Establishing Procedures for "Turnbacks" in the Classification Center

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Abstract *— The research project is aimed to investigate the procedures for "turnbacks" that transpire on the system's repository of a global trade department for X Company. Turnbacks are errors that delay the classification process of commodities and documents for business units. These consume time and effort for classifiers, which must complete a classification for export/import with the correct regulation and jurisdiction. If the request is rejected, it causes a delay in the process. These rejections are documented in a data sheet as turnbacks, and it was observed that some of these rejections could have been resolved within minutes by engaging in real-time communication with the requestor. Using the DMAIC method, the Classification Request Rejection Process was implemented, reducing the amount of time wasted from 2022 to 2023 by 44.8% in a three-month period, saving the company time and reducing costs for the business units with the goal of securing additional projects.*

Key Terms *— Classifications, DMAIC Method, Rejections, Turnback.*

PROBLEM STATEMENT

The research is centered around creating procedures for an ongoing problem within the company, which occurs daily and adversely impacts the productivity of item output, leading to work delays throughout the day. In the centralized repository system of company X, the requestors must enter certain information for the classification request to be completed by a classifier of the classification center. These requests can be for parts of company equipment, commercially available components, documents containing technology data or software. If the requestors don't provide the necessary information for the classifier to complete the request, the classifier must reject the request, being the rejection note the only communication between the requestor and the classifier. This lack of communication hinders the classifier's ability to provide real-time assistance in resolving the request. By rejecting the request, the classifier will then have to submit a new request; this not only affects the company itself, but also the businesses receiving the service of item classification for export/import purposes. The rejected requests are documented on a datasheet as a "turnback" stating the reason why it couldn't be completed, and that time is charged to the pertaining business unit. Thus, an analysis of the data in the turnback sheet will be conducted to establish a process that promotes enhanced efficiency in determining the classification or rejection in a request.

Research Description

The focus of this research is to minimize defects in the classification process by establishing a procedure on the necessary information for a request to be rejected or completed in the system. The primary goal is to establish communication between the classifier and the requestor and as a result, they can discuss via chat or email significant defects that arise regularly while classifying commodities, technical data, software, and equipment within the company's system.

Analyzing all the turnback's from the previous year and comparing them with the current year, is crucial as it has the potential to reduce the number of defects and eliminate wasted time caused by invalid requests.

Research Objectives

The objective of this research is to define the problem statement, incorporating guidelines to reduce rejections, and empowering the classifiers to communicate directly with requestors. Also, to

define turnbacks and the concept of export/import classification. Subsequently, an analysis of the entire dataset stored in the system's database will be conducted. This objective can be accomplished by utilizing the datasheet where all the turnbacks are documented. Based on the comparative of the year 2022 vs 2023, a solution can be devised to decrease the frequency of turnbacks submitted through the system, resulting in a 40% reduction in errors and defects.

Research Contributions

In this research, the primary contribution to the field and the classification center is the reduction of daily time wasted. These turnbacks adversely impact the daily volume of classification processes and result in time and cost implications for Company X. By addressing this issue, both the time spent on turnbacks, and associated costs, can be minimized. Allocating less time to resolving classification issues allows for a more efficient use of resources that could be better utilized in serving other business areas. Additionally, reducing wasted time on turnbacks, not only benefits Company X in terms of cost savings, but also enhances overall efficiency. Also, giving these guidelines to requestors and classifiers to open the communication between them to try and solve the case instead of sending it to the supervisor to solve it, will benefit the work center and the business unit.

LITERATURE REVIEW

The conducted research focuses on a process that transpires within the classification center, involving turnbacks in the presented service, which can strain the organization. The classification center consists of a team of professionals responsible for classifying various commodities, documents, software, and equipment.

The International Trade Compliance (ITC) encompasses the requirements imposed on products, services, and technical data to ensure compliance with relevant laws and regulations regarding economic sanctions, imports, and exports. It is crucial for every company to adhere to these regulations and laws to avoid penalties and government-related complications. There's also the Commerce Control List (CCL) [1] and the United States Munition List (USML) [2], which contain all the item regulations per chapter and paragraph for export, and the Harmonized Tariff Schedule [3] which contains all the chapter/headings for import classifications. Classifiers have to stay on topic with these regulations because they're changing constantly, especially in times of conflicts between countries.

Various organizations oversee regulations and laws related to this matter. For instance, in the United States of America (U.S.A), the United States Export Administration Regulations (EAR) [4] govern these regulations, while other countries have their own respective organizations. The responsibility of the classifier is to accurately classify products or services according to the appropriate regulations. Ensuring correct categorization is crucial because an under-classified classification could lead to export violations, fines, and loss of business, while an over-classified classification could trigger ITC/government investigations. Precision in classification is therefore essential. This classification process is conducted through a system where businesses submit requests for classification of new products under development. The request includes different categories that specify the type of articles being classified, such as equipment, commodities, technical data, and software. In addition to other details, the request must include identification of the business unit, functional area, item identification (ID), item description, and the Commercial and Government Entity (CAGE) code.

If the request is filled out incorrectly, it is considered a turnback, and this has various negative impacts. It can lead to project delays, hinder the achievement of daily targets, reduce the efficiency of the classifiers, and result in financial costs for the company. Turnbacks are not limited to errors in the request itself; they can also include technical difficulties within the system or computer, such as

updates, system freezes, or blocked accounts. Essentially, any time that disrupts the workflow is considered a turnback. Therefore, this research aims to identify and reduce the monthly occurrence of turnbacks, creating a standard process in which the classifier can define if the turnback can be fixed in the moment, if it needs further investigation or if it's a reject. The current yearly data is going to be compared with the prior year's data to maintain a satisfactory standard within the preferred metrics of the company with the implemented guidelines.

The current yearly data is going to be compared with the past years to maintain a satisfactory standard within the preferred metrics of the company with the implemented guidelines.

METHODOLOGY

To conduct and address this research effectively, a combination of various primary methods and tools will be utilized to enhance results and performance. The main method employed in this research is Lean Six Sigma, also known as Six Sigma. Although these methodologies are distinct, they are interconnected, and by integrating Lean principles with Six Sigma, improved outcomes can be achieved.

Six Sigma is a methodology that equips organizations with tools to elevate process levels within the business [4]. This approach offers several improvements, including enhanced performance, reduced process variation, improved profitability, decreased occurrence of defects, boosted employee morale, and higher quality products or services. Although Six Sigma has various definitions, they converge on certain key points. One such point is the utilization of teams comprising experienced and knowledgeable individuals who work together to accomplish the business's project objectives [4].

Another crucial aspect is the effective use of available tools, such as Define, Measure, Analyze, Improve & Control (DMAIC), which will be applied in this research. The underlying philosophy of Six Sigma is that processes can be defined, measured, analyzed, improved, and controlled. All processes require input data, and if the input data can be obtained and controlled, the output data can be managed effectively [2]. Six Sigma enhances process control and simultaneously reduces process variation within a business [2].

Conversely, Lean identifies and eliminates non-value-added processes while standardizing steps or processes to establish control [2]. By combining these distinct concepts, Lean Six Sigma is achieved, leading to improved research outcomes and positive results. The combined definition underscores defect prevention to drive customer satisfaction and achieve results by reducing waste and process variation. Moreover, process standardization aims to enhance applied processes and attain favorable outcomes through the active involvement of all employees. Lean methodology relies less on technical tools, whereas Six Sigma methodology places greater emphasis on statistical data analysis. Another tool employed to establish the procedure was the DMAIC and we can see a brief definition of its five phases in Figure 1.

DMAIC	
Define	Define the process and set objectives
Measure	Measure to determine process needs
Analyze	Analyze the data to find the best design
Improve	Identify, test and implement the solutions
Control	Ensure the design output meets the design input requirements to achieve the goal

Figure 1
DMAIC Methodology

DMAIC aids in structuring and organizing project work. In the Define phase, the objective is to identify the problem, project scope, the process improvement, and consider business units requirements along with what is expected from the company. Useful tools for this phase include the Value Stream Map, Voice of the Customer, Project Charter, or SIPOC [4]. Moving on to the Measure phase, the primary goal is to measure the extent of the problem, marking the start of data collection. Therefore, it is crucial to gather as much information as possible to ensure abundant data availability for validating the optimal solution. The subsequent

phase is Analyze, where the collected data is processed to determine the root cause of the problem and identify areas of poor performance. This phase involves calculations and the presentation of graphs to support the analysis. Based on the data in the analysis phase, the improve phase is then implemented to provide a solution to the problem. It involves identifying innovative solutions to eliminate key root causes and resolve process issues like in this case the time waste. And the final phase is Control, with the objective being to test the results to verify if it meets the expected outcome. During this step, various processes are carried out, including adjusting work procedures, monitoring progress and we integrate the implemented changes and ensure their long-term sustainability.

- **Define phase:** In this segment, the problem will be defined to obtain an overview of the entire process associated with the problem. By creating a SIPOC (Supplier, Input of the Process, Process Itself, Output of the Process, Customer) diagram all the variables related to the process will be identified. The work center and the tasks that revolve around the classification center can be observed in Figure 2. The Supplier can be an in-house business unit or a third-party manufacturer. The Input of the Process would be the requestors task and the Process Itself of the process and the Output of the process would be the part of the classifier. And lastly, the customer receives his import/export if everything else runs in a timely manner.

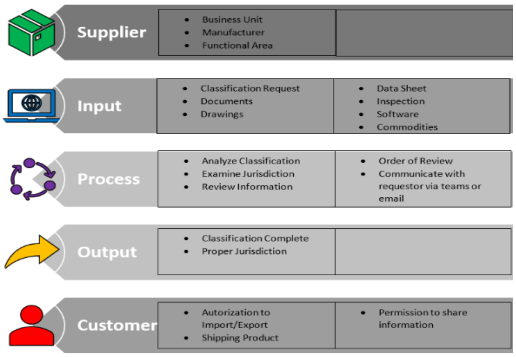

Figure 2
SIPOC Diagram

Figure 3
Gant Chart

- **Measure phase:** This phase was performed with data Gathered from Company X. However, certain information will be omitted to ensure technology data protection and legal matters for company X. The turnback datasheet, which is the source of information for the project, contains details such as the classifier's name, the business unit receiving the service, the captured category, the duration of the activity, and comments from the classifiers explaining the reasons for registering the turnbacks. Each classifier logs in the system repository where there are a number of requests sent daily. If the request does not have the necessary information to be completed, the classifier rejects the request. That rejection becomes a turnback and even though it is time worked, it becomes time wasted because it doesn't add to the number of classifications completed for that day. However, the classifier then annotates the turnback on the datasheet and it will still be time charged to that business unit. The Pareto Chart is going to be used to represent this data gathered. The Pareto Diagram is a type of bar graph that uses the lengths of the bars to represent time, cost, or frequency. In this particular case, it represents time. The longest bar is positioned on the left side of the graph, while the shortest bar is on the right. This arrangement provides a visual representation of the most significant defect occurring each month. Additionally, the graph includes a line that indicates the percentage of each bar. The behavior of this line resembles a square root function, gradually increasing until

it reaches 100%. The data used in this section will be to be from the months of February to April of 2022 vs the data of February to April 2023. A difference in time waste in minutes can be observed since implementing the procedures to upload a proper classification in February.

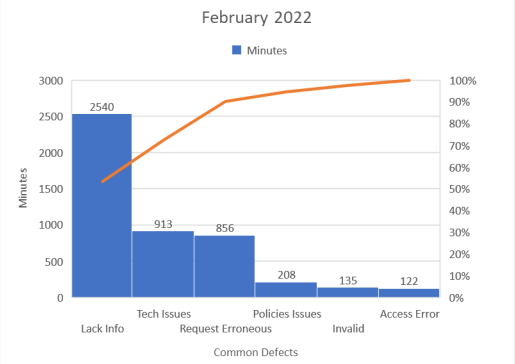

Figure 4
Pareto Chart of February 2022 [2][3]

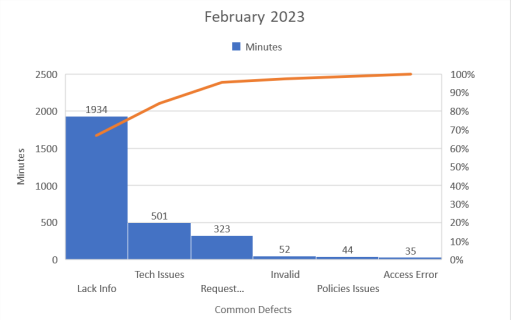

Figure 5
Pareto Chart of February 2023 [5][6]

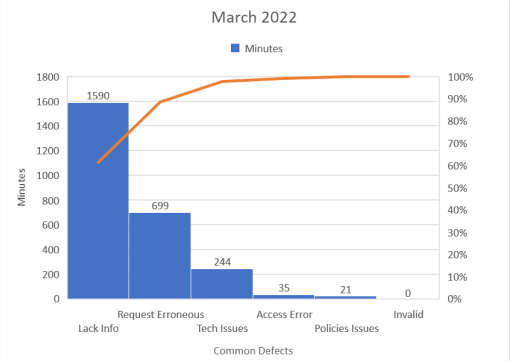

Figure 6
Pareto Chart of March 2022 [5][6]

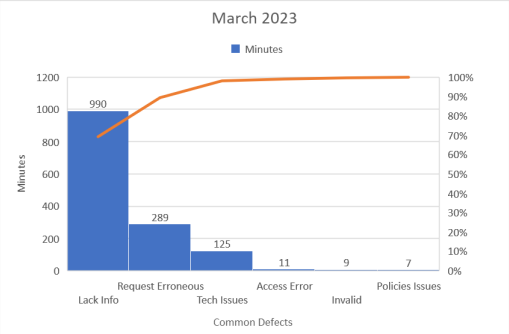

Figure 7
Pareto Chart of March 2023 [5][6]

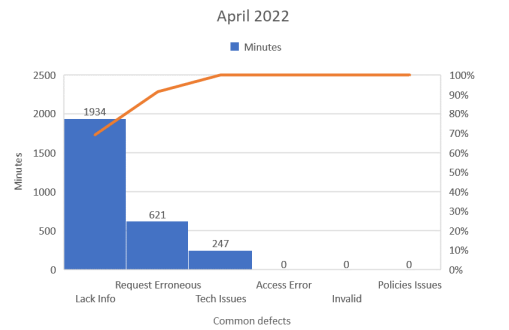

Figure 8
Pareto Chart of April 2022 [5][6]

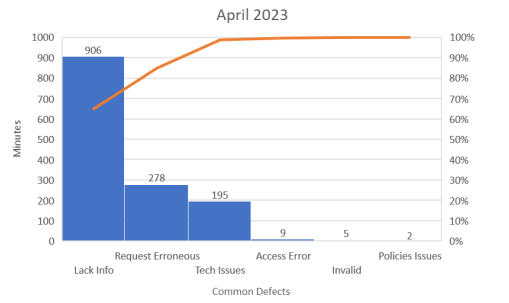

Figure 9
Pareto Chart of April 2023 [5][6]

- **Analyze phase:** In this section the causes of the primary turnback problem will be analyzed through a cause-and-effect analysis using the fishbone diagram, known for its effectiveness in root cause analysis [5]. The fishbone diagram helps uncover defects, failures, and variations within the classification process. It follows a structure resembling the skeleton of a fish, with the head representing the result of all the defects and the ribs representing the 6M's: Manpower,

Material, Mother Nature, Measurements, Method, and Machine. This tool gives us an overview of the process and the problems related to each area. For example, one of the 6M's is mother nature and X company has had turnbacks related to power outages on the island. Due to the remote nature of the work, it has a significant impact on production, resulting in a shift in the work environment, requiring the classifiers to physically go to the company. However, in this research, the focus will be directed towards areas that are within the company's control and where improvements can be made.

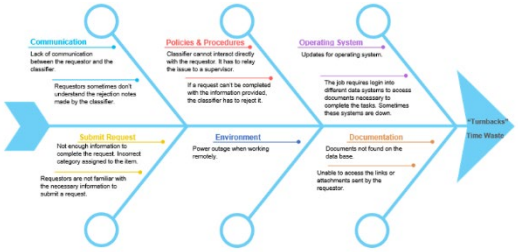

Figure 10

Fishbone Diagram

Secondly, the 5 Whys technique is going to be applied to delve deeper to uncover the root cause of the problem question after question. The 5 Whys technique is valuable for troubleshooting, quality improvement, and effectively addressing the problem in conjunction with other root cause analysis methods, such as the fishbone diagram. Its primary goal is to identify and solve the problem, ultimately eliminating future defects [5].

5 Why's		
Why	Question	Answer
1st Why	Why are turnbacks affecting the classification center?	It affects productivity. Resulting in more time charged per item.
2nd Why	Why is there limited communication with the requestors?	The classifier will write a rejection note in the system. The requestors will need further explanation and the classifier refers the case to a supervisor.
3rd Why	Why is it that the rejection note serves as the sole form of communication between the classifier and the requestor?	The classifier is supposed to relay the case to a supervisor for further explanation. There was a meeting with the supervisor and the classifier is going to commence to communicate via chat or email to resolve the error in the request before rejecting it.
4th Why	Why is there no proper training?	There is no guideline available for the requestor or company.
5th Why	Why are guidelines needed to reduce turnbacks?	To keep the business units working with the classification center. Plus attracting new business units.

Figure 11

5 Why's Table

In this exercise, two categories were chosen as the primary factors influencing time waste: Communication and Policies and Procedure. Specifically, the design will be based on the third inquiry regarding communication. When employing the five whys, the key is to continue asking why until the root cause of the problem is uncovered. With the results presented above, the design phase can now start, constituting a significant part of the overall project development.

- **Improve phase:** The 5 Why's were essential to the improve phase. It can be observed that time was being wasted not only due to errors made by the requestor, furthermore, the absence of communication between the classifier and the requestor played a significant role in these turnbacks. Considering this, a procedure was established where the classifier could communicate with the requestor directly. The existing process required the classifier to pass on any inquiries from the requestor to the supervisor. As a result, this often led to numerous rejections when immediate communication with the supervisor was not possible. Therefore, training was developed to enable classifiers to address the needs of requestors, allowing them to establish direct

communication with the requestors. If the request has an error, for example, no document found in the system, has an incorrect cage code, a typo in the item identifier, etc., the classifier will now have the capability to communicate with the requestor through various channels such as MS Teams calls, chat, or email. This will enable the classifier to promptly inform the requestor about how to rectify the error in the system or submit a new and accurate request to the repository, eliminating the need to wait for hours or days to upload the classification to the system. If the classifier encounters an issue that they are unable to resolve independently, they will proceed to discuss the case with a peer, either through a phone call or by sharing their computer screen. This collaborative approach allows them to work together as a team to find a solution. If a solution cannot be found, the classifier will contact the supervisor for assistance. If time permits during the day, the classifier will convene a call with the entire team to share and explain how they successfully resolved the problem. In case there is a lack of time, the classifier will make detailed notes regarding the challenging case and bring it up during the weekly meeting for the benefit of others. This discussion aims to provide clarification and address any doubts regarding the proper classification of the item. This will lead to a reduction of at least 40% in turnbacks and promote the professional development of the classifiers, thereby offering advantages to the company.

Figure 12

Classification Request Process

- **Control phase:** The concept of the Improve phase originated from the recognition of Common Turnbacks, which will lead to the next phase of validating this information with the newly implemented procedures. As these items were reviewed, it was observed that many of them could be resolved simply by engaging in conversation with the requestor. These were minor errors that could be rectified quickly. By enabling direct communication with requestors, the classifiers will have the ability to address these issues in real-time, eliminating the need to reject these types of mistakes. Alternatively, completing the classification request instead of documenting it as a turnback. This approach reduces time wastage and minimizes the impact on the classification metrics. Of course, there's always more complex cases that are going to end up being turnback, but that's when the new procedure comes into place to validate this research.

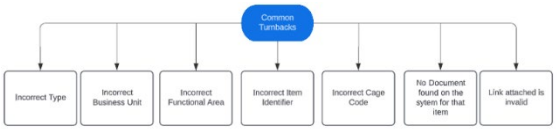

Figure 13
Common Turnbacks

In this validation phase the 5S methodology is going to be used, which is centered around waste reduction and increasing efficiency in the workplace. It can be implemented across all departments and activities. In contrast, Six Sigma is a process improvement approach that aims to eliminate defects by implementing standardized processes, identifying areas of concern, and implementing appropriate solutions. Hence, in this case, the reduction of turnbacks and the improvement of classifications.

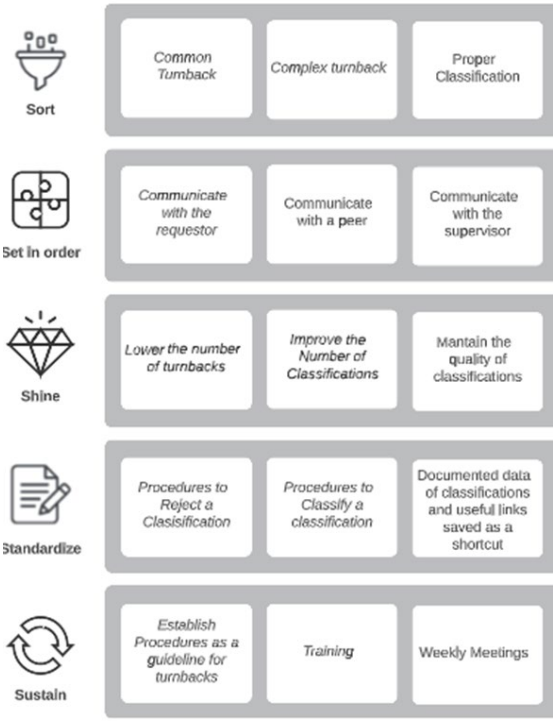

Figure 14

5S Table

To validate the effectiveness of the designed and implemented procedures for turnbacks, the data from a three-month period in 2022 will be examined and compared with the corresponding period in 2023. After implementing the communication between the requestor and the classifier to resolve errors in the requests in real time, the researcher saw a reduction in total time waste of 39.5% in the month of February, 44.7% in the month of March, and 50.2% in the month of April as we can see in Figures 15, 16, and 17.

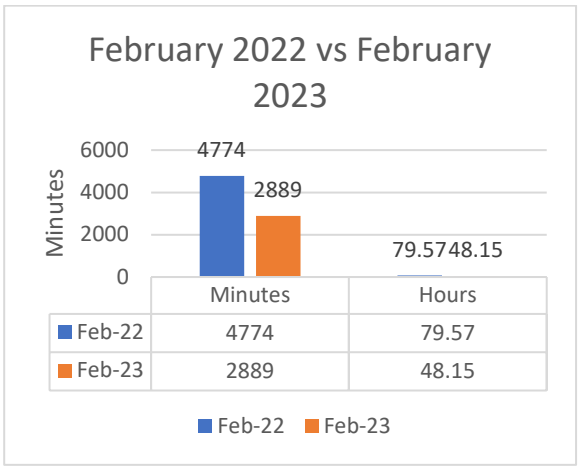

Figure 15
Total Time Wasted February 2022 vs 2023 [5][6]

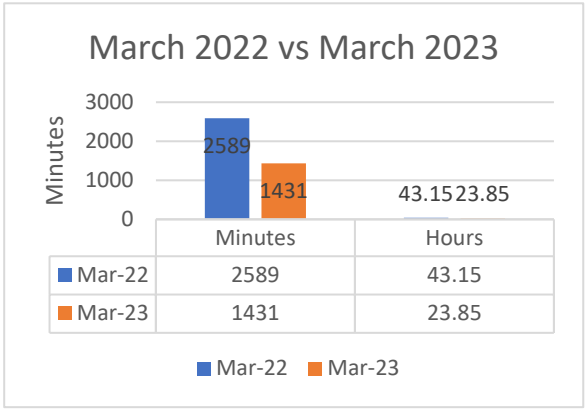

Figure 16
Total Time Wasted March 2022 vs 2023 [5][6]

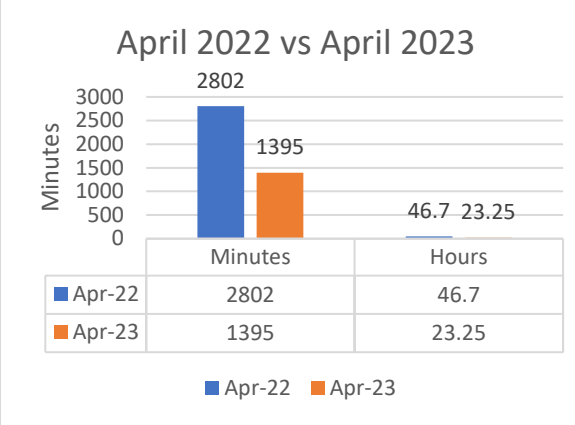

Figure 17
Total Time Wasted April 2022 vs 2023

CONCLUSIONS

This article aims to provide an overview of the advantages achieved through the design and implementation of procedures for turnbacks in the classification center employing the DMAIC methodology. Based on the evidence, it can be deduced that the utilization of the Lean Six Sigma Methodology tools has resulted in favorable outcomes. The following section will summarize these benefits.

The classifier will possess the ability to examine the request and determine the appropriate course of action, whether it involves providing guidance to the requestor in real time for resolution, engaging in a discussion with a colleague, seeking guidance from a supervisor, or ultimately rejecting the request. This process promotes the individual advancement of the classifier and enhances their visibility and recognition within the work center and across the business units. Additionally, documenting explanatory notes within a shared document regarding the resolution of the problem benefits the team by enabling faster classification in future instances. Implementing standardized procedures, along with regular training sessions and weekly meetings is positively impacting the professional development of the classifiers and enhancing the productivity of the work center. This contributes to lowering the number of turnbacks, improves the number of classifications, and maintains the quality of proper classification.

The main benefit was the reduction of minutes from 2022 to 2023 for a total amount of 4,486 minutes or 74.8 hours, which is almost two weeks of work saved in a three-month period. This data validates the achievement of the objective by demonstrating a decrease in the number of turnbacks by 39.5% in February, 44.7% in March, and 50.2% in April. The time saved allows for the opportunity to engage in additional projects, which benefits the growth of the classification center and positively impacts the budgets of both the business units and the company as a whole.

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