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Abstract

In order for any company to accurately count sales leads and predict future revenue, the database where it stores sales leads must be valid, accurate, and updated. However, this is not always an easy feat when multiple databases are used within one company and different sales and marketing analysts are inputting, updating, and deleting information on a daily basis. Company XYZ, a global, multi-million dollar technology and innovation company, dealt with just such a problem. The company had a sales pipeline that housed invalid, dead, or duplicate leads that caused much wasted time chasing cold opportunities and inaccurate reporting of future revenue. A Lean Six Sigma approach helped create a system for better reporting and accuracy within the sales and marketing pipeline of Company XYZ.

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Chapter I: Introduction

Company XYZ is a publicly held global technology and innovation company founded in the early 20th century that develops and manufactures information technology products and services (yahoofinance.com, 2011). There are five business units within Company XYZ. These consist of: Systems Technology Group, Global Technology Services, Software Group, Global Business Services, and Integrated Global Financing. The company's capabilities within these units include services, software systems, hardware systems, business consulting, fundamental research and related financing. The company's business model is based around two principle goals that strive to provide value to its clients and shareholders by leading the industry in manufacturing and developing the most innovative and advanced information technologies.

Being one of the leading companies within the diversified computer systems industry, the global client base is vast. At Company XYZ, each sales opportunity goes through a series of five stages and ideally becomes categorized as a validated lead. Once a lead becomes validated in the fourth stage, the lead is considered part of Company XYZ's Tivoli sales pipeline and is counted as potential revenue. In order to stay efficient and organized within the sales and marketing division, Company XYZ uses Oracle's Siebel Customer Relationship Management (CRM) 2000 software, a lead management system, to track these hundreds of thousands of leads within its pipeline. However, due to the extremely high number of leads, it becomes hard for the marketing and sales analysts to track when leads become invalid, dead, duplicated, or inaccurate and this results in a pipeline that is not completely accurate and one that produces a low yield of actual sales.

Company XYZ formed an internal Global Process Innovation team in 2005 to continue to create a more productive and efficient company. This team currently consists of 60 Lean Six

Sigma Black Belts worldwide who are certified in and utilize Lean Six Sigma practices to continuously improve internal operations at Company XYZ. This pipeline cleanup project was categorized as a Yellow Belt Lean Six Sigma project with the intention of saving several million dollars in win revenue, creating a cleaner, more accurate pipeline in order to save time spent on chasing cold opportunities, and improving accuracy in future projections.

Statement of the Problem

Company XYZ had a sales pipeline where leads had been validated and counted as potential revenue that was extremely bloated and inaccurate. Because the pipeline was filled with scores of invalid, dead, duplicated, or inaccurate sales leads, it produced a low response rate of leads that were actually converted to sales, causing inaccurate sales forecasts of revenue for future quarters. Company XYZ needed to clean up its pipeline as well as create a system for eliminating the incorrect reporting and keeping up-to-date with its sales leads in the future.

Purpose of the Study

The purpose of the study was to reduce the proportion of defected, aging leads in the pipeline that had not been updated by a sales or marketing analyst within the last 30 days, increase the response rate of sales leads from the baseline of 57.25% to the target of 90%, and improve the overall pipeline quality and yield by improving Company XYZ's Pipeline Acceleration System process. This Pipeline Acceleration System process is used internally to remove dead, duplicate, and invalid leads while identifying and passing on aging leads to best-fit owners within Siebel. This study used a Lean Six Sigma approach to achieve a reduction in non-value added activities and create efficient processes that would allow the company to convert the desires of the customers into proper systems and outputs.

Assumptions of the Study

This study assumed that the managers and team members of Company XYZ's Global Process Innovation team that were assigned to this particular project had intimate knowledge of the sales processes involved in the particular area of study, which was Sales Stage 04 of the Software Group (SWG) and Global Technology Services (GTS) North America Geography.

Definition of Terms

Defect. Leads in Oracle's Siebel CRM 2000 older than 60 days that have had no updates or activity in 30 days or more as well as leads where the current state is not known and cannot be acted upon (neither passed nor deleted).

DMAIC. "An acronym for Define-Measure-Analyze-Improve-Control, the various development phases for a typical Six Sigma project" (Ching, Ngee, See, & Yoap, 2006, p. 5).

Lead passing. Moving a lead to a place where revenue can be counted.

Lean. The core idea of Lean is creating more value for the customer while utilizing a minimum number of resources (Lean Enterprise Institute, 2009). Lean can be applied in any type of organization, from production to services. It is a way of thinking that should be filtered through an entire organization in order to change the focus of management from one of optimizing a company's assets and vertical departments to one that optimizes the flow of products while eliminating waste along the entire value stream.

Lean Six Sigma. George, Rowlands, and Kastie state, "Lean Six Sigma is a business improvement methodology which combines (as the name implies) tools from both Lean manufacturing and Six Sigma. Lean manufacturing focuses on speed and traditional Six Sigma focuses on quality. By combining the two, the result is better quality faster" (as cited in "Lean Six Sigma" n.d., para. 1).

Non-value-added. "Activities or tasks performed during the production of a product or service that do not contribute to meeting customer requirements. Their elimination from the work process does not degrade its overall performance or results" (Watson, 2004, p. 221).

Sales lead. Any person or company that has expressed interest, either through e-mail, a phone conversation, or face-to-face interaction, in purchasing products or services from Company XYZ.

Sales pipeline. Once Company XYZ's marketing analysts and sales employees validate a lead, the lead is considered to be in the sales pipeline, where it is then counted as Company XYZ's potential revenue.

Siebel report. A report run from Oracle's Siebel Customer Relationship Management (CRM) 2000 software that details the breakdown of sales opportunities within Company XYZ's sales pipeline.

Six Sigma. "A business process that allows companies to drastically improve their bottom line by designing and monitoring everyday business activities in ways that minimize waste and resources while increasing customer satisfaction" (Ching et al., 2006, p. 3).

Six Sigma Black Belt. This person "leads improvement-project teams and conducts the detailed analysis required for the DMAIC and DMADV methodologies" (Watson, 2004, p. 67).

Tivoli software. A brand of service management software.

Value-added. "Activities or tasks performed during the production of a product or service that increase its value to the customer" (Watson, 2004, p. 224).

Limitations of the Study

The limitations of this study are:

1. The results of this study were limited to Company XYZ.

2. The data was taken only from leads in Sales Stage 04, Software Group (SWG), and Global Technology Services (GTS) North America Geography.

Methodology

This study used a Lean Six Sigma sequence in order to create a more efficient pipeline for Company XYZ with greater reporting accuracy of potential revenue among sales leads. In particular, the DMAIC method, including the five phases of Define, Measure, Analyze, Improve, and Control, was established as the main project methodology and specific tools and practices stemming from this approach were tailored to this project to maximize output.

In the first step, known as the Define phase, the goal was to determine the scope and objectives of the project and outline how the project would be executed. Some of the process tools used in this phase were a detailed project plan, an as-is process map, the voice of the customer associated with critical to quality characteristics, operational metrics, a data collection plan, the estimated baseline metrics or headcount and initial targets, and the project charter. By using these specific tools, the project team was able to fully understand what the goal of the project was and the sequence of how the project would look through its completion in the hopes of creating a cleaner, more accurate sales pipeline.

The second step was the Measure phase. Through this phase, the team gathered information and statistical data about the reporting accuracy of Company XYZ's pipeline to better understand the project metrics and the probable cause or causes of the issue. Through the use of tools like a Pareto Chart, data validation, a detailed level process map, and a project charter that includes measured operational baseline metrics and estimated targets, the project team was able to better concentrate the improvement effort. With a greater understanding of potential causes of the pipeline accuracy and efficiency issue, the project team moved onto the actual analysis stage.

The third step was the Analyze phase, in which the project team looked to identify root causes based off of the statistical data gathered in the Measure phase. The overall analysis included a root cause analysis, identification and validation of root causes, identifying and prioritizing pain points, creating a process redesign, identifying value-added/non-value-added process steps, and identifying areas of waste. Through this analysis, the project team pinpointed a few key causes of the bloated, inaccurate sales pipeline and was better able to identify opportunities for improvement based on these understandings.

The final two stages of the project were the Improve and Control phases. In theory, the Improve stage would have looked to address the root cause or causes from the Analyze phase and create potential solutions for improvement. Then, the Control phase would have maintained those improvements through a systematic monitoring and control system. However, due to stakeholder buy-in issues with this specific project, the Improve and Control stages were put on hold indefinitely. The project team did make recommendations to the process owners based on their findings in the Define, Analyze, and Measure phases.

Summary

Being a global technology and innovation company with several business units across multiple geographies, Company XYZ thrives on the reporting accuracy of its sales pipeline. With the help of Company XYZ's Global Process Innovation team, this paper details the scope of the problem, how the problem was analyzed to reach recommendations for improvement, and what those recommendations were. Even though the project did not make it through all five stages of the DMAIC process, these suggestions were presented to the process owners for future improvements to the sales pipeline reporting process.

Chapter II: Literature Review

Company XYZ's sales pipeline contained inaccurate, invalid, dead, and duplicate sales leads causing the sales and marketing analysts to waste time chasing cold opportunities and creating inaccurate sales forecasts in revenue for future quarters. Because this project took a Lean Six Sigma approach to creating a more efficient sales pipeline within Company XYZ, the literature review will describe sales forecasting, Lean principles and methodology, Six Sigma principles and methodology, and how Lean and Six Sigma work in conjunction to improve quality and efficiency while reducing waste and cost within an organization.

Sales Forecasting

Sales forecasting is a management process that many companies use to predict demand and respond to that demand in a timely and efficient manner (Moon, Mentzer, Smith & Garver, 1998). Forecasting is a function critical to a company's production operations. By accurately predicting future sales, a company can better obtain adequate materials at a low cost, hire and train the adequate personnel at a low cost, and utilize adequate logistics services to avoid bottlenecks when transporting product to the consumer. Ultimately, sales forecasting creates efficiency within an organization, which inadvertently increases its levels of customer satisfaction. It is critical for a company to have accurate forecasts in order to establish a truly lean operation where the flow of goods and information is as efficient as possible.

Lean Principles

Lean production is synonymous with the Toyota Production System practiced at Toyota's global manufacturing plants (Lean Enterprise Institute, 2009). In the 1930s, Toyota began to look at the Ford model of mass production. At the time, Ford was leading the industry in turnaround time of inventory with its fabrication sequence. However, after World War II,

consumers began to demand more variety, rather than just the one type of car offered by Ford. Taiichi Ohno, Toyota's plant manager during this transition period, began to expand on the mass production system of Ford and looked to create a way to offer continuity in process flow alongside a wide variety of product offerings. This was where the Toyota Production System was born. The system shifted the focus to the flow of a product through the total process, rather than focusing on individual machines (Lean Enterprise Institute, 2009).

The Toyota Production System worked toward creating right-sized machines for the demand volume, self-monitoring machines for quality control, proper sequence for machine placement to maximize efficiency, and faster set-up times by using a batch method to produce many parts in small volume. Another key to this new type of thinking was to create a process where the previous step notified subsequent steps of the need for materials. Through all of these new techniques, Toyota was able to eventually become the largest automobile maker in the world in terms of sales because it was able to accomplish its goal of achieving low cost, high variety, high quality, and fast turnaround times based on customer demand (Lean Enterprise Institute, 2009).

In the book *Toyota Way,* Liker (2004) describes how Toyota's model can be used to improve any business process in any type of company through key elements that include waste elimination, quality from the ground up, efficient and standardized business processes, and a continuous improvement culture at all levels. Through Toyota's formation of the Toyota Production System, the company has identified seven major types of non-value adding waste that are described below. The elimination of these wastes is essential to improving the value stream with a company and truly creating a lean enterprise. Liker (2004) documented the following seven wastes:

Overproduction. Overproduction is production of items that the customer has not requested yet. This can include such wastes as storage and transportation costs and overstaffing stemming from surplus inventory.

Waiting. Waiting is essentially time on hand when workers stand around waiting for the next step, tool, part, or supply, watch an automated machine as it runs, or have no work because of a variety of delays or bottlenecks.

Unnecessary movement. Unnecessary movement describes any motion a worker takes during the course of his or her work process that is unnecessary and creates wasted time. This may include walking, looking for tools, reaching for or staking parts, and others.

Unnecessary transport or conveyance. Unnecessary transport or conveyance describes the movement of materials, parts, or finished goods to and from storage between processes, the misuse of space so that work-in-process inventory is carried long distances to reach the next process, or inefficient transportation between processes.

Excess inventory. Excess inventory includes extra raw materials, work-in-process inventory, or finished goods lying around. This excess can increase costs of transportation and storage, lead times, damaged goods, and may hinder the ability to find problems in the process that need fixing.

Defects. Defects describe parts that are produced inaccurately and need rework or repair, scrap, or replacement production. Inspection of defective parts also creates waste within the process through employee handling, time, and effort.

Overprocessing or incorrect processing. Overprocessing or incorrect processing happens when there are unnecessary steps taken to complete a part, which may stem from poor

tool and product design. Also, providing higher-quality products than the customer requests produces waste.

Lean Ideology and Methodology

As the ideology and methodology of Lean has transformed over the years since the Toyota Production System, the Lean Enterprise Institute has created a five-step thought process to aid in the implementation of Lean techniques (Lean Enterprise Institute, 2009). These include:

1. Value that is specified by the end customer and is narrowed to a specific product family.
2. All steps in the value stream for each specific product family being identified so as to exploit and eliminate the non-value-adding steps within the process.
3. The value-adding steps being placed so they can occur in a rigid progression to allow for the product to flow efficiently through the sequence toward the final goal of the end customer.
4. The steps being placed in a tight sequence with the end customer in mind to allow customers to pull the product from activities upstream for the best possible flow.
5. The ultimate goal of a lean enterprise being the creation of a state of perfection where value is created with no waste. This requires continuous improvement where perfection is sought through endless modification of the processes.

The overall Lean methodology of creating value by eliminating waste and establishing efficient and streamlined business processes was the key focus with helping Company XYZ improve its sales pipeline and provide more accurate sales forecasts. By understanding the current value stream through the creation of a standard Lean tool – the value stream map – the team was able to understand the process flow of information within this sales pipeline with the

goal of finding where bottlenecks and holes were occurring. This allowed the team to suggest changes to this current value stream to create a continuous flow of information. This project focused on overproduction, excess inventory, and overprocessing or incorrect processing, the three main types of waste that deal with information flow. The Lean tools used by the team, as well as the Six Sigma tools described below, were tailored to fit the needs of this project.

Six Sigma Principles and Methodology

The creation of the Six Sigma philosophy and methodology is attributed to Motorola Corporation and the company holds the Six Sigma trademark (Brassard, Finn, Ginn, & Ritter, 1994). Six Sigma quality thinking came about in the mid-1980s after Motorola realized that the best quality products in use were the ones that made it through the production process without any defects. This led to the company creating defect reduction strategies in its products. It also led to the collaboration in the mid-1980s with companies such as AlliedSignal, Kodak, IBM, and Texas Instrument to found the Six Sigma Research Institute with the hopes of disseminating the process and methodology of Six Sigma.

Six Sigma is a problem-solving methodology that focuses on increasing effectiveness, reducing variation, eliminating defects, and increasing customer satisfaction while improving a company's financial well-being and focuses on reducing bottom-line expenses through a process of measuring and documenting results (Ching et al., 2006). Six Sigma can best be understood by breaking down its actual name. Sigma is a statistical term used to measure standard deviation and when used in the business world, it denotes the defects of a process' output and how far the defects are from being perfect (Brue, 2006). The Six Sigma level is ideal because at this level, there are only 3.4 defects per million opportunities.

Six Sigma is considered to be a business strategy and often has different definitions (Watson, 2004). The main definitions stem from a variety of different implementation views within various organizations and include a philosophy of management, a process-measurement methodology, an analysis methodology, and a business culture. The definition derived from the philosophy of management describes Six Sigma as a philosophy for business operations that applies the scientific method to routine work processes with the intention of reducing the number of product defects and wasted operating costs and increasing customer satisfaction levels within a company (Watson, 2004). Ultimately, management's goal in any organization is to achieve bottom-line results (Rath & Strong, 2003). In order to achieve bottom-line results through Six Sigma practices, an organization must have a rigorous, disciplined process improvement philosophy within its core values. Therefore, in order to deliver what the customer wants, top leadership must aim to create nearly perfect processes, products, and services by properly training everyone in the organization in the Six Sigma philosophy and application of process improvement techniques.

The process-measurement methodology definition aligns Six Sigma with measurement tools such as standard deviation in which the probability that a process will produce satisfactory results for customers is predicted (Watson, 2004). Standard deviation is a way to measure variation and companies use this tool to improve processes to increase process-performance consistency. A process can be defined as "any set of repetitive steps – in any manufacturing, services, or transactional environment to achieve some result" (Brue, 2006, p. 6). Efficiency of a company's processes is in direct correlation with how a process deviates from a standard (Eckes, 2003). Efficiency can be a measurement of time, cost, labor, or value and in order to achieve an efficient process, exploiting the areas where a process is not producing to customers'

specifications and finding ways to improve upon those areas is necessary. Thus, Six Sigma as a process-measurement methodology attempts to understand the processes through the collection of data on variations within the process outputs and make the processes work at their maximum efficiency (Brue, 2006).

The analysis methodology definition describes Six Sigma as being data-driven to make decisions based on statistical analysis in order to exploit the best workers within a company (Watson, 2004). The specific sequence of statistical tools used in Six Sigma practices allows for the exposure and control of areas of variation within processes with the goal of optimizing process output (Watson, 2004). These particular tools may include the Plan-Do-Check-Act (PCDA) cycle, which focuses on teamwork, and the Define-Measure-Analyze-Improve-Control (DMAIC) sequence, which is the most widely used and focuses on the problem-solving method for improving an existing process (Watson, 2004). The Define-Measure-Analyze-Design-Verify (DMADV) method is similar to the DMAIC sequence but is focused more on creating a process, product, or service or when a redesign is needed for the improvement of customer satisfaction.

The business culture definition of Six Sigma characterizes the methodology as a culture rooted in achieving better performance and productivity levels at a lower cost (Watson, 2004). The business culture "represents the common understanding, habits, and acceptable ways of doing business that characterize an organization" (Rath & Strong, 2003, p. 20). The definition rooted in the business culture emphasizes top-down support and the evolution of processes that become part of the organization's business language and philosophy (Watson, 2004). Managers of a company must be prepared to take a serious look at what is happening within the entire organization and be willing to change (Brue, 2006). Because managers in today's world are faced with rapidly changing markets, emerging technologies, intense competition, and other

face-paced business shifts, Six Sigma provides a cause-effect mentality into the culture of a business by providing tools that can help problems to be identified, quantified, and typically removed (Rath & Strong, 2003). In this sense, Six Sigma creates a business culture where root causes are identified and then solutions are derived, and not the other way around.

Six Sigma Tools

The DMAIC sequence is used to improve the current capabilities of an existing process, product, or service with evolutionary improvements (Brassard et al., 1994). The potential benefits of using this method are that it may provide a framework for subsequent projects, it provides a common language among team members as well as among members of the entire organization, it provides a checklist so critical steps are not missed as the process moves along, and it allows a company to improve the way in which it handles problem solving and improvement methods. The five steps of the DMAIC method are: define the project, measure the current situation, analyze to identify causes, improve the process, and control the process. Many companies have used this tool successfully, but in order for this method to produce dramatic improvements, every person on the team must understand the goals and outputs of each step along with the various tools used in each step.

In the Define step, the goal is to specify what the purpose and scope of the project is and understand the background and boundaries of the process and the requirements of its customers (Brassard et al., 1994). By beginning with this step, the team hopes to gain a clear statement of what the improvement will be and how it will be measured, a high-level process map, and a list of key quality characteristics based on the voice of the customer analysis. Some of the most common tools used during the Define stage include communication plans, project charters, as-is process maps, SIPOC (Suppliers, Inputs, Processes, Outputs, and Customers) analyses, voice of

the customer analyses, and tollgate reviews. It is always important when doing a DMAIC project to have a communication plan for the project team in order to create buy-in with stakeholders, keep the team on track and prevent issues, properly identify the correct people involved or affected, and gain the support of the whole organization (Brassard et al., 1994). A communication plan "describes the requirements for communication, including messages, type of media to be used, and frequency of communication" (Watson, 2004, p. 82). Project charters are common to all types of projects and are used to define the business purpose for taking on a project and the potential opportunity for improvement (Watson, 2004). Once management approves the project charter, this charter can be used during project reviews to update resource requirements, get new people on board, and identify project-management measures. The as-is process map shows the process in its current state, oftentimes in a swim lane format, so the team can visualize where issues may be occurring (i six sigma, 2010). After the as-is process map is created, a SIPOC analysis is completed to identify certain key points of the project, including starting and ending points, where the data collection will take place, who the suppliers and customers are, and what is flowing in and out of the process (Brassard et al., 1994). Ultimately, a SIPOC analysis is "a diagram that enables a team to develop a high-level understanding of a process under study, including the upstream and downstream links. The term SIPOC stands for Suppliers, Inputs, Process, Outputs, and Customers" (Watson, 2004, p. 222). From there, a voice of the customer analysis is used to help focus the improvement project, create suitable measurements for data collection and analysis, facilitate decision making among team members, offer a baseline measure of customer satisfaction for comparison purposes, and pinpoint key elements that drive customer satisfaction (Brassard et al., 1994). A voice of the customer analysis is "a method for identifying the key drivers of customer satisfaction. This enables an

organization to effectively design, deliver, and improve its products and services" (Watson, 2004, p. 224). The last part of the Define phase, and each of the other four phases, is for the team to conduct a tollgate review. A tollgate review is used for a few reasons, including providing guidance for the project team, monitoring progress and getting the team on board with the status of the project, reinforcing and aligning priorities, supplying continuous instruction and support to the team members, and recognizing efforts and continuing to motivate the team members (Brassard et al., 1994). The Define phase sets the stage for what the scope of the project and the specific problem at hand is before honing in on specific tools for the end result of process improvement.

The goal of the Measure phase is to gather information about the state of the current situation and concentrate the improvement effort (Brassard et al., 1994). During this phase, the project team attempts to obtain data that describes and focuses on where the problem is occurring and how often it is occurring, baseline data describing the level of which the process meets the customer's needs, a thorough understanding of the process, and a more specific and focused problem statement. Some common tools used in this step include data collection, detailed level process maps, and Pareto charts. Data collection is a series of steps used to assist in the collection of appropriate, useful, and meaningful data (Brassard et al., 1994). The steps include: clarifying data-collection goals, developing operational definitions and procedures, validating the measurement system, starting the data collection, and continuing to improve measurement consistency. It is beneficial to undergo the data collection steps in order to save time and effort and create a structure for the data collection to ensure accuracy and proficiency among team members. A detailed level process map has all of the process elements of the as-is process map from the Define phase with a high-level view of the flow of goods and services and also takes a

much deeper look into the process (i six sigma, 2010). It defines the inputs and outputs at each step and categorizes them based on their relevance to the process. These classifications may include: 'critical noise', 'standard operating procedure', or 'controllable'. The team then uses a Pareto chart to "rank problems by their relative frequency or importance to help a team focus on causes that offer the greatest potential for improvement if solved" (Watson, 2004, p. 221). This type of analysis is based on the proven principle that 80% of problems stem from 20% of sources (Brassard et al., 1994). The Measure phase begins to detail what specific issues may be arising within the process, what may be causing theses issues to happen, and what affect these issues are having on the process. From this stage, the project team has a better idea of what needs to be looked into for further analysis.

In the Analyze phase, the project team has a goal of identifying root causes of issues in the process and confirming those causes with data. Through this phase, the team hopes to have a theory that has been tested and confirmed (Brassard et al., 1994). Root cause analyses and value stream mapping are two of the main tools used in the Analyze phase. A root cause analysis identifies sources of variation in order to find the root causes of a problem (Watson, 2004). Once these are identified, they can be eliminated to allow for the biggest impact when solving the problem. A value stream map is used to identify and visually display the flow of materials and information along the value stream of a product (i six sigma, 2010). The purpose is to exploit and eventually reduce non-value adding activities in each step of a process and reduce wait times between successive steps. The Analyze phase allows for the team to get into even more detail than the previous two phases about why the problem is occurring and what effects this problem has on the process. By fully understanding what the problem is, the team can then move on to creating solutions for improvement.

During the Improve phase of the DMAIC process, solutions that address the root cause from the Analyze step are developed, tested, and implemented (Brassard et al., 1994). The team also evaluates the solutions and potential plans for implementation by using data. In this phase, the project team attempts to conclude with a selected series of actions that have been planned and tested with the hopes of eliminating or reducing the impact of the root cause, collected data that has been analyzed before and after to demonstrate the impact, and an evaluation of the plan compared to how it was actually executed. The tools used in this step might include: brainstorming, to-be process maps, commitment scales, control charts, failure mode and effects analyses, histograms, prioritizing matrices, process sigma, or run charts. There are many tools that could potentially be used and since each project varies greatly, the tool set should be tailored to the needs of the project. The Improve phase is where actual results will start to show and wins will hopefully occur. The project team starts to get the feel for what will work and what will not work.

Once solutions have been put into place and the process is beginning to improve, the project team moves into the final step, which is the Control phase. The Control phase seeks to maintain the achievements that have been made in the Improve stage (Brassard et al., 1994). The team hopes to create standardized work processes, forecast improvements that may be necessary in the future, and document and utilize the lessons learned from the process. By completing this phase, the team may expect thorough documentation of the new process and method, a system for training new employees on the new method, a way to monitor and check the use of the new method among employees, and documentation of the results, lessons learned, and suggestions. Lessons learned is an excellent tool that, like project charters, is used in all types of projects. A lessons learned review can be used at various points throughout a project as well as at the

completion of a project in order to build the knowledge base of a company and its employees by documenting new understandings (Egeland, 2009). The lessons learned from a specific project should be applied across an entire organization for consistency in all future projects. Detailed information about approaches, resources, protocols, forms, and attitudes that either worked or did not work to a project's favor are some things that may be shared in a lessons learned review. Ideally at this point the team has gained some key wins within the project and has learned how to maintain and stabilize the process. Continuous improvement is never-ending and it is important to keep the project team on track and motivated so that future projects become more and more efficient and successful.

Structure of Team

The typical team structure in the DMAIC approach includes four major roles, including the process owner; champion or sponsor; the team coach, also known as the Master Black Belt; and team members of Black Belt, Yellow Belt, or Green Belt status (Brassard et al. 1994). Process owners are line managers who are in charge of the performance and outcome of particular work processes, therefore ensuring their vested interest in thoroughly completing a Six Sigma initiative (Watson, 2004). Process owners have many responsibilities in order to maintain the consistent performance of their work process such as measuring, monitoring, and controlling the performance of the process; creating the maximum performance in order to enhance the outcome of the entire system; creating documentation; identifying problems and areas for potential improvement; and sponsoring Black Belt and Green Belt projects. The project champion is a process owner who has the responsibilities of keeping the project on track and producing results (Watson, 2004). This person identifies which projects a Black Belt will work on and have a hand in the Define phase of the Define-Measure-Analyze-Improve-Control

(DMAIC) or Define-Measure-Analyze-Design-Verify (DMADV) processes. Because the champion is tasked with keeping the project focused, he performs reviews at each milestone, sets targets for improvement, and provides the proper resources for the completion of the project. Team coaches, also referred to as Master Black Belts, are trained as consultants who coach and mentor Black Belts in Six Sigma tools and methodology (Watson, 2004). These people are internal to a company and perform both management and technical activities, including coordinating large projects across an organization's processes, coaching and advising the entire portfolio of Six Sigma projects within a company, identifying proper Six Sigma projects that align with a company's strategic business objectives, conducting training and workshops, and coaching team members on proper use of Six Sigma tools and the DMAIC or DMADV processes. The project's team members are chosen based on their varying levels of training as well as the level of difficulty of the project. Team members may include people of Black Belt, Green Belt, or Yellow Belt status.

Black belt. Black Belts are trained to be the head of the analysis of a Six Sigma project and lead the team in the DMAIC or DMADV approach toward improvement or innovation (Watson, 2004). Besides being the front runner and most visible role in a Six Sigma project, the Black Belt is required to conduct detailed analyses, uncover root causes and pursue problems, work with front-line employees to truly gain an understanding of the process and its issues, and work with management to find the best possible solution and approach for the problems. The Black Belt does not participate in implementation of the solution.

Green belt. Green Belts are considered junior Black Belts (Watson, 2004). They complete their tasks and work on projects as Green Belts while still working a full-time position within the company. The projects are usually smaller in scope and are mentored by Black Belts.

Throughout the DMAIC process, Green Belts typically assist with the time-consuming analysis tasks like data collection and measurement and conducting of experiments.

Yellow belt. Yellow Belts are given introductory training in the fundamentals of Six Sigma ("Six sigma yellow belt training"). The Yellow Belt does not lead a Six Sigma project alone but instead works underneath the Black Belts and Green Belts and accomplishes tasks such as gathering data, participating in problem-solving practices, and integrating Six Sigma methodologies and tools into process improvement initiatives.

Lean Six Sigma

Lean and Six Sigma methodologies can be used in conjunction to establish a framework of tools and processes that enable a company to remain customer-focused while improving overall quality and efficiency as well as decreasing cost and waste (Sharma, n.d.). The principle of Lean Six Sigma can be stated as "the activities that cause the customer's critical-to-quality issues and create the longest time delays in any process offer the greatest opportunity for improvement in cost, quality, capital, and lead time" (George, 2002, p. 4). In order to create process excellence, Lean Six Sigma meets four key standards, including: concentrating on improving the overall process, focusing on the voice of the customer, creating tools to gain quick wins along with creating lasting methods for more intricate solutions, and being flexible enough to apply the established tools and methods to the wide range of organizational processes (Sharma, n.d.). The reason Lean and Six Sigma work together is because Lean provides simple tools for reducing waste and cycle times and Six Sigma provides an approach that makes setting targets, measuring performance, analyzing causes, reducing variation, and improving performance understandable and achievable.

Even though both Lean and Six Sigma provide a cross-functional process view of an entire organization, some differences should be noted between the two (Rath & Strong, 2003). For example, Lean applies principles while Six Sigma utilizes specific tools. Lean principles are best used in conjunction with each other while Six Sigma tools are typically used independently of one another. Despite being two different approaches to process improvement, they are dependent on each other for project success, and the organization that realizes the benefits of using both Lean and Six Sigma in conjunction will be able to create a significant competitive advantage.

Summary

Lean thinking paired with Six Sigma tools and methodology and the proper team has proven to be a beneficial way for a company to reduce waste, increase customer satisfaction, and ultimately improve their bottom line. When properly implemented, a Lean Six Sigma approach to process improvement can provide a way to establish a company culture of seeking perfection. With Lean's focus on waste reduction through the elimination of non-value added activities and streamlining processes, and Six Sigma's focus on reaching 3.4 defects per million, the combination is powerful. While each opportunity for a Lean Six Sigma initiative may be different, a company can benefit from fully understanding the tools needed to improve processes and can tailor these tools to meet the specific needs of the company.

Company XYZ has a powerful system for creating forecasts for future sales within their global geographies. Forecasting sales helps create more efficient operations by allowing a company to plan for future needs of customers. Common to the business world, however, many sales forecasts are inaccurate. Company XYZ's forecasts proved to be inaccurate due to a sales pipeline that contained scores of invalid, duplicate, and dead sales leads, stemming from a large

amount of sales and marketing analysts inputting, updating, and deleting information on a daily basis. This project focused on the Lean principles of continuous flow of information and creating efficient, streamlined operations through the analysis of the value stream of Company XYZ's sales pipeline. These lean principles were then coupled with Six Sigma's Define-Measure-Analyze-Improve-Control (DMAIC) methodology to set numerical targets for improvement and monitor the improvements made. The next chapter will detail how many of the described Lean Six Sigma tools and processes were used to help improve Company XYZ's bloated and inaccurate pipeline and create a more efficient sales and forecasting process.

Chapter III: Methodology

Company XYZ's sales pipeline contained inaccurate, invalid, dead, and duplicate leads, which caused the sales and marketing analysts to perform many non-value added activities by chasing cold opportunities. The pipeline also created inaccurate sales forecasts in revenue for future quarters. In order to clean up the current sales pipeline as well as establish a way to allow for less non-value added activities to take place and increase the response rate of sales leads within the pipeline, this study applied both Lean principles and Six Sigma quality measures to achieve its goal. This study followed the DMAIC approach within the Six Sigma methodology as described in this chapter to identify the pain points within the process, the main causes of the issue of low rate of leads converted into actual sales, and potential solutions to these main issues.

Sales Stages at Company XYZ

At Company XYZ, there are a series of sales stages that every opportunity goes through to potentially reach validation and be counted as possible revenue. These are described below along with the activities that take place in each of the stages and the person responsible. The subject of the study was Sales Stage 04.

Sales stage 01 - noticing. Opportunity data is being gathered for a possible opportunity by the opportunity noticer.

Sales stage 02 - noticed. Contact information, including contact name, business, e-mail, phone, and address is recorded by the opportunity noticer. The opportunity is closed if the prospect will not be able to provide contact information.

Sales stage 03 - identified. The opportunity identifier gathers the prospect's needs in his or her own terms and updates their contact information. The opportunity is closed if the prospect will not be able to provide his or her needs.

Sales stage 04 - validated. The opportunity identifier confirms that the prospect will buy something from someone and confirms that Company XYZ has access to the key decision maker. The opportunity identifier also understands the customer's wants and needs enough to assign that customer to an opportunity owner. The customer is closed if it cannot be validated.

Sales stage 05 - qualified. The prospect and Company XYZ agree to a preliminary conceptual solution. The opportunity owner confirms continued interested in the customer doing business with Company XYZ and then executes the control point, which is the verification that the opportunity is validated. The opportunity owner closes the opportunity if it cannot be qualified.

Sales stage 06 - conditionally agreed. The prospect and Company XYZ agree to a solution and Company XYZ submits a proposal. The opportunity is closed if a proposal will not meet the prospect's or Company XYZ's needs or requirements.

Sales stage 07 - won/implementing. The customer signs the contract with the opportunity owner and the solution delivery control points contract and change management are executed. The solution delivery verifies that the proposed solution meets the customer's needs. The opportunity is closed if the customer does not agree to sign the contract.

Sales stage 08 - closing sales stages. The deliverer of opportunity provides reason codes, as required.

Data Collection Procedures

This study used the Define-Measure-Analyze-Improve-Control (DMAIC) method as described in detail below. A project plan was created to map out the tasks of each phase in the DMAIC process and estimate how long each task would take (Table 1). Table 1 is an example of a typical project plan used in this type of process methodology. It details the Define, Measure,

and Analyze phases as this was where the project was concluded due to stakeholder buy-in issues. Table 1 also notes specific tasks in each of the phases and the estimated time it would take to complete each task. This project plan table is typically created by the project champion and Master Black Belt and then rolled out to the other team members.

Table 1

DMAIC process project plan

Define	**Total # of Days**
Task 1	# of days/weeks
Task 2	# of days/weeks
Task 3	# of days/weeks
Task 4	# of days/weeks
Task 5	# of days/weeks
Measure	**Total # of Days**
Task 1	# of days/weeks
Task 2	# of days/weeks
Task 3	# of days/weeks
Task 4	# of days/weeks
Task 5	# of days/weeks
Analyze	**Total # of Days**
Task 1	# of days/weeks
Task 2	# of days/weeks
Task 3	# of days/weeks
Task 4	# of days/weeks
Task 5	# of days/weeks

Define. The goal of the Define step was to specify what the purpose and scope of the project was and understand the background and boundaries of the process and the requirements of the customers (Brassard et al., 1994). Within the Define step, the tasks for this pipeline project included: finalizing the roles and responsibilities by adding the core team members, creating a communication plan, finalizing the scope and objective, creating a detailed project plan (Table 1), completing a Suppliers, Inputs, Processes, Outputs, and Customers (SIPOC) analysis (Figure 1), creating an as-is process map (Figure 2), establishing the voice of the

customer associated with Critical to Quality Characteristics (CTQC), establishing operational metrics, defining the data collection plan, determining the initial estimated baseline metrics or headcount and initial targets, finalizing the project charter, and performing a tollgate review and lessons learned discussion.

In kicking off the Define phase of the project, the process owner, project champion, and Master Black Belt first met to discuss definitional aspects of the project. This was where team members were chosen and a formal meeting and communication plan was established. The process owner, project champion, and Master Black Belt solidified the essentials of the project, such as determining the business problem, the scope and objective and project plan before delegating tasks to the various Yellow Belt team members. The entire team met bi-weekly on a conference call to further define the important aspects of the project before moving into the actual measurement phase.

The Yellow Belt team members, with the help of the Master Black Belt, created a SIPOC diagram (Figure 1) after brainstorming and researching the suppliers, inputs, process, outputs, and customers as well as the resources, business rules, and requirements within the process. Figure 1 is an example of a typical SIPOC analysis diagram used in this type of project. The Yellow Belt team members also created the as-is process map in a swim lane format (Figure 2) that was broken down into five lanes of process owners, including sales representative, vendor, lead desk, pipeline quality manager, and stakeholder/customer and detailed a timeline of the entire process. Figure 2 is an example of an as-is process map used in this type of project. In order to create the as-is process map, each team member was asked to create his or her own version based on their research and interviewing of the sales and marketing team members. Then, results were compared and adjustments were made once consensus was reached. The

process owner, project champion, and Master Black Belt approved the final as-is process map and after approval, the Yellow Belt team members, with the guidance of the Master Black Belt, determined the voice of the customer. In order to do this, the team members gathered data from internal customer comments in the e-mails received from the market segment manager or brand leaders over the past two years. One of Company XYZ's document controllers provided this information to the team members in a spreadsheet. The team members grouped similar customer complaints or suggestions and ranked them by frequency. Then, these were translated into critical to quality characteristics and operational definitions so that actions could be taken. This was accomplished through another brainstorming session and approved by the process owner, project champion, and Master Black Belt. The process owner, project champion, and Master Black Belt determined the operational metric, which was established on a baseline versus target basis. The metrics were added to the project charter and the process owner, project champion, and Master Black Belt approved the final project charter. Once approval of all of the outputs of the Define phase was achieved, the process owner, project champion, and Master Black Belt closed the Define phase with a tollgate review and lessons learned meeting, where each team member contributed inputs about what went well in the Define phase and what could be improved upon for the next phase of the current project. The team moved on to the Measure phase.

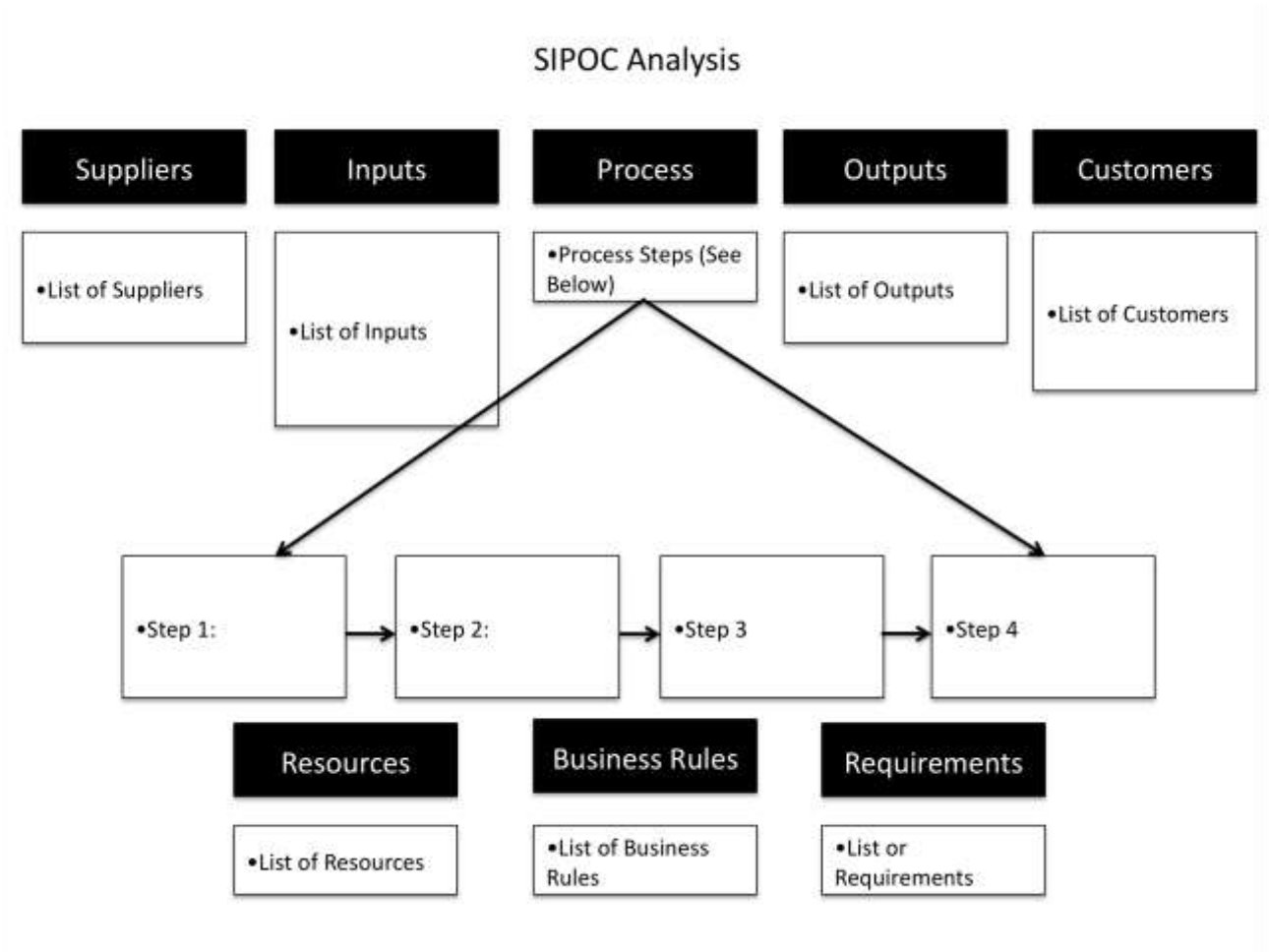

Figure 1. SIPOC analysis.

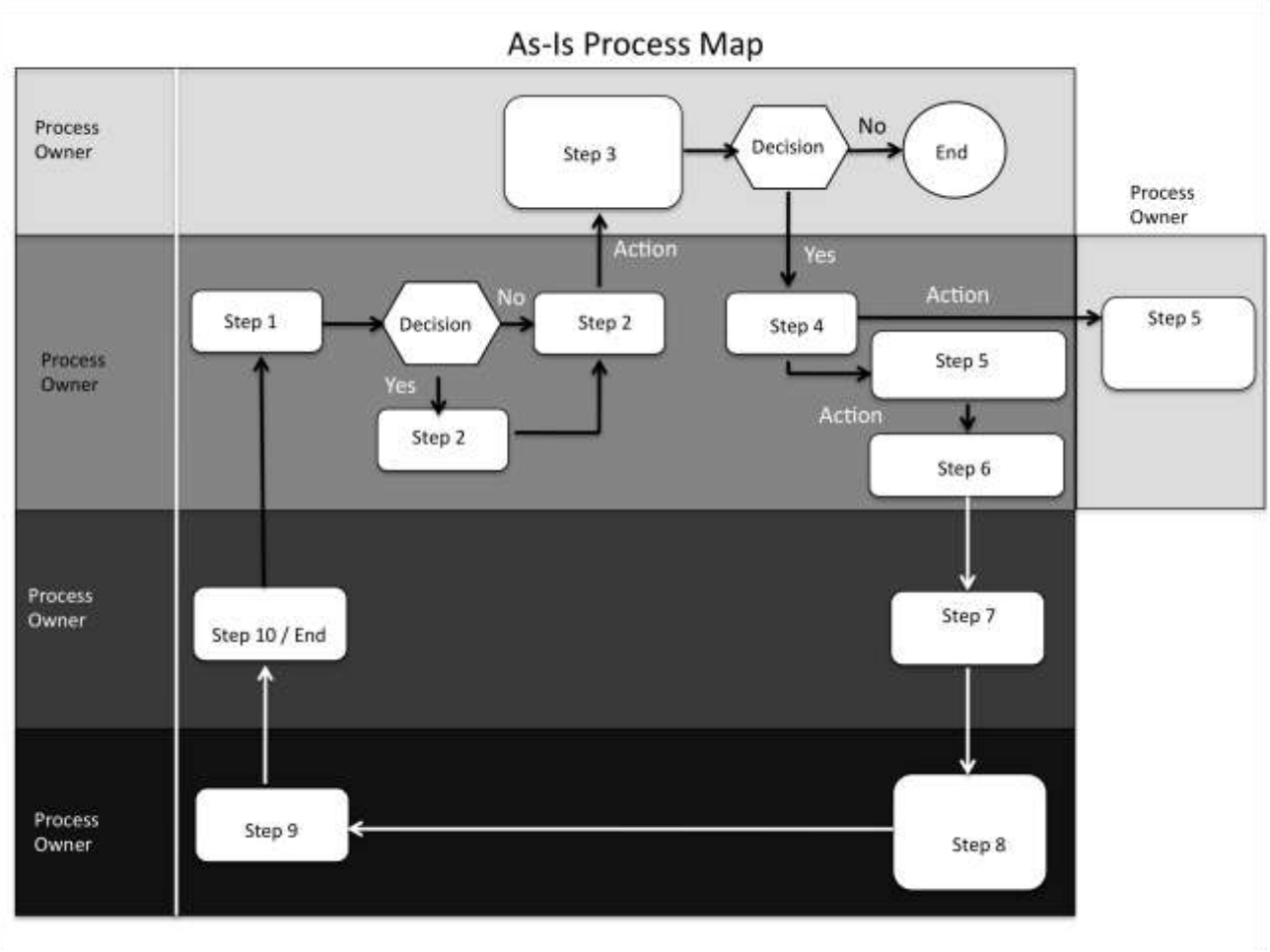

Figure 2. As-is process map.

Measure. During the Measure phase, the goal was to gather information about the state of the current situation and concentrate the improvement effort (Brassard et al., 1994). Within the Measure phase, the tasks for this pipeline project included: validating the data collection methodology, creating a data chart, executing the data collection plan, updating the project charter with measured operational baseline metrics and estimated targets, and performing a tollgate review and lessons learned discussion.

In order to collect the data necessary to complete the DMAIC process, the process owner, project champion, and Master Black Belt established a measurement and data collection plan to be used by the Yellow Belt team members. The plan detailed that data would be gathered through Siebel reports run by the third party vendor that detailed the breakdown of sales opportunities that were older than 60 days and had not been updated in 30 days or more. Ultimately, the main task of the Measure phase for the Yellow Belt team members was to utilize the reports given to them, find out the sales response rates per quarter, and follow the opportunities back through the pipeline to the opportunity owner or sales representative to see where, when and how the opportunity was lost. This would, in turn, lead the team to gain a better understanding of what needed to happen in order to increase response rate for future quarters.

The Siebel reports were given to the Yellow Belt team members to be sorted into three metrics for testing, including win revenue, response rate, and proportion of the aging pipeline. The team members documented win revenue in an Excel file of all of the opportunities in the specific quarter with the following fields for each opportunity: response status in touched quarter, summary of value, and total count of opportunities. The data source for the win revenue report was Siebel and the report was run by a third party vendor once every quarter. The

response rate report was an Excel file that included: opportunity identification, customer name, description (product details), region name, owner or user name, owner's Lotus mail, when it was last updated, the status of the response, and comments. The data source for the response rate was Siebel and the report was run by a third party vendor once every quarter. Proportion of the aging pipeline report included: opportunity identification, elapsed days of the opportunity's contact, and when it was last updated in the system. The data source for the proportion of the aging pipeline was Siebel and a third party vendor ran the report once every quarter.

From these reports, the Yellow Belt team members created an Excel graph showing the sales response rate of the North American geography (since this was the best overall representation and the process owner chose to use it as the main geography for review) from quarter one to quarter four of 2010. The chart solidified the need for a better sales opportunity process and validated the accuracy of the sales response rate baseline and target metrics as well as validated that poor response rate was a major issue within the pipeline. Once approval of all of the outputs of the Measure phase was achieved, the process owner, project champion, and Master Black Belt closed the Measure phase with a tollgate review and lessons learned meeting, where each team member contributed inputs about what went well in the Measure phase and what could be improved upon for the next phase of the current project. The team moved on to the Analyze phase.

Analyze. In the Analyze phase, the goal was to identify root causes of issues in the process and confirm those causes with data, which allows for the output of the stage being a theory that has been tested and confirmed (Brassard et al., 1994). Within the Analyze phase, the tasks for this pipeline project included: performing a root cause analysis, identifying pain points, identifying root causes, validating root causes, identifying value-added/non-value-added process

steps, identifying areas of waste, validating the findings with the process owner, and performing a tollgate review and lessons learned discussion.

The Yellow Belt team members took the metrics from the Measure phase and began a root cause analysis. The main tool used in the root cause analysis was the cause and effect diagram (Figure 3). The cause and effect diagram is a standard tool used in the analysis portion of the DMAIC process and helps the team visually consider all of the possible causes of a problem. The shaded boxes denote the brainstormed causes of the effected problem, which is shown as the main shaded box at the end of the centralized arrow. Arrows with sub-causes protrude from the brainstormed causes boxes. The team suggested possible causes of poor response rate within the sales pipeline and compiled ideas. The process owner, project champion, and Master Black Belt approved the cause and effect diagram and in turn validated the root causes. The team broke down the main issues and brainstormed suggestions for future improvement, pointed out areas where there was waste in the process, and validated the suggestions with the process owner, project champion, and Master Black Belt before the ideas could be presented to the sales and marketing team managers. Once approval of all of the outputs of the Analyze phase was achieved, the process owner, project champion, and Master Black Belt closed the Analyze phase with a tollgate review and lessons learned meeting, where each team member contributed inputs about what went well in the Analyze phase and what could be improved upon in future projects.

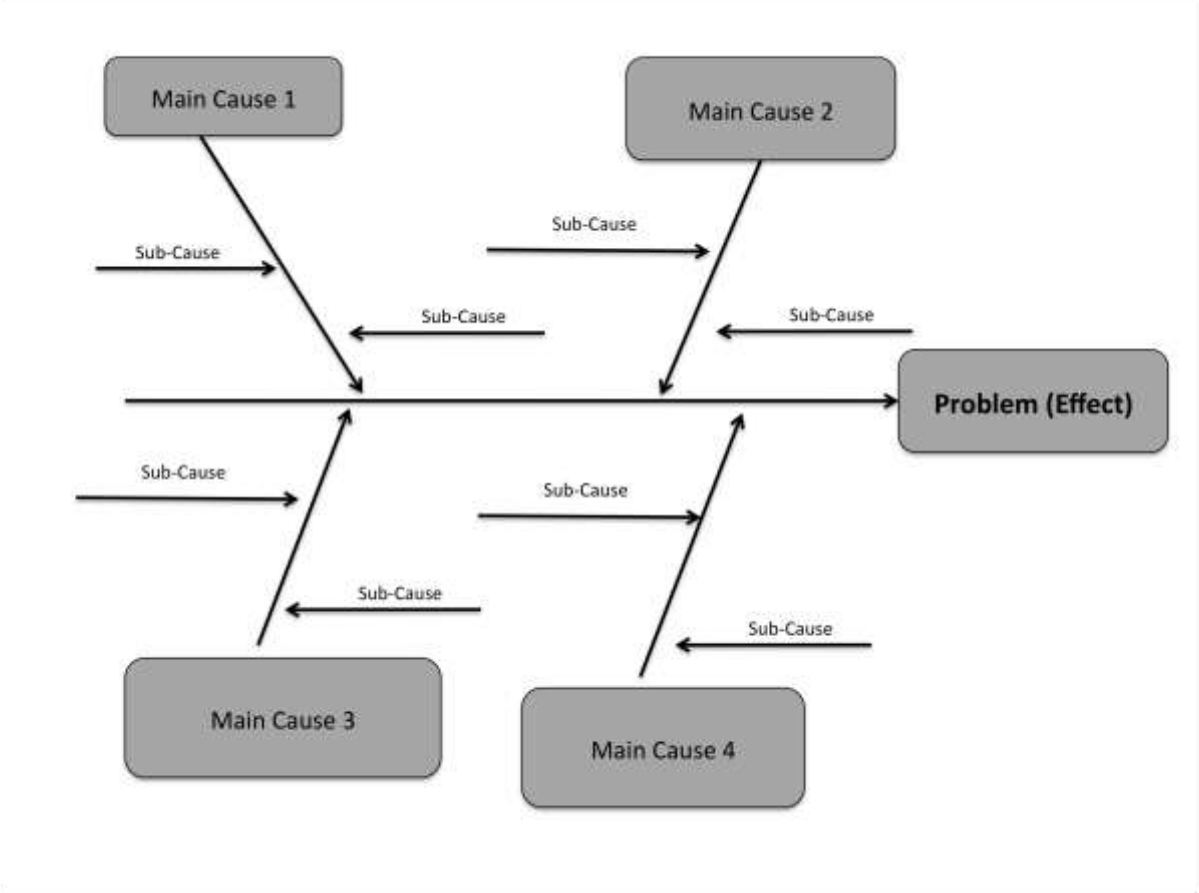

Figure 3. Cause and effect diagram.

Limitations

Due to stakeholder buy-in, the entire DMAIC process was not used. Therefore, the study only went through the Define, Measure, and Analyze phases and made recommendations based on those findings.

Summary

With the goal of creating more accurate reporting of revenue for future quarters for Company XYZ, cleaning up the sales pipeline that the marketing and sales analysts use to track sales leads, and creating more efficient processes within this department, the project team

utilized various tools from the DMAIC methodology to provide suggestions for improvement. Within the Define phase, the team created a SIPOC analysis to define and better understand the suppliers, inputs, processes, outputs, and customers of Company XYZ's sales pipeline. An as-is process map was created in a standard swim lane format to provide a visual of how the information flows within the process and determine where there may be issues. Also in this phase, all metrics and project definitions including the scope and objectives were solidified. In the Measure phase, the team moved more toward gathering data in order to provide solid suggestions for improvement. The main output was the creation of graphs based off of the Siebel reports. Finally, the Analyze phase allowed the team to get to the root cause(s) of why Company XYZ has a bloated, inaccurate sales pipeline. The project team completed a root cause analysis and created a cause and effect diagram.

Chapter IV: Results

This study took a Lean Six Sigma approach and used the DMAIC methodology in order to create a more accurate pipeline yield and greater sales lead response rate for Company XYZ. Company XYZ is a global technology and innovation company founded in the early 20th century that develops and manufactures information technology products and services (yahoofinance.com, 2011). The company had a pipeline that was filled with many invalid, dead, duplicated, or inaccurate sales leads and produced a low yield of leads that were converted to sales, causing inaccurate sales forecasts of revenue for future quarters. Below are the results of the Lean Six Sigma study.

Results of the Define Phase

The business problem was defined as Company XYZ having a bloated, inaccurate pipeline with a low yield due to many dead/invalid, duplicate, or unreal leads. Inaccurate pipeline projections for future quarters were due to the inefficient lead passing process. The objective of the project was to improve pipeline quality and yield in Global Technology Services (GTS) by improving the current Pipeline Acceleration System process that removes dead, duplicate and invalid leads while identifying and passing on aging leads to best-fit owners in Siebel. This included increasing the response rate of sales leads from 57.25% to the target of 90%. The scope was defined as including all leads in Sales Stage 04, Software Group (SWG), and Global Technology Services (GTS) North American geography.

First off, the project champion and the Master Black Belt created the project plan based off of the typical DMAIC sequence and detailed a formalized outline of the processes to be completed by the team members (Table 2). The project plan is an excellent benchmarking tool to help keep the team on task.

Table 2

Optimizing sales and marketing pipeline yield of Company XYZ project plan

Define	**55 days**
Finalize Roles and Responsibilities (add core team members)	7 days
Finalized Scope and Objective	1 week
Detailed Project Plan	1 week
SIPOC	1 week
Communication Plan	1 week
As-is Process Map	2 weeks
Voice of the Customer associated to CTQC	2 weeks
Operational Metrics	1 week
Define Data Collection Plan	1 week
Determine Initial/Estimated Baseline Metrics or Headcount and Initial Targets	2 weeks
Process Owner, Project Champion Signoff Required	2 weeks
Finalized Project Charter	2 weeks
Toll Gate Review	2 weeks
Lessons Learned	2 weeks
Measure	**15 days**
Validate Data Collection Methodology	5 days
Data Chart	1 week
Execute Data Collection Plan	2 weeks
Validate Data Accuracy	1 week
Update Project Charter with Measured Operational Baseline Metrics and Estimated Targets	1 week
Toll Gate Review	1 day
Lessons Learned	1 day
Analyze	**20 days**
Root Cause Analysis – Typical of a Six Sigma Project Identify Root Causes Validate Root Causes Identify Value Add/Non-Value Added Processes Steps	10 days
Validate Findings with Process Owner	2 weeks
Toll Gate Review	1 day
Lessons Learned	1 day

A communication plan was established to detail the execution of the project based off of the detailed project plan. This was particularly important for this project because the team members were located on various continents around the globe. It detailed three objectives, including a project status call, a project phase tollgate, and a cadence call. The project status call took place biweekly to communicate project status, successes, and issues and included all team members, including the project sponsor, process owner, financial analyst, steering team members, Master Black Belt, Black Belt, and four Yellow Belt team members. The project phase tollgate was conducted at the end of each phase and included the sponsor, one member of the steering committee, the Black Belt, and the project manager. The cadence call happened weekly in order to communicate project plan activities, project status, successes, and issues and was held with the Black Belt, the Master Black Belt, and the Yellow Belt team members.

The SIPOC analysis (Figure 4) detailed the suppliers, inputs, process, outputs, and customers as well as the resources, business rules and requirements within the process in order for the team to get a better grasp on these elements of the process. The suppliers included the vendor, which was Berkshire Solutions, and the sales/client representatives. The inputs were the list of dead/invalid or duplicate leads and e-mail responses from sales/client representatives. The process included four steps:

1. Extract data from Siebel by the vendor
2. Apply criteria and send notices via e-mail to sales/client representatives
3. Collate and correlate responses
4. Make Siebel updates

Within the process, the resources included Siebel as the vendor, the business rules as lead age and pipeline yield, and requirements as win revenue. The output included an updated, accurate

pipeline and pipeline reporting. The customers were all internal customers, including the sales representatives, sales leaders, integrated marketing team leaders (IMT), and brand leaders.

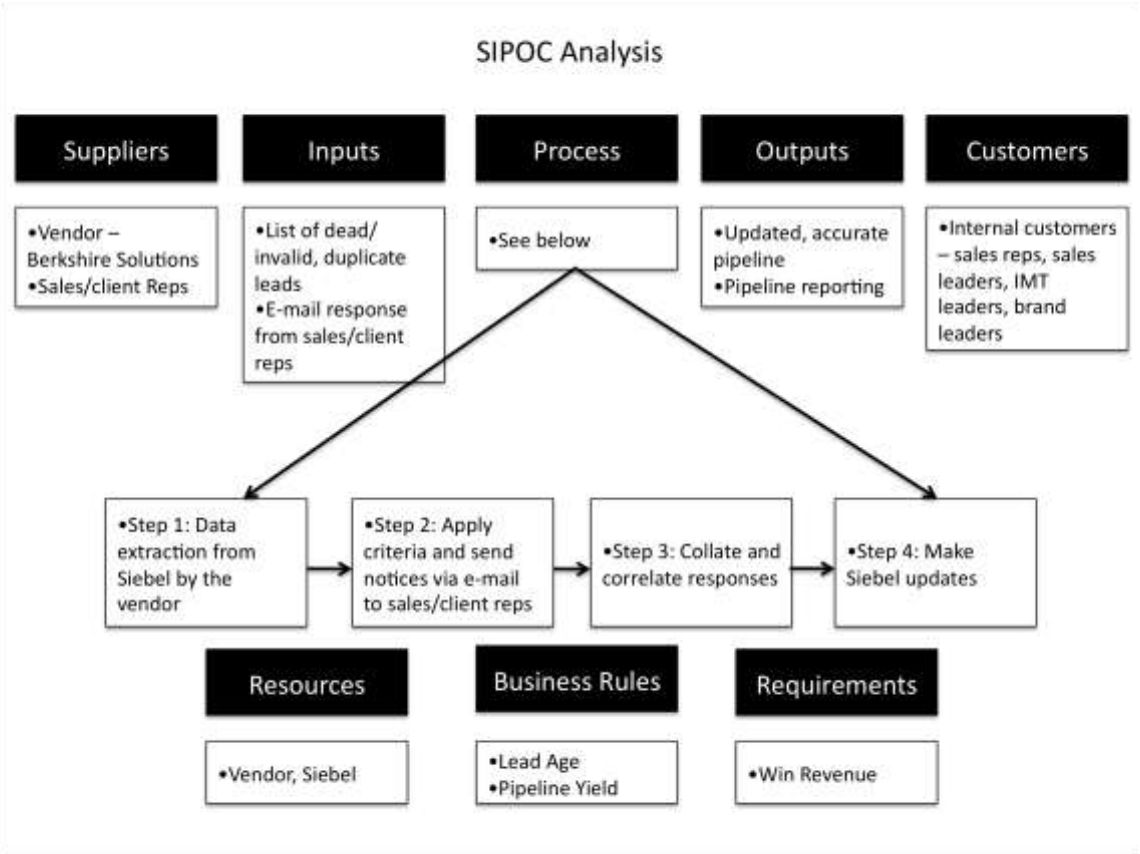

Figure 4. Company XYZ's marketing and sales SIPOC analysis.

The as-is process map (Figure 5) used a swim lane format and was broken into five lanes of process owners, including sales representative, vendor, lead desk, pipeline quality manager, and stakeholder/customer. The process was previously run once every quarter and started with the extraction of data by Berkshire Solutions, who was the third party vendor contracted to run the reports. If there were duplicates, the duplicates were removed and criteria were applied. Then an e-mail was sent to the opportunity owner. The sales representative received the pipeline acceleration system e-mail notification and if he or she received a response from the customer, the vendor would collate the responses and either send them to the lead desk in order for the lead desk to make updates in Siebel or generate a response report to be sent to the pipeline quality manager. If that were the case, the pipeline quality manager would review the pipeline report with the IMT and share the feedback from the IMT with the internal customer in order to prioritize improvements within the report. The time in days of the process steps are shown in Table 3 below.

Table 3

Pipeline acceleration system process timeline

Process Steps	**Time (In days)**
Data extract	1
Filter duplicates	1
Application of criteria and sending out e-mails*	2
Wait for response	5
Sending out e-mail reminders	1
Waiting for the reminder response	5
Creation of response report**	2

Note: The entire process (from 1 to 7) takes 21 days for SWG.
*For step 3, the timeline is 2 Geos per day and Company XYZ has 3 major Geos so that would make it 2 days instead of 1.
**The last step is 2 days per Geo so the count increases from 2 days to 6 days.

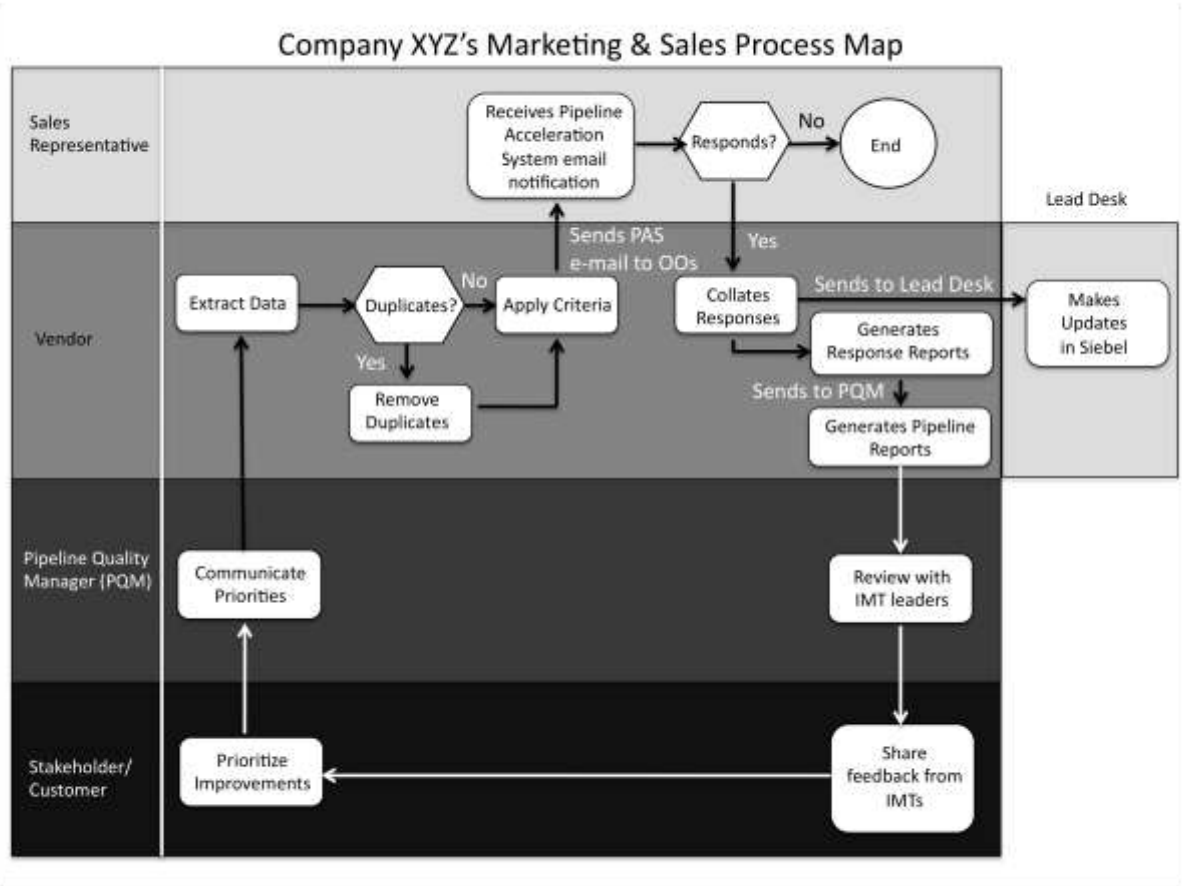

Figure 5. Company XYZ's marketing and sales as-is process map.

The voice of the customer was defined and translated into Critical to Quality Characteristics (CTQC) and operational definitions. The voice of the customer data was gathered from internal customer comments in the e-mails received from the market segment manager or brand leaders. These were translated into CTQC and three potential actions were suggested, including improving the report itself, improving communication to the stakeholders, and improving project scheduling. In order to improve the report itself, a standard reporting format needed to be established for all three new reports. The proposed format needed to be

reviewed by all stakeholders and users and revised to include feedback from them. In order to improve communication to stakeholders, a standard e-mail to marketing and sales stakeholders worldwide before the run that would communicate detailed run criteria, run dates, and report dates specific to the geography was suggested. Finally, in order to improve project scheduling, it was suggested to conduct brainstorming sessions with the team to come up with a list of promising parameters and the most suitable timing for the runs. Operational definitions were then established from the CTQCs. For improved reporting, year-to-year trending and lead age and response quality analyses (marketing versus sales leads) were defined. For better communication, advanced notice detailing run criteria, run dates, and report dates were defined. For process fine-tuning, experimenting with newer parameters related to lead age, sales stage and deal size and scheduling the 'identified' pipeline run, which includes leads that have not been processed yet, about three weeks ahead of the 'validated' pipeline run, which includes leads that have been validated, were defined.

The operational metric was established on a baseline versus target basis. The metric included an e-mail response rate from the sales lead at a baseline of 57.25% in the North American geography and the target was 90%.

Results of the Measure Phase

The project team gathered data and created a chart to graphically display the North American geography's sales response rates in all four quarters of 2010 (Figure 6). This graph shows a 50% response rate in quarter 1, a 63% response rate in quarter 2, a 69% response rate in quarter 3 and a 47% response rate in quarter 4 of the year 2010. This solidified the operational metrics as being an average of 57.25%. The project team then added quarter 1 of 2011 to the graph (Figure 7) after which sales and marketing analysts were told to copy all managers on

follow-up e-mails in 2011. Figure 7 shows a 94% response rate in quarter 1 of 2011. This copying of the managers on e-mails had a significant impact on the North American geography's sales response rates.

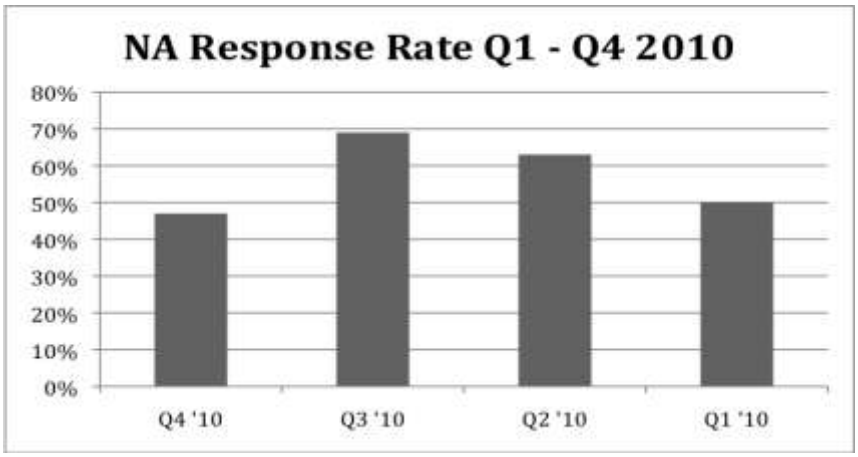

Figure 6. North American geography's sales response rate Q1 - Q4 2010.

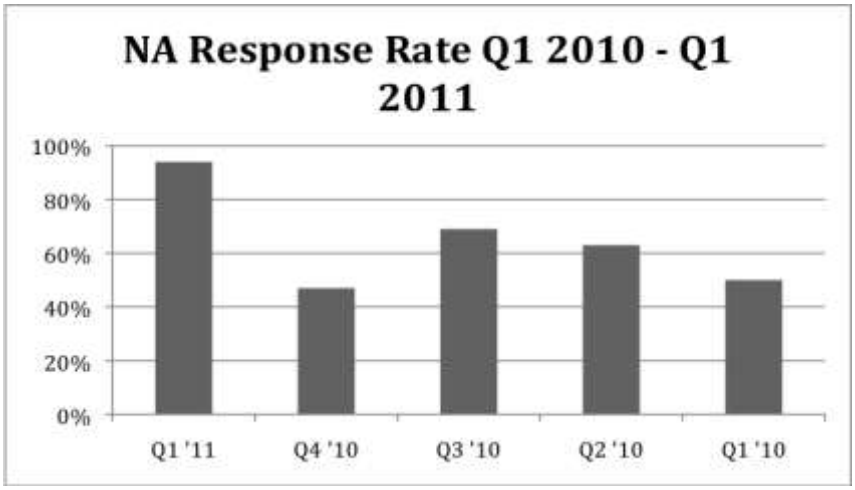

Figure 7. North American geography's sales response rate Q1 2010- Q1 2011.

Results of the Analyze Phase

The project team created a cause and effect diagram to assist with the root cause analysis (Figure 8). This cause and effect diagram detailed the main issues leading to the poor response rate of e-mail replies among sales leads. The main causes were sales and marketing representatives forgetting or taking on an "I'll do it later" attitude, the representatives not receiving the pipeline acceleration system e-mail notification, the representatives being out of the office, and leads being cold for too long. Stemming from the representatives forgetting or taking on an "I'll do it later" attitude, some causes were believed to be the managers were not intimate of a non-response, there was a representative swap, or the manager did not get prior intimation of this exercise from the manager. Stemming from the representatives not receiving the pipeline acceleration system e-mail notification, the main cause was believed to be an e-mail delivery failure, either from a change of e-mail address or from the representative being separated from Company XYZ. Stemming from the representatives being out of the office, some causes were believed to be the representative was on vacation, on maternity leave, their PC was down, or they were out of the office on business for a customer workshop, training, an all day meeting, or an enablement workshop. Finally, stemming from the leads having been cold for too long, the main cause was identified as being the pipeline acceleration system was only run quarterly instead of at more frequent intervals.

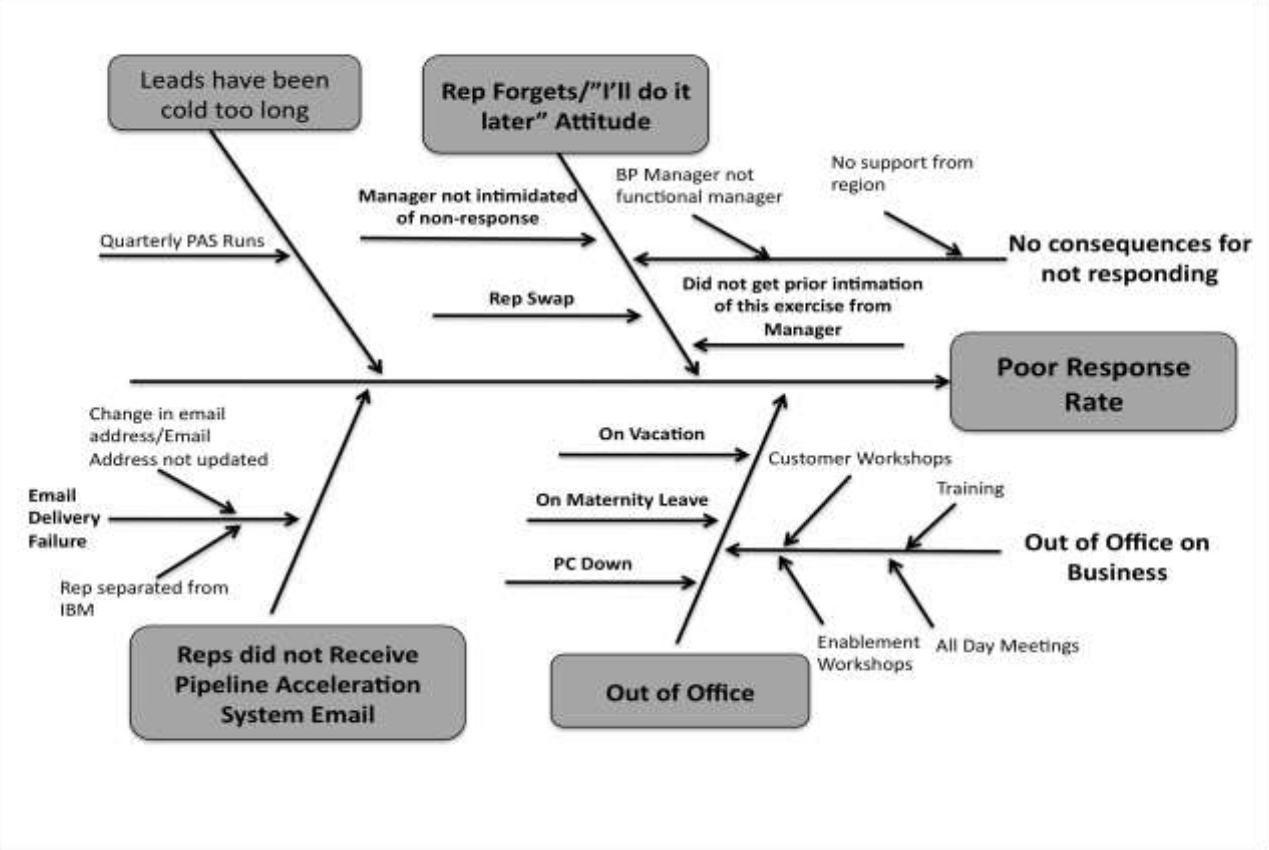

Figure 8. Company XYZ's marketing and sales cause and effect diagram.

Summary

This pipeline optimization project took the project team, which included ten people, nearly four months to get off the ground and get to a point where the company saw progress. The project team started by defining the problem, opportunity and impact of undertaking a project of this magnitude and determined that such a project would potentially cause a great positive impact within Company XYZ for future quarters, not only with monetary savings, but also with general improvement of processes within the sales and marketing divisions globally. Then, the team measured the actual amount of sales leads within the pipeline and determined the possibility of increasing the response rate of leads that the sales and marketing analysts reach out to. Finally, the team analyzed why the response rate of sales leads was so low and how they could potentially improve upon their processes to gain a better amount of win revenue and decrease the amount of wasted time and energy. Through this process, the team was able to put into action small steps that they hoped would allow for a better overall process and quick results for quarterly revenue.

The results of this study were a success based on the first trial of the team's recommendations. Through the tools used, particularly the root cause analysis and cause and effect diagram, the team was able to provide basic recommendations to allow for an easy win. The major recommendation was to have the sales and marketing analysts copy their managers on all follow-up e-mails to sales leads. The team recommended this so that the all leads were accounted for and there was a more effective system for checks and balances so that leads were not slipping through the cracks or being unattended to. With this recommendation, response rate of sales leads increased to 94% in quarter 1 of 2011 from its previous average of 57% in 2010. With a 94% response rate, if the sales and marketing analysts can keep this number where it is at,

the team projects an improvement of $800,000 in Tivoli sales for Company XYZ annually. The team calculated this number by multiplying the average win rate (8.5%) by the median lead value ($70,000) and then multiplying that by the percentage of responses from the aging leads in the pipeline to get $5,950. There were 3,761 aging leads in the North American geography's pipeline and the average response rate was 57%. Therefore, about 2,144 leads responded. The 2,144 was multiplied by the $5,950 and divided by 10 for a total of $1,275,543 in generated revenue. The same calculation was made with a 94% response rate for a total of $2,103,527 in generated revenue. The difference of those two numbers was about $800,000. With this number as a first win for this project in just one quarter, it became even more clear for the project team and the sales and marketing department of Company XYZ of the impact of improving the pipeline yield and creating a better process for keeping track of sales leads and creating wins from them.

Chapter V: Discussion

The purpose of this study was to improve the pipeline yield and response rate of sales leads for Company XYZ through a Lean Six Sigma approach and the DMAIC methodology. Chapter I detailed the background of Company XYZ and the issue studied within the sales and marketing department as well as the purpose for doing this study. Chapter II provided a background of Lean Six Sigma, the different tools and methodologies of both Lean and Six Sigma separately, as well as how they work together. Chapter III described the steps used in the DMAIC process specific to this study and Chapter IV discussed the results of the DMAIC methodology, specifically how the following recommendations were concluded.

Limitations

This study and the results were limited to Company XYZ and data was taken only from leads in Sales Stage 04, Software Group (SWG), and Global Technology Services (GTS) North American geography. Also, due to stakeholder buy-in, the study only went through the Define, Measure, and Analyze phases and made recommendations based on those findings.

Results

Based on the cause and effect diagram, the main issues were extracted and solutions were derived. The first main issue was a sales representative being on vacation. The recommended solution was to generate a calendar of vacations for each region and reach out to representatives with the pipeline acceleration system e-mail notification in accordance with the same sales leads. Also, if an out of office auto reply was the response for the pipeline acceleration system e-mail, it was recommended to re-send the e-mail once the representative returned. The second issue was an e-mail delivery failure through either a wrong e-mail address or because a sales representative had left Company XYZ. In that case, it was recommended to make sure the

database (Siebel) containing the addresses of the representatives be kept current and leads reassigned to a new owner by the client when their current opportunity owner leaves Company XYZ. The third main issue was no consequence for a non-reply. The recommended solution was to copy the representative's functional manager on reminder notices and keep an updated list of functional managers and regional sales leaders so that the right person was copied.

The team analyzed the frequency of running the pipeline acceleration system in order to remove dead, duplicate, and invalid leads while identifying and passing on aging leads to best-fit owners within Siebel. The team concluded that running the system every thirty days would be difficult as the current process took a month to complete, would significantly increase the cost for running the system, and would fatigue the representatives. Running the system every forty five days, however, might fatigue the representatives, which in turn could have a negative impact on the response rate of sales leads, and would increase the cost of running the pipeline acceleration system. Therefore, running the system every sixty days was deemed to be the most ideal run frequency given that it was feasible from a funding perspective and would not fatigue the representatives.

The team made recommendations for potential actions based on the voice of the customer analysis. In order to improve the report itself, a standard reporting format needed to be established for all three new reports. The proposed format was reviewed by all stakeholders and users and revised to include feedback from them. In order to improve communication to stakeholders, a standard e-mail to marketing and sales stakeholders was to be sent out to all geographies before the run took place and an e-mail communication to detail the run criteria, run dates, and report dates specific to the geography was to be sent out as well. And finally, for improved project scheduling, it was recommended to brainstorm with the team to come up with a

list of promising parameters upon which the process could be fine-tuned and research and brainstorm with the team on the most suitable timing for the runs (both validated and identified).

Finally, the team determined a series of cross brand implications. For example, there were 18,226 leads worldwide with a total value of over $2 billion that were more than 90 days old and had not been updated in the last month. Based on experienced response rates, the team estimated that 10% of those sales leads would have been designated as lost or invalid, totaling a loss of $150 million. An estimated $200 million, or 15% of sales leads should have been moved to a new opportunity owner to progress the opportunity. Based on experience, 8.5% of sales leads are won, which means that an estimated $17 million should be counted as win revenue in a six-month period. With an increase in response rate of aging leads, this could greatly impact the amount of win revenue globally for Company XYZ.

Conclusions

Although this project only made it up through the point of recommendations, the results of this study were a success from a process improvement standpoint. The project team made headway with the analysis of the issue and brought to attention the magnitude and inefficiency of having a sales pipeline that contained invalid, dead, or duplicate sales leads leading to inaccurate sales forecasts for future quarters. For a global company the size of Company XYZ, having inaccurate sales forecasts can greatly hinder its production operations. In order to have a truly lean environment, information flow, stemming from the elimination of wastes such as overproduction, excess inventory, and overprocessing or incorrect processing, must be as efficient as possible. Through this study, the project team verified that the information flow within Company XYZ's sales and marketing pipeline was inefficient and had many areas where improvement could be made. Based on the team's findings, the recommendations made to help

streamline communication within this department could have a great impact on accuracy of future sales forecasts and future revenue if adopted.

Recommendations for Further Research

This study, although not yet fully implemented per the team's recommendations, has the potential to make a huge impact on the sales and marketing department at Company XYZ, not only within the North American geography, but within the other global sectors as well as across all five of the company's business units. It is suggested that management within the North American geography pilot the recommendations made by the project team and based off of what may work and what may not, the project could be duplicated in other branches of Company XYZ.

In addition to Siebel, Company XYZ's marketing analysts use multiple databases in order to collate and analyze marketing and sales data and opportunities for reporting across different teams and brands. This causes issues in accuracy as data from different sources does not match and produces differing results and also causes issues in timeliness as data from different sources is refreshed at different times, causing delays in reporting. Once the Siebel sales pipeline is cleaned up, Company XYZ should look toward standardizing one common platform of data points that could be acceptable to all marketing and sales analysts across all brands and geographies.

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