance on how to conduct transactions, evaluate actual stock and production limits, and merchandize.
- Control safety risk in daily operations and reduce the number of accidents to zero.
Values.

- Innovation to lead, no limits to developing and sharing ideas.
- Work-life balance; we believe family time and balance of daily activities is essential to healthy living.
- Continuously learning and growing, both personally and professionally.
- Embracing inclusion to enrich the work culture.
- Collaboration and communication to create a strong community.
- Commitment to quality in everything we do.
- Safety as being the right way to operate.
Appendix B: Improvements Based on Customer Focus Structure

Following quality management principles, the subsequent list presents actions and improvements for the company to take into consideration when implementing the proposed customer focus business structure and model.

- Identification and understanding of customers’ current and future needs.
- Work time extensions to accommodate and fulfill orders.
- Build communication and good relationships.
- Effective and efficient service.
- Updates and information sharing.
- Meet identified requirements.
- Special offers to specific clients.
- Quick response for returns, add-on jobs and complaints.
- Delivery dates and locations.
- Post-sales service.
- Reach and exceed customer expectations.
- Benchmarking
- Loyalty programs
- Technological progress, new machinery and constant change of expectations.
Appendix C: Cross-Functional Process in ABC Truss

The following graph represents the proposed cross-functional process of selling, design, scheduling, manufacturing, dispatch and handling of roof and floor trusses in ABC Truss. It illustrates a standardized procedure with clear roles and activities for the involved departments in the company.