

# ***Time Optimization for Service Provider Operational Performance***

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**Abstract** — *A DMAIC methodology was carried out to identify and improve two processes within a Service Providing Company. These processes where the Quote redaction process and the Field Work Time Management. A bottle neck was identified on the Quote process and means where implemented to delegate work and mitigate the bottle neck. Check lists where developed to help reduce the error while evaluating, buying and preparing for works. This translates into less missed time in the completion of the work and therefore more revenue for the company.*

**Key Terms** — *DMAIC, Quote Delivery, Service Provider, Time Management.*

## **INTRODUCTION**

It is no secret that in any country there is great competition for service companies due to the high demand for specific services which require complex and/or technical skills. These types of companies include plumbing, electrical, masonry and even data providers among many others.

There are many processes within a Service Providing Company that are completely transparent to customers and even field technical personnel. These processes can include, quote preparation, contract emission, client acquisition, invoicing, project planning and management, and even material acquisition. Careful execution of each process is a key aspect that differentiates the company as profitable from one that is not.

### **Problem Statement**

The core of a service providing company are its employees and how these behave and manage tasks at the work place. These employees carry the company name and reputation with their acts and performance. Time management and fast

interaction with customers provides a better chance of landing crucial jobs and gaining new customers. Both, fast delivery and Field Work time management are crucial aspects of day to day activities that represent two of the most profitable aspects for the company. The goal is to improve the Quote delivery time while increasing time management skills in the workplace.

### **Research Description**

This project is about increasing time management on field work and the reduction of the quote delivery process. Increasing these factors can contribute to a company's profitability and efficiency. To achieve project deliverables, a DMAIC methodology is going to be used.

### **Research Goals**

This project main goal is focused on quote redaction and field work time management, by reducing the Quote preparation time by one week and to maintain Field work time inside quoted time parameters.

### **Research Values**

This project seeks to improve the two processes mentioned above so profitability and customer satisfaction can be increased. By improving the Quote time delivery, more clients can be acquired, do to it being easier to contact them and maintain a selling relationship. By maintaining field work time within quoted times, revenue would be more consistent due to employees not consuming more than planned when proposing the work to the client. Consistency on field work time could represent an income of approximate \$1000 per job due to them being quoted but not consumed.

## LITERATURE REVIEW

Time management is an achievable process by anyone. It is a set of specific priorities along with timelines and a firm commitment to achieving set goals. Good time management requires an important shift in focus from activities to results, because being busy is not the same as being effective. It helps one to organize and plan how long to spend on specific activities in order to achieve greater productivity and efficiency. Time management includes:

- Effective planning
- Setting SMART goals as stated in [1] and objectives
- Setting deadlines
- Delegation of responsibilities
- Prioritizing activities as required by their importance
- Matching spent time with the activities required time.

Benefits from effective time management, according to [2], can include:

- Greater productivity and efficiency
- Decrease stress levels
- Greater opportunities to achieve set personal and professional goals.

## DMAIC METHODOLOGY

DMAIC is an acronym used to describe the five phases of an improvement cycle. These phases are called Define, Measure, Analyze, Improve and Control as demonstrated on Figure 1. The DMAIC methodology is a data-driven quality strategy used to improve, stabilize and optimize processes. The DMAIC cycle can be interpreted as a linear approach by executing phases once and then moving onto the next stage, but this is not always the case. As stated in [3], the cycle can be an iterative one, since you can arrive to a stage, for example the analyze phase, and realize that not enough data was collected so you need to go back to the measure phase and gather the data again. The versatility of the DMAIC techniques provide it with

the flexibility to be incorporated to any process or improvement opportunity of any kind of industry. The DMAIC stages are defined as follows [4]:

- Define: The customer is identified as well as project scopes and goals. The process to be worked on is explained and visually mapped to understand where the focus will be.
- Measure: Elaborate data collection plans from the process under scope. Data shall be collected from different sources according to the type of data needed and shall properly represent the problem under study.
- Analyze: The data collected is analyzed using different techniques to identify as well as map defects and gaps for improvement.
- Improve: Opportunities for improvement identified on the previous stage are worked on, in order to mitigate or eliminate them.
- Control: This is the most important stage of the DMAIC, since if satisfactorily executed it provides a higher percentage that the project will be maintained at a same standard of quality from its first implementation. Continuous revision and training, as well as proper documentation is maintained on this stage.

## PROJECT METHODOLOGY

This project consists of implementing the DMAIC methodology to elaborate Time optimizations solutions for a Service Providing company. As discussed in the previous section, the DMAIC methodology consisting of its five stages will be implemented.

Each tool to be executed per phase will be mentioned and explained in the proper phase on the Results section, due to them being directly related to the results obtained from previous phases of the DMAIC. The tools were chosen with reference materials from [5] [6], which in turn defined each phase and the proper tools according to the phase to be worked on.

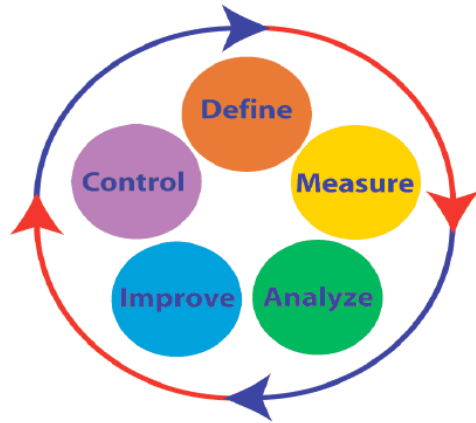


Figure 1  
DMAIC

## RESULTS

The results of this research are presented through each of the five phases of the DMAIC methodology.

**Define** – The tools used to execute the Define phase, where:

- Project Charter – Enables the presentation of Project deliverables, goals and description. It provides a clear scope of the project and customer expectations.
- SIPOC Diagram – This tool enables us to map out the process under study by dividing it into Suppliers, Inputs, Process, Outputs and Customers.
- The Project Charter presented on Table 1, includes the sections, Project description, Project Goals and Measures, Expected Business Results and Expected Customer Results. Each with a clear description of the scope for this study.

Table 1  
Project Charter

<b>Project Description:</b> Improve Time management focusing on Quote preparation process and Field work missed time.
<b>Project Goals &amp; Measures:</b> Quote delivery time reduced from 10 days to 3 days and limit field work execution time consumed to 80% of total quoted time.

**Expected Business Results:** 1) Be among the first options available to customers, increasing chances of obtaining the job

2) Reduce out of scope time field work, increasing revenue

**Expected Customer Benefits:** Have earlier Quotes for decision making and less invasive and out of schedule field work interruptions

From the SIPOC diagram in Table 2, the Quote redaction process was outlined to properly display the lifecycle from beginning to end for a Customer Quote. It can be noted that it is a fairly simple process involving straightforward steps to produce a finished Customer Quote. We will be focusing on finding the bottle neck in the process and the implementation of enough tactics to meet our expected goals.

Table 2  
SIPOC Diagram

Supplier	Inputs	Process	Outputs	Customers
Materials Supplier	Material and Equipment quotes from suppliers	Quote redaction process	Service Quote	Clients
Equipment supplier	Client request for job		Field Work tasks	Field Workers
-->-->-->-->Process-->-->-->				
Staff receives suppliers quotes	Calculates Revenue percentage and labor cost	Delivers cost information to manager	Manager Redacts Quote detailing services to be provided and costs associated	Customer Service revises quote and sends to Customer

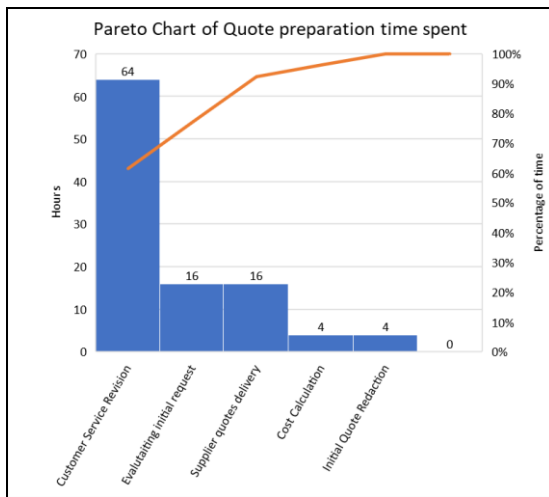
**Measure** – For the Measure phase, an Operational definition was established to maintain a clear scope of the problem under study. We proceeded to define what aspects of “Time” were important for means of the study.

Time spent in the preparation of the quote would begin from the moment a client requests the service until the final quote is delivered. Meanwhile Field Work Time would be classified as three main variables; quoted time, actual time and missed time. Quoted time is defined as the total amount of hours that were taken into consideration when preparing the customer quote. Actual time is defined as the

real time it takes the employees to execute the established tasks and Missed time would be the number of hours that the work takes out of the Quoted timeframe. The variable “Time” is always measured in hours.

Another tool used to execute the Measure phase was the Pareto chart. This tool gives us the opportunity to identify process steps or historic causes for the project mentioned in Table 1. The contributors are then graphed by occurrence or in this case “time” as the variable under study.

The Pareto chart for the Quote Redaction Process (Figure 2) presents each steps of the process outlined on the SIPOC Diagram in Table 2. The chart considers the average amount of hours the quote remains on a single step before it is passed onto another step of the process.

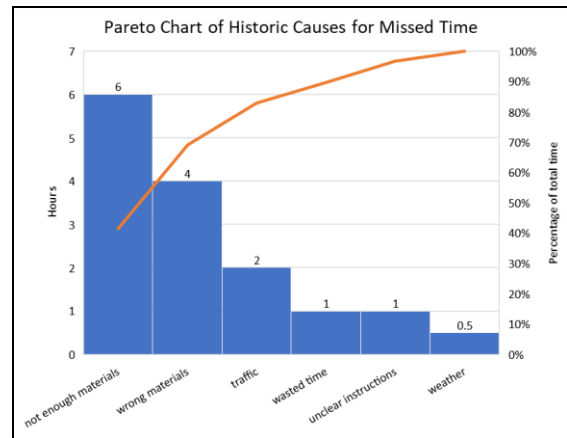


**Figure 2**  
**Quote Preparation Pareto Chart**

The Field Work Pareto chart (Figure 3) displays the historic causes for Missed time. It considers the severity of the cause, meaning the number of hours of Missed time caused by that event, it does not consider the quantity of occurrences of that event. By quantifying missed hours instead of occurrences, we can focus our efforts on identifying the severity of each cause and mitigate it, instead of wasting efforts reducing occurrences of low impact events in missed hours.

From Figure 2 we can appreciate that the Customer Service Revision is a clear bottleneck in

the Quote redaction process. Therefore, the next stages of the DMAIC methodology will be focused on improving this stage. On the other hand, from Figure 3 we see that the main cause for Missed Time, by a factor of 2 hours, is not having enough materials, which includes either not enough materials quoted or forgotten material when preparing for the job.



**Figure 3**  
**Field Work Pareto Chart**

**Analyze** – For the Analyze phase of the DMAIC methodology the 5 Why’s and Fishbone Diagram tools were used.

The 5 Why’s enabled us to dilute the main question derived from the Pareto charts, created on the Measure phase, for both problem under the scope of this study, into a single manageable aspect for the problem. It is focused on 5 questions, each deriving from the answer of the previous in order to arrive to the root cause. Table 3 shows the 5 Why’s analysis for Customer Service and Table 4 shows the 5 Why’s for the Missed Time identified on Figure 3.

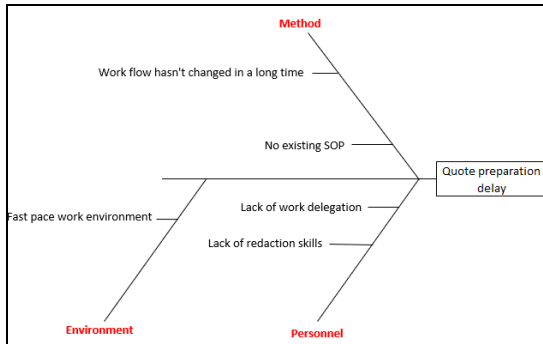
On the other hand, the Fishbone diagrams gives us a broader view of possible causes for the main problem identified on the Pareto charts. It presents the main effect as the result of all other contributing factors which sprout from the middle line. Figure 4 presents the Fishbone for the problem identified for Quote preparation delay while Figure 5 presents the same diagram for Missed Time.

**Table 3**  
**5 Why's Analysis for Customer Service**

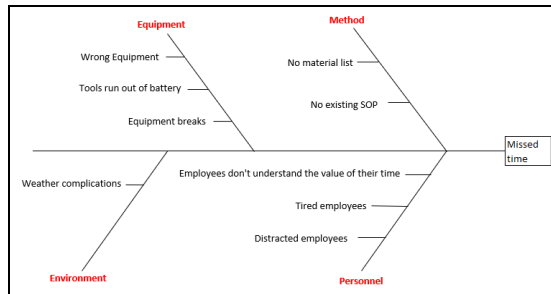
	Question	Response
1	Why is Customer Service taking longer than other stages?	Employee focused on too many tasks
2	Why is the employee focused on so many tasks?	Spends too much time on details in each task
3	Why does the employee spend so many time on details of each task?	Company had less employees on other departments and all the work rested on Customer Service revision
4	If company has more employees, why does the work still rest on Customer Service?	Resistance to change and delegation of work
5	Why is there resistance to change and delegation of work?	Lack of trust toward new employees capabilities

**Table 4**  
**5 Why's Analysis for Missed Time**

	Question	Response
1	Why do employees don't have all the required materials?	Employees forget materials when loading the trucks for the job
2	Why do employees forget materials when preparing?	short preparation time interval
3	Why is there a short preparation time interval?	Employees tend to get distracted if timeframe is to wide
4	Why do employees get distracted?	No detailed lists lead to employee not being directed to a specific location
5	Why is ther no detailed list?	The employees discover the description of the job task verbally



**Figure 4**  
**Quote Preparation Delay Fishbone Diagram**



**Figure 5**  
**Missed time Fishbone Diagram**

From Table 3 we can identify the lack of employee training as a factor for work load on

Customer Service employee. If we provide redaction training for employees on previous steps of the quote redaction process, we could alleviate work load on Customer Service, start delegating responsibilities and eventually lead to minimal or no Customer Service revision needed. On the other hand, from Table 4 we derived that a major cause for the miss time is the lack of written communication. By implementing written procedures or checklist we could begin to mitigate miss communication effects that translate on missed time out on field work.

Potential causes for Quote delay identified from Figure 4 that go along with what has been discussed from the Pareto chart's major contributor (Customer Service), are the lack of employee training and a parallel cause with this is the lack of work delegation. Improvement efforts will be focused on providing means to qualify personnel on the quote process and prepare them to receive new job tasks and therefore alleviate Customer Service.

From Figure 5 we can correlate potential causes like the lack of existing SOP and material list, as lack of written documentation to properly support day-to-day personnel activities. This is supported with the means identified to mitigate the not having enough materials (Figure 3's major contributor).

**Improve** – On the Improve phase, a Failure Mode and Effect Analysis (FMEA) tool was created.

The FMEA is a structured approach to identify, estimate, prioritize and evaluate risk. It aims at failure prevention and is primarily used to limit the risk involved in changing the process.

After identifying and implementing training requirements and effectively delegating work, the risk prioritization number (RPN) shown on Table 5, was lowered from 114 to 104, focusing only on occurrence improvement.

By implementing written procedures in the checklists, the risk prioritization shown on Table 6, was lowered from 113 to 108, by focusing only on occurrence and detection.

**Table 5**  
**Quote Redaction FMEA**

Item of Process Step	Potential Failure Mode	Potential Effect (s) of Failure	Severity	Potential Cause (s)	Occurrence	Current Controls	Detection	RPN	Recommended Action	Responsibility	"After"-> Action Taken	Severity	Occurrence	Detection	RPN		
Supplier Quote	Late quote	Quote delay	8	external causes	3	phone or email follow up	10	21	none	none	none	8	3	10	21		
Cost calculation	Wrong calculations			lack of training	2	Manager revision	10	20					2	10	20		
				lack of training	3	Manager revision	10	21								3	10
Quote redaction	long redaction time			high work load	7	none	10	25	train employees on quote redaction skills	Operation Manager	Quote arrives more robust and less revision is needed		3	10	21		
Quote revision	long revision time			high work load	9	none	10	27	delegate work on to trained employees	Customer Service Manager	Work does not accumulate and quotes are dispatched faster		3	10	21		
Total Risk Prioritization number									114	Total Risk Prioritization number							104

**Table 6**  
**Field Work FMEA**

Item of Process Step	Potential Failure Mode	Potential Effect (s) of Failure	Severity	Potential Cause (s)	Occurrence	Current Controls	Detection	RPN	Recommended Action	Responsibility	"After"-> Action Taken	Severity	Occurrence	Detection	RPN		
Prepare Material list	Not enough materials	Missed time	9	No effective evaluation	7	Manager revision	5	21	Establish written checklist	Operation Manager	More realistic material lists	9	3	10	22		
Buy materials	Wrong materials			Did not have written material list	5	Manager revision	8	22	Only written material list would be approved	Operation Manager	No verbal purchases		1	10	20		
Prepare for Job	Forgotten materials or equipment			Lack of training	7	Manager revision	7	23	Establish written checklist	Operation Manager	Less forgotten materials		2	10	21		
				No written material list	8	none	7	24	Hand employees written job description and material list	Operation Manager	Employees prepare better for the job to execute		4	10	23		
Execute job	Takes more time than planned			Backtracking do to no available items	7	none	7	23	Responsibility employee who executed checklist for forgotten items	Operation Manager	Employees take more seriously the job execution		3	10	22		
Total Risk Prioritization number									113	Total Risk Prioritization number							108

**Control Phase** – For the Control phase employees will be systematically supervised so an equal level of quality and performance can be maintained over time. Trainings will be properly documented using newly created attendance forms. Checklists will be continuously reviewed with field workers to accommodate changing job types and upcoming suggestions as to how to effectively improve job performance.

## CONCLUSION

Project deliverables were met on both Quote redaction time and Field Work time management.

The implementation of satisfactory measures enabled us to lower quote delivery from 10 days down to only 3. Work load has lowered and is more properly distributed among qualified employees. According to [7], this is a critical point in the behavior and successful growth of the effectivity of the company.

Field Work Missed time has been controlled and maintain within planned times by 78%. The proper use of the created checklists enabled us to standardize ways of evaluating jobs, buying materials and preparing to execute the jobs.

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