Process Standardization on Customers' Requests for Infrastructure and Security Services

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Abstract **—** *This research project focuses on the development of a Process Standardization for services requests of an Information Systems Consultant Company. The existing process is not ideal nor practical because of the time gap between the service request submission by the client and when the service is provided. Additionally, it adds unnecessary tasks for the technicians which decreases their productivity. Therefore, standardizing the process will ensure the reduction of this time gap from a request standpoint and increase the technician's productivity. In order to standardize the process, the DMAIC methodology was used. DMAIC is an acronym for a series of steps that truly are the foundation of any process improvement. The term DMAIC stands for the five main steps in the process; Define, Measure, Analyze, Improve and Control. DMAIC was successfully implemented, providing a structure and tools to standardize the request process, reducing the time the customer has to wait on the availability of the company to perform a request, while also reducing the tasks of the technicians providing the service [1].*

Key Terms **—** *DMAIC Methodology, Improvement, Process, Standardization.*

INTRODUCTION

Business Technology Group Puerto Rico (BTGPR) is a new small business that focuses on the full lifecycle of solutions and provides end-to-end consulting, deployment and management services. Nowadays, computers are the foundation for businesses, therefore, there is a necessity to be up-to-date with infrastructure and security. Management consulting companies have big challenges due to a competitive marketplace. Delivering a service efficiently and in a timely manner is essential because these factors increase the customer's satisfaction and loyalty while also increasing the profit. The problem affecting BTGPR is the time it takes to submit a service request, which will be enhanced through the implementation of DMAIC in order to standardize the process.

PROBLEM STATEMENT

In order to submit a service request, customers have to wait for a technician to be available on Skype Business between Mondays through Fridays from 8:00am to 5:00pm. This is a problem for companies experiencing technical issues after business hours. It also adds unnecessary tasks to BTGPR's technicians in order for them to obtain all the technical details of the issues and then adding the customer to a waiting list which increases the customer's waiting time. A process standardization is needed in order to eliminate this gap within the service request process which ultimately will increase the technician's productivity while reducing the customer's waiting time.

RESEARCH DESCRIPTION

This research is about standardizing the current service request process in order increase the productivity of technicians and increase customer satisfaction through services delivered meeting and exceeding expected requirements.

RESEARCH OBJECTIVES

Design and develop a standardized process to improve communication between the customer and

BTGPR, and reduce the time gap between the service request and service execution.

RESEARCH CONTRIBUTIONS

The project seeks to increase BTGPR's efficiency by providing services that will increase customer satisfaction, and even profits by reducing the service request lifecycle, allowing the company to have extra time to acquire new customers increase their portfolio. By removing unnecessary steps within the current process, BTGPR's productivity may increase and customers will not have to wait until business hours to perform a service request.

LITERATURE REVIEW

Standardizing a process is a fundamental step to a lifelong improvement journey. A standard process is defined as a clear and consistent sequence of work steps [2]. It is important to emphasize that standardized work does not only apply to production areas, services and consultant companies also have to follow processes in order to deliver their products or services.

Most of the time processes are executed by more than one person which means there is likelihood of the existence of more than one method for each process which could cause efficiency and consistency issues. These issues result in degrading the time management and efficiency of employees because they could start debating if problems exist given the lack of a process definition. The lack of process standardization limits feasible improvement of any organization and adds inefficiencies with duplication of work. The key to overcome these issues is to involve the process owners into the standardization in order to clearly define each step so that the process will always be followed according the design and produce the same results. In order to begin this improvement a process map needs to be designed by breaking down each of the steps needed to complete said process by gathering knowledge and feedback from the people directly involved with the activity. People within the organization need to decide the most efficient way of completing each step through the creation of a process map improvement. As a result, the standard process map should then be translated into an operating manual, so it can be used to train new personnel and as a reference for auditors. Besides, it can also be used as a measurement tool to review the performance of the employees for evaluation purposes [3]. By creating operating manuals, BTGPR can achieve a well-founded base to make improvements. If the operating manuals are followed properly and updated regularly, BTGPR could increase the productivity, efficiency and quality of the services provided.

The benefits of process standardization are: achieving consistency, minimizing deviations, setting a standard procedure, accelerate learning and increase transparency. However, process standardization may add no benefits on certain processes. The more complex and customizable the process is, the more challenging it is to standardize.

PROJECT METHODOLOGY

The methodology DMAIC is a data-driven strategy used to improve processes of an existing business process. DMAIC is an abbreviation of five improvements steps: Define, Measure, Analyze, Improve and Control. The DMAIC cycle is the core to manage improvement. However, in order for the implementation be successful every DMAIC steps are required and should follow the same order. (Figure 1)

- **Define**: Identify the problem, what constitutes a defect, the project goals, improvement opportunities and the internal and external customer's requirements.
- **Measure**: Determine key aspects of the process performance, quantify the problem and collect relevant data.
- **Analyze**: Investigate the root cause of variation and the defect in the performance, verify the cause and effect relationships, identify the

value and no-value-added process steps and ensure that all the issues are being considered.

- **Improve**: optimize the current process performing Design of Experiments to develop potential solutions. Also, validate the potential improvement setting up experimental runs to establish the process capability.

- **Control**: The phase of Control helps to maintain and improve the new process implemented. This help to prevent reverting back to the old process. This phase monitors constantly the future process performance to ensure that the defects are corrected and the statistical process control, production boards, and visual workplaces are implemented [4].
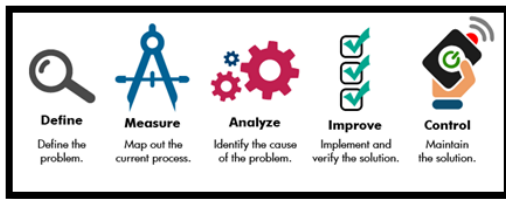
Figure 1
DMAIC

RESULTS AND DISCUSSION

In order to achieve improvement each stage of the DMAIC methodology was followed. The results obtained through the DMAIC tools used for each of the five phases are as follows:

For the Define phase, a Project Charter was developed to determine the scope, goals and measure of the project. The Project Charter works as a reference of authority for the future of the project.

Table 1
Project Charter

Project Description: Develop a process for customers to request services in a standardized, organized and timely manner.
Scope: Determine an efficient service request format and implement Six Sigma through the development of the process.
Project Goal & Measures: Development of a standardized process to request security and infrastructure services.
Project Deliverables: • Standardize and organize a

service request process to be used by customers that eliminates the dependency of a technician to be online and increase the productivity and workload. • Smooth transitions between the old systems to the new system.

Particularly for the Measure phase, the tools used were the SIPOC and the Critical to Quality Diagram. The SIPOC which derives as Suppliers, Inputs, Process, Outputs, and Customers aids by providing a large perspective of the system as a whole. Additionally, helps to understand the relationship of the supplier and customers with the process, the inputs and outputs variables and the actual steps of the process. On the other hand, the Critical to Quality (CTQ) Diagram leads to identify the wants and needs of the customer. The CTQ Diagram is an organized hierarchical structure prioritizing the important items for customer satisfaction. The results of the SIPOC and CTQ are shown below in Figure 2 and Figure 3, respectively.

Although SIPOC does not start with process as the first step based on the acronym, it is ideal to start with it in order to have a clear scope of the problem.
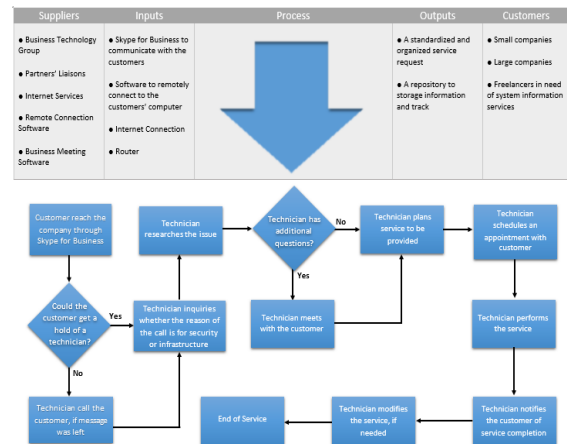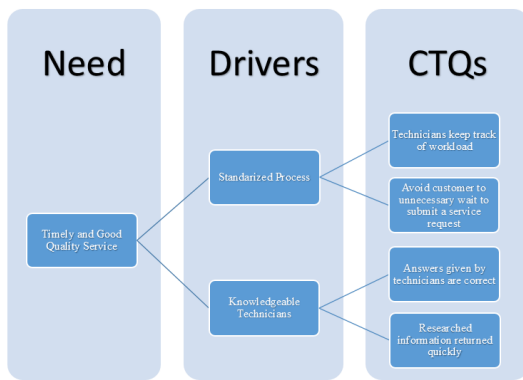

Figure 2
SIPOC

Based on meetings held with BTGPR, the process consists of the following: (1) Customer reaches the company through Business Skype during normal business hours. (2) If the customer cannot get a hold of a technician. (3) Technician call the customer to inquiry the reason of the call whether is grounded on security or infrastructure. (4) Based on the information provided, the

technician researches the issue. (5) If during the research the technician has additional questions, he/she calls the customer. (6) The technician plans the service to be provided. (7) Technician calls the customer to schedule an appointment to perform the service. (8) Service is performed at the previously scheduled date. (9) Customer is notified of service completion. (10) Customer has 10 days to assess the service received and call the company if there are any changes needed. (11) Technician delivers a service report to the customer. (12) If no modifications are needed, the service is successfully delivered. From the process, the inputs, outputs, suppliers and customers were identified. Several repetitive steps were identified by analyzing the process. These unnecessary steps may reduce customer's satisfaction by increasing the time gap between the service request and service delivery. Services can be delivered faster and more efficiently by removing unnecessary tasks and improving the process, which also improves technicians' efficiency.
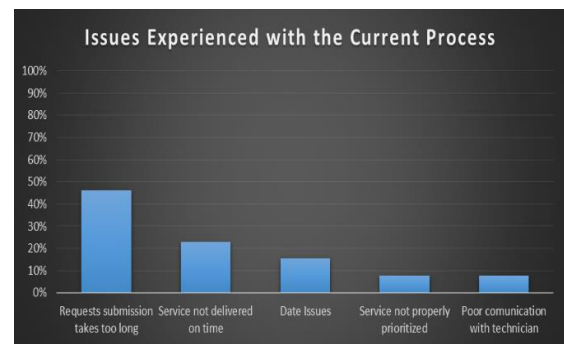

Figure 3
Critical to Quality Attributes

Every parameter of the process that could lead to customer dissatisfaction is considered as a critical to quality attribute. The analysis of the CTQ goes as follows: A standardized process will allow technicians to keep track of their workload, and will avoid customers to unnecessarily wait to submit a service request. At the same time knowledgeable technicians will provide in a timely manner correct answers and services. As a result, these critical to quality attributes will fulfil the need to deliver a

good service. The improvement will be beneficial to the company by increasing technicians' productivity and reducing the customer's waiting time which ultimately will increase customer's satisfaction.

Given the results of the tools used in the Measure phase, a questionnaire was created with specific questions for BTGPR's customers in order to determine the cause of their dissatisfaction towards the current process. This questionnaire was used as a tool for the Analyze phase, then was plotted into a Pareto chart in order to obtain a visual indicator of the problem, see Figure 4. The Pareto is a visual aid which represents the main issue experienced throughout the current process and helps to identify which sub-process needs to be improved in order to reduce the time it takes from the submission of the request to actually receive the service.
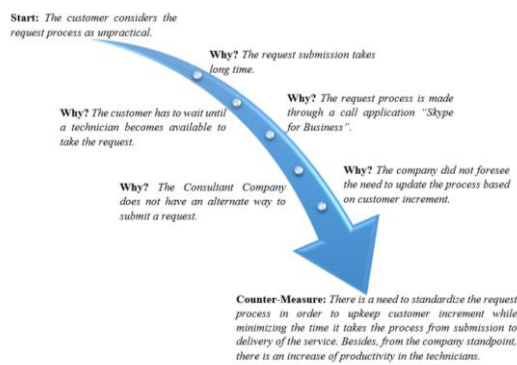

Figure 4
Issues Experienced by the Customers

The top issues that customers perceived during the current process were: "Request submission takes too long", "Service not delivered on time", "Date hours", "Service not properly prioritized" and "Poor communications with technicians". These issues represent customer dissatisfaction, being the Request submission sub-process the main discomfort.

All of these issues experienced by customers are considered to be major offenders because they contribute to the overall process starting from service request submission to service delivery to not meeting the expectation of customers. In order to achieve the main goal of the project these major

offenders need to be directly or indirectly improved.

However, the outcome will still depend upon the knowledge of the people involved in the issue, in this case the consultant company. In order for the project to be successful, they need to realize and identify the root cause of the problem. Thus, before embarking into a possible solution, the Five Whys Technique was used as a problem solving and quality improvement tool to efficiently identify the root cause, but also to explore the relationship between different root causes of the problem.

Figure 5
Five Whys Technique

Based on the Five Why Technique in Figure 5 the following issues were established: the request submission takes long time, the customer has to wait until a technician becomes available to take the request, the request process is made through a call application "Skype for Business", the consultant company does not have an alternate way to submit a request, and the company did not foresee the need to update the process based on customer increment.

Given the start point problem that customers consider the request process to be unpractical. The team from the consultant company were present during the execution of this exercise which had as a result the following counter-measure for the main problem: it is necessary to standardize the service request process in order to upkeep with the customer increment while minimizing the time it takes from submission to the service delivery.

Besides, from the company standpoint, an augmentation in technicians' productivity [5].

During the analyze phase, the major contributors that negatively affect the process which lead to the issue at hand were identified. This phase also allowed the different root causes to be verified, quantified and prioritized.

Given the previous results, it was determined that it is essential for the process to be restructured and new methods employed in order for the process to be really improved. During a trial-and-error approach, it was converged that the right path to follow required a method which allows customers to submit a service request without the need to wait for the availability of the technicians, but also to have the ability to submit the request anywhere. Therefore, the best approach to standardize the process was through the internet. By opening a website not only for the current clientele to access the services provided by the company, but to allow an increment of new customers.
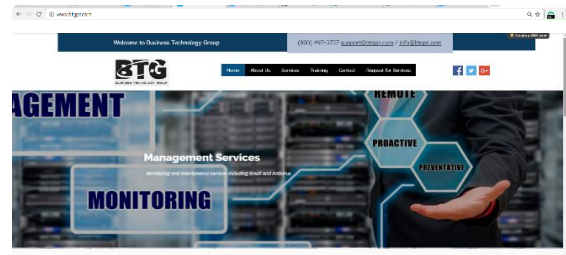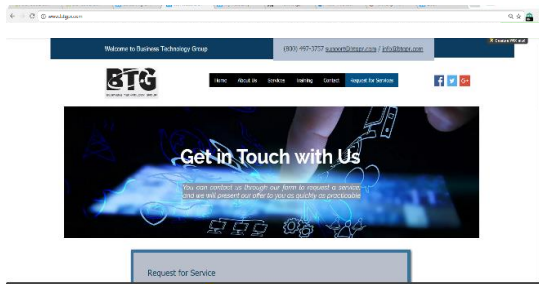
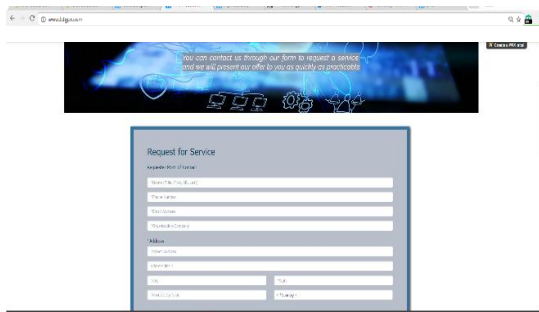

Figure 6a
Business Technology Group Homepage (Upward)
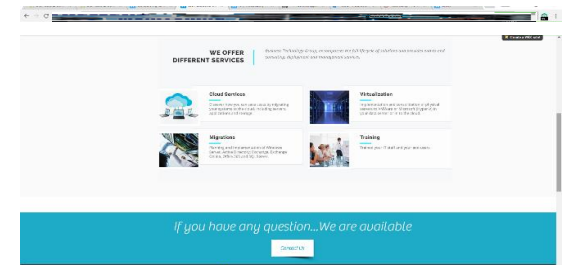
Figure 6b
Business Technology Group Homepage (Downward)

Figure 6a and 6b are the trial-and-error results of the BTGPR homepage. The homepage emphasizes the main services provided by the company. The navigation tab includes the following: About us, for new customers to learn

about the company; Services, a more in depth description for services provided by the company are provided in this tab to supplement the information available at the homepage; Training, provides information for customers looking for training rather than services; Contact information and Service Requests. This last section is the new method included in the request process which consists of a detailed form that customers fill out with essential information.
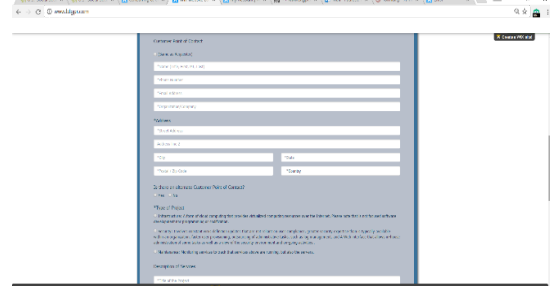

Figure 7a
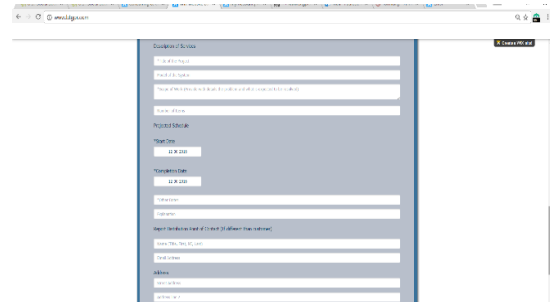**BTG's Request for Services Page**

Figure 7b
Request for Services Form, Requestor Point of Contact

Since BTGPR is a company that holds a partnership with a multinational technology company, a requestor point of contact field was added for cases where the partnership company submit a request on behalf of a customer, see Figure 7a and 7b. This will ensure direct communication between BTGPR and the end customer to inquire additional information if not included in the original request. If the requestor is the same as the customer a checkbox was available to avoid the need of the customer to duplicate his/her contact information. There is also an option that allows customers to add an alternate customer if needed, as shown in Figure 7c below.

Figure 7c
Request for Services Form, Customer Point of Contact &
Type of Project

After completing the contact information section, the customer starts filling out the information of the project. For instance, they will start selecting the type of project or service they are looking to receive from the company. Definitions of the services were added in order to avoid confusions of what is being requested, see Figure 7c.
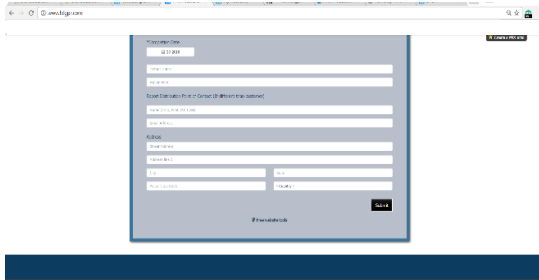

Figure 7d
Request for Services Form, Description of Service

After the type of project is selected, customers proceed to fill the project information. By providing the title of the project, model of the system (if available), the scope of work which constitutes of detailed information about the problem, what is expected to be resolved and the number of items with the issue, the technician will then perform analysis and research to identify a solution to the customer's problem. Additionally, projected start and completion dates are input by the customer in order to prioritize the service request, as shown in figure 7d.

The last section of the form requests the information of the person who shall receive the report if different from the customer point of contact (Figure 7e). When the customer is ready, by

clicking on the submit button the information filled on the form will be sent through an email to the support group in a generated PDF. Then, the designated project specialist assigns the project to the right technician. A confirmation email is generated and sent to the email address that the customer provided.

Figure 7e
Request for Services Form, Report

A standardization of the service request process was achieved through the addition of this new method which restructures the process. The following steps constitute the process after the improvement: (1) customer fills out the form located at the company's website. Then, an email is sent to the lead technician and a carbon copy email is sent to the customer. (2) Technician receives the request submission, analyzes the information, research and prioritize the information based on the schedule proposed by the customer. (3) A meeting is scheduled with the customer to discuss questions that technicians may have, the plan to execute the service, and schedule a service delivery date/time. (4) Technician executes the service and files the report. (5) Technician sends the report and notifies the customer that the service has been provided. (6) Customer has 10 days to notify if any modification is needed. (7) If no modifications are needed, the service is successfully delivered. Since current customers were not aware of the changes in the service request process, they were trained within each call and went through the steps on the form while on the Skype for Business communication.

Monitoring the standardized process as part of the control phase ensured that each of the issues previously identified during the improvement operation have been resolved. The new request process ran as a pilot for 2 months in order to gather feedback and identify gaps from customers and technicians. Throughout this pilot, current customers were at the same time trained by the technicians on how to access and fill out the service request form. For the multinational technology company an electronic formal letter was sent notifying them about the change in the process, for which they acknowledged receiving it, and were also trained to use the new service request process. During this phase, the process was documented and updated as needed. A meeting will be held every 6 months to discuss and modify the form in order to keep the new process up-to-date and working properly.

CONCLUSION

A standardized process for service requests has been developed for BTGPR using the DMAIC tools. By adding the new method for customers to submit in an efficient and convenient manner service requests through the company's website, technicians have become more productive due to the steps reduction within the process since the customer dependency is considerately reduced avoiding the need to be in contact directly with customers. The results of the improvement validated the main goal which was to develop a standardized service request process was achieved successfully with a smooth transition between the improvement and satisfaction from the people involved in the process.

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