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Abstract

Productivity is the most significant factor in manufacturing industries. Low productivity of workers can have a great impact in the finances of an organization. In this project paper, the focus is to improve the manufacturing productivity of Company X, particularly the Injection Molding Department of a Medical Devices Company. Data from daily operations was collected and analyzed finding that the low productivity was caused by rework performed on stock number x due to embedded particle matter caused by the mold manifold. After implementation and validation of a new mold manifold, embedded particle matter was eliminated, and the productivity was increased by 12.2%. During this project, rework was found as the cause and is one of the factors that affects productivity greatly, but other areas were identified as well that can be improved to increase even more the value of productivity obtained.

Introduction

Productivity is an area of manufacturing that requires attention as this is related to the cost associated to work. If this is not carefully monitored, it can have great impact in the finances of an organization. In manufacturing there is always the need to improve productivity, in the Injection Molding Department of Company X there is a need to increase the productivity as currently it is low, and it is impacting the organization financially.

The objective of this paper is to report the results of the improvement in the productivity of the Injection Molding Department of Company X after the root cause has been determined.

Literature Review

One of the important areas for the economic stability and development in the manufacturing industry is leaning to manage productivity. As the productivity is increased, the cost that is associated to work is reduced and another way of increasing productivity is by increasing the output of the units that are produced [1].

There are several studies that have been conducted over the years on manufacturing productivity focusing on different areas that can be improved. One of the studies conducted at Dewa's Gear Manufacturing which dedicates to axels and gears, used a software to study the design of production lines [2]. During this study it was identified that there was no adequate control in the manufacturing process due to difficulties with the tools and handling of the equipment.

On the other hand, a study conducted at Toprak Energy Glass Factory, worked on improving efficiency by measuring the times of the work cycles [3]. It was determined that by reducing the steps required for the preparations of the molds improved the productivity. Another company dedicated to assembling air compressors, worked to reduce the high cycle time of the bottleneck stations by listing the activities and measuring times to perform them [4]. It was found that the distances that the operators had to travel impacted the production times.

In addition to the studies mentioned, another study was conducted on a tractor parts manufacturing company where the goal was to increase productivity by reducing the time to deliver complex shaped components [5]. It was determined in the study, that the reject components decreased by grouping some of the operations that were necessary to manufacture the component in a single configuration on a CNC machine.

According to the literature review, the productivity is an area that can be improved by applying the methods mentioned before.

Methodology

Analyze the data from Finance Department: information regarding manufacturing such as actual earned labor hours, direct labor hours, efficiency, down time, rework, and productivity.

Analysis of productivity measured in the operations review of Company X, finding the root cause for this low productivity, and finding ways to improve it

By analyzing the current state, it sets the baseline of the current productivity and with the theoretical new productivity a difference in the comparison between the two helps to determine the root cause

The method or approach used for analyzing the data was the time series plot to measure current productivity state and the hypothetical new productivity

Results

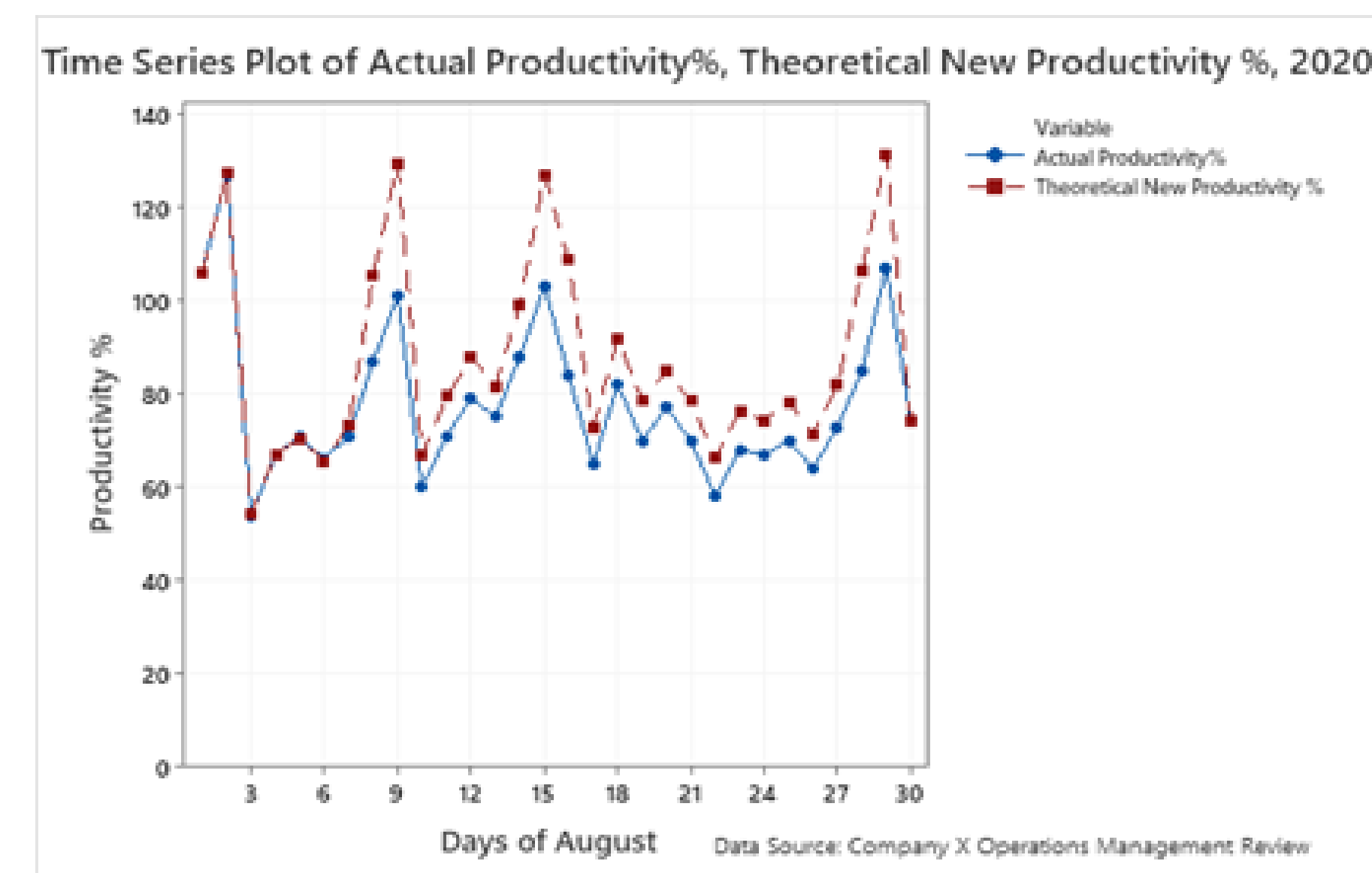


Figure 1
Time Series Plot of Actual Productivity % and Theoretical New Productivity %

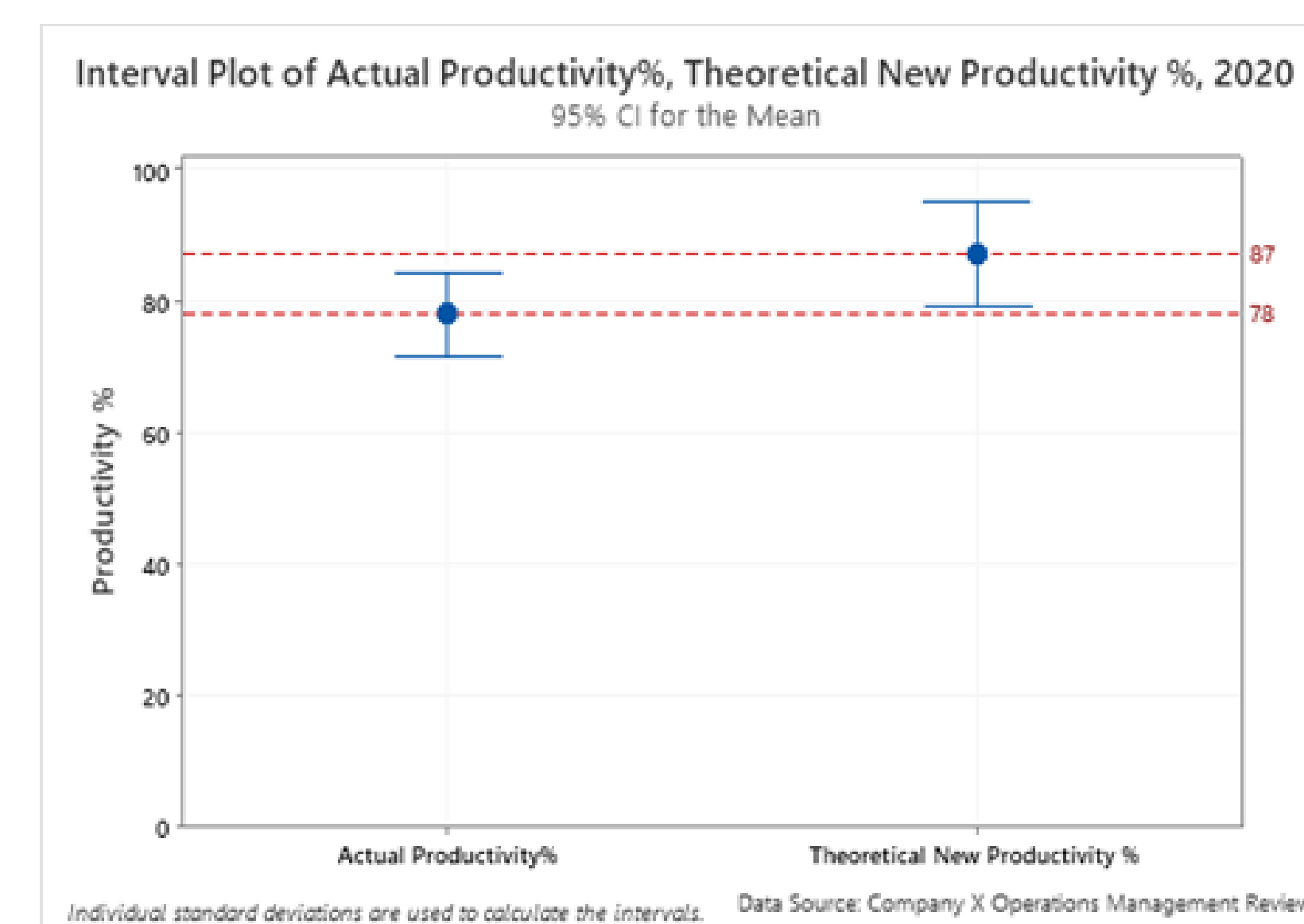


Figure 2
Interval Plot of Actual Productivity % and Theoretical New Productivity %

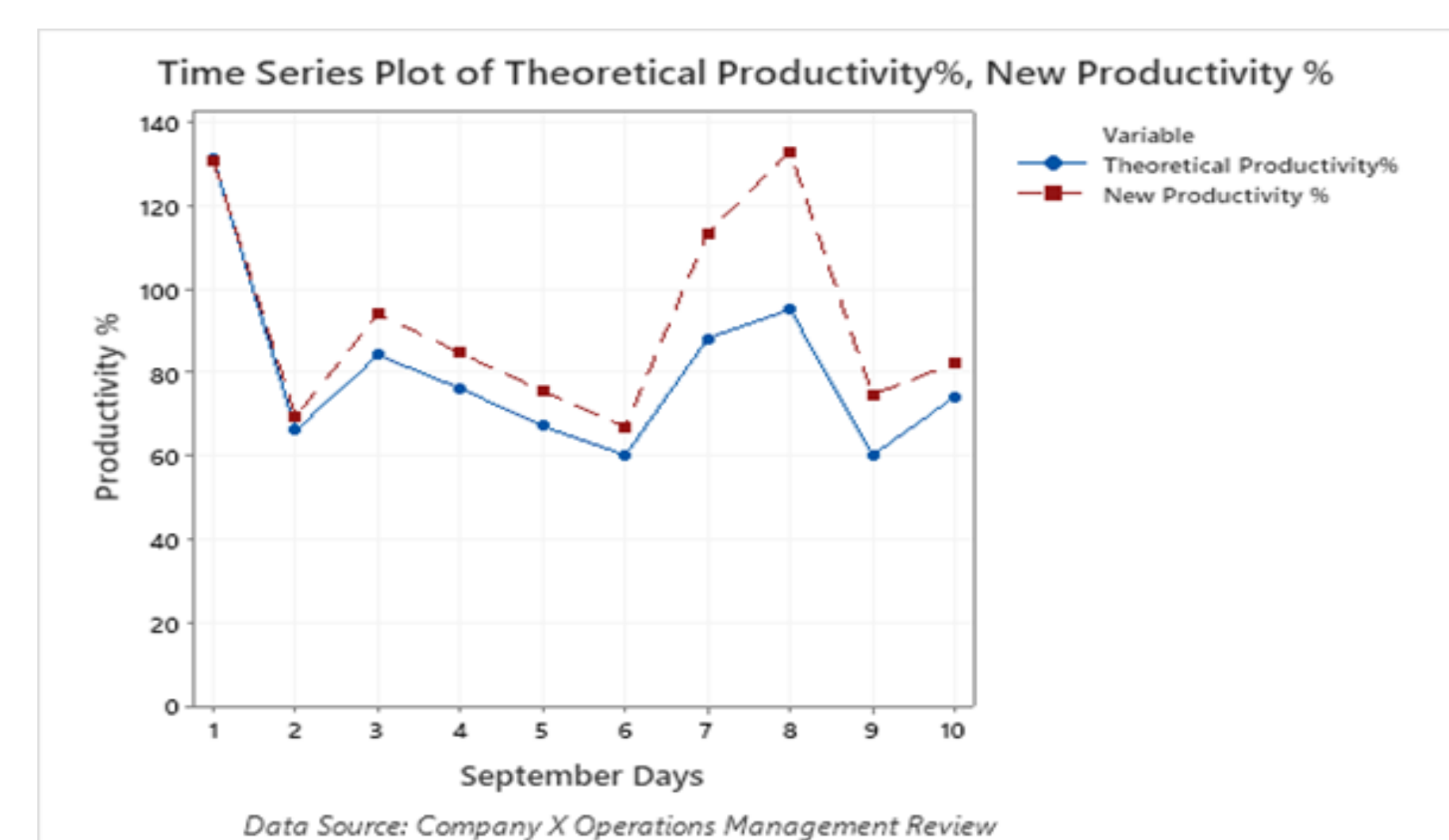


Figure 3
Time Series Plot of Theoretical Productivity % vs. New Productivity %

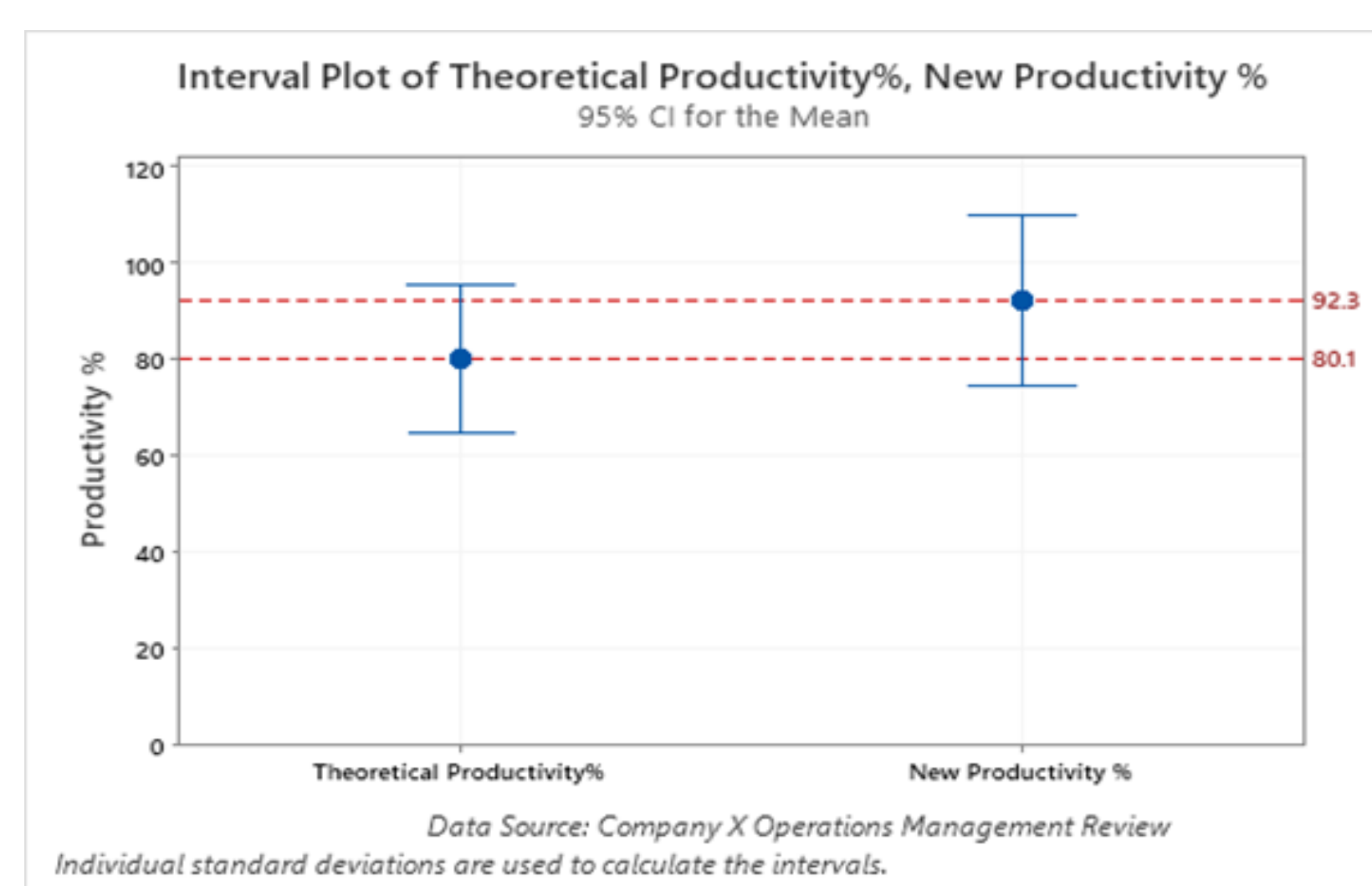


Figure 4
Interval Plot of Theoretical Productivity % vs. New Productivity %

Results Analysis

The analysis for the current state and root cause indicated by the data observed shows that for the current state it was found that the productivity mean was at 78% for the month of August, as indicated in Figure 2. Analyzing the data for the month of August and using the plot in Figure 1, it was found that the root cause was related to the re-work of stock number x.

The results after the new mold manifold implementation which helped eliminate the need for rework, the data indicates that an increase in productivity of 12.2% was achieved as seen in Figure 3 and 4 for the month of September.

Conclusion

After the root cause was identified, an implementation of a new mold manifold eliminated the need of rework resulting in an increase of the productivity by 12.2%, which is greater than the 5% initially established.

Besides just improving the productivity by eliminating the rework, it was also identified other areas of opportunity that can be addressed such as down time, direct labor hours and cycle times. If these other variables are improved, the productivity will increase even more than just the 12.2% obtained in this project.

Future Directions

Some additional future work needed in productivity is the evaluation of the calculation of the manufacturing standards performed and what to consider when standards are being developed or calculated.

References

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