Suppliers Information Exchange Process Optimization

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Abstract

The emphasis of this research project, is to reduce the processing time for supplier's requests for change or requests for information. Request for change and or information (RC/I) is a tool utilized to request information and/or changes in response to technical or contractual issues encountered before or during the manufacturing process, or for requesting Process Plan approvals, or for Counterfeit Material Prevention/Detection.
The Six Sigma Initiative provide us with 2 key methodologies, DMAIC and DMADV. For this research project we utilized the DMAIC methodology. The DMAIC methodology consists of five steps; Define, Measure, Analyze, Improve and Control. DMAIC is a data-driven quality approach with the purpose of improving the process or processes. This approach is utilized to improve an existing process or processes.
In this case the RCI tool has been established and we are seeking to reduce the requests processing time.

Introduction

In the mid 90's the Aerospace Industry went through a historic evolution that impacted their typical "modus operandi". Big Aerospace Companies decided that "in house" manufacturing was not cost effective and initiate an outsourcing phenomenon. Now days outsourcing has become more than just a way to get inexpensive components and parts. In order to off-load some of the investigation expenses and development, U.S. firms are entering into joint partnerships with state-subsidized firms in other nations. Currently, the industry depends on their suppliers' performance, they are even investing in the suppliers quality systems to ensure a quality product. The industry has being forced to change the customer-supplier relationship with the intent of removing any communication constraint and identify misalignment in their processes.

Background

In 1987 a research conducted Daft et al, five channels of communication were identified. They were defined as: face to face, memos, email, voice mail and telephone. The channels were measured using a media richness scale. Media richness was based on feedback capacity, medium, source and language. The findings indicated the media richness decreasing in the following order: face to face, telephone, voice mail, email and written memos. Nowadays, with technology, four computer-mediated communications channels have been defined as video conferencing, email, web-based tools, and face to face since it has been universally characterized. The research revealed that a channel with higher media richness, is likely to lead to greater levels of knowledge exchange between buyer & supplier. Were face to face was the highest followed by video conferencing, email then, web-based tools.

Problem

For years the aerospace industry has relied on suppliers to provide quality products for the system assembly line. Historically, paper format has been the communication platform between engineering, suppliers and assembly line for any request for change or information. Depending on the magnitude of the program, this format could create a traceability issues specially when referring to engineering specs, design changes, software, material, manufacturing processes, etc. Suppliers Manufacturing Engineers deal with this issue on a daily basis.

Methodology

SIX SIGMA: DMAIC METHODOLOGY

DMAIC is a data-driven method used to improve processes. It is a key tool of the Six Sigma methodology, but it can be implemented as a standalone improvement method or as part of other process initiatives like Lean. DMAIC stands for define, measure, analyze & control. These five steps signify an improvement cycle that is intended to be repeated frequently in an effort to identify best practices and move closer to perfect processes.

The DMAIC methodology acronym defines the steps order of execution and the importance of performing all the steps

- Define: This is the definition stage were the team will define the problem to be solved, the stakeholders including the customer and the goal to be obtained. The process will be mapped to better understand the stakeholders' responsibilities.
- Measure: In this phase the team will develop a data collection plan. The data will be collected utilizing the existing communication tool format to avoid data repeatability.
- Analyze: In this phase the team analyze the data collected and brainstorm potential root causes. The intent is to generate multiple hypotheses as to why the issues occur and then work to validate or invalidate their hypotheses. Subsequently, this will provide a better understanding of the root cause(s), identifying opportunities for improvement and the differences between current performance and goal performance.
- Improve: In this phase, the team will brainstorm & implement possible solutions to the previously identified root cause. It is important to collect the data post implementation to ensure that we have a measurable improvement.
- Control: For the control phase, the team will establish a monitoring plan with the intent of continue measuring the success of the updated process. It is imperative to focus on preventive actions to impede recurrence of the issue.

PROJECT METHODOLOGY

This project intent is to achieve an enhanced communication exchange processing time. Since organization is crucial, a systematic approach will be utilized via the DMAIC methodology/tools. The DMAIC approach will provide the necessary tools to organize, investigate, correct and control this issue.
Define- In the define phase the team will develop a project charter with the intent of clarifying the process issue being addressed, the motive for addressing it and what "accomplishment/success" looks like for the team. Basically, the project charter outlines the process improvement project for the team, the leadership and in some instances, the customer.
Measure-Since this process is already established, the team will utilized the automated software to collect the data. A process flow chart will be created to identify the locations where the data will be collected.
The Analyze, Improvement and Control steps tools were selected during the project processes development. Each step tool was driven by previous step output.

Results and Discussion

The team utilized the established software report feature to collect the data.
Since this project was a quality initiative from the team and there was no requirements or expectations from the customer, the request for change and or information process current state was considered our operational baseline.
The average turnaround time to obtain a Request for Change and or Information disposition was 44 days. A Pareto Charts was created with the intent of providing visibility to the quantity of requests submitted between January 1, 2015 and June 18, 2018. It was observed that from January 1, 2015 to June 18, 2018 the top 5 contributors were Supplier 1, Supplier 2, Supplier 3, Supplier 4 and Supplier 5. Since our intent was to reduce the processing time by 30%, our investigation was focused on those suppliers that caused the 30% of RCIs submitted.
With the observations acquired from the Pareto Chart, the team proceeded to investigate each individual supplier. The automated software data collection feature provide us with the ability to segregate the data per supplier, reason code, date submitted, date required, etc. We proceeded with analyzing the data focused on the reason code category. Why the reason code category and not the date? Simply because in other for us to understand the issue, we needed to evaluate the process from all perspectives starting with our internal interface. The reason code identifies the type of issue that the supplier is dealing with, the code also communicates that the supplier needs a change or additional information on how to fix it. The 5 suppliers' data analysis revealed that the top contributor on the "reason code" category was M2B. The M2B code is define as a Manufacturing Request from the supplier.
In order to understand why the Manufacturing Request (M2B) reason code was the top contributor, the team developed a Fish Bone or Cause and Effect Diagram to identify the possible drivers of this issue. From the Cause and Effect diagram it was determined that users utilized the M2B reason code for multiple/different issues, issues that the system have dedicated reason codes. It is imperative to mention that the Cause and Effect Diagram identified a "no-correlation" condition between all the contributors. Because of the incorrect reason code assigned to the RCI, the team spent more time re-assigning/rerouting the requests to the adequate entity driving the increase of processing time. Once the correct entity was notified about the supplier request, the processing time was not affected.
The team concluded that the Manufacturing Request Code category definition does not provide a proper description of the true reason as to why the RCI was initiated by the supplier. If we provide a proper definition of the reason code, then the users will be able to assign the correct reason code. The team also discovered during this research that there were unnecessary codes in the reason codes library.
In order to remove the wastes from our process the team needs to identify a solution and in order for the team to identify a solution the team developed an Impact Effort Matrix. Based on the Impact Effort Matrix results, the team can determined that the best solution for our problem is to specifically define the M2B code via company process architecture, conduct a yearly refresh training and discuss the issue before submitting the formal request. During the improvement phase we also determined that we need to revise/review our training package to ensure a clear understanding on the reason code to use.

Conclusions

The Requests for Change and or Information Process has been enhanced/improved throughout the last four months. The average requests for change and or information processing time was 44 days and we were able to reduce the average processing time to 27 days an equivalent to a **39%** improvement in processing time. The improvement was achieved utilizing the DMAIC Methodology.

Our established goal of reducing the processing time by **30%** was accomplished within the first two months of implemented. In addition to accomplishing the established goal, another opportunities for improvements were identified for example the standardization of the supplier work transfer activities

Future Work

Recently, a new tendency was exposed were the quantity of the requests for change and or information increased due to a work transfer. In other words when a supplier transfer his current statement of work to another supplier, the number of requests for change and or information will grow. To mitigate such behavior, we deployed supplier manufacturing engineers to their facilities to accelerate the process and ensure a smooth transition. The project implementation positively impacted the new tendency since the training material and requirements were recently updated.

Acknowledgements

I would like to express my very great appreciation to Dr. Carlos Gonzalez for providing assistance during this research development and to Isabel Batteria who helped me with the editing the article.

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