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SUPPLIERS QUALITY ANALYSIS

October 2024





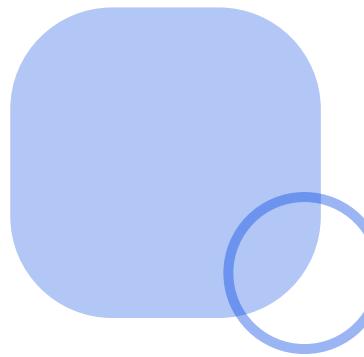
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ABOUT DATASET



The dataset appears to focus on quality analysis related to suppliers, with a variety of dimensions that could be useful in assessing the quality performance of vendors, materials, and plants :



- 01 **Defected_Items:**
Likely contains records of items that were defective.
- 02 **Vendor:**
Likely contains data on the vendors or suppliers.
- 03 **Defects:**
Likely details various defect cases or incidents.
- 04 **Plant:**
Probably contains information related to the production or manufacturing plants.
- 05 **Material_Type:**
Likely holds data on the types of materials used.
- 06 **Defect_Type:**
Contains the types or categories of defects.
- 07 **Category:**
Could categorize the items or defects further.
- 08 **Calendar:**
Likely includes date-related information for analysis.





BACKGROUND



This project focuses on analyzing the defect data from multiple vendors, plants, and material types for a manufacturing operation. The data was sourced from various tables detailing vendors, plants, defected items, material types, defect types, and categories. The goal was to cleanse and analyze the data to derive meaningful insights for improving operational performance.

PURPOSE AND OBJECTIVES



The primary purpose of this analysis was to:



Identify key trends in defect data across different vendors, plants, and materials.



Clean the dataset to ensure consistency, particularly resolving issues related to duplicate defect IDs.



Establish defect reduction targets and provide actionable insights for improving vendor and plant performance.



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EXECUTIVE SUMMARY



- Project Goals
- Key Findings
- Recommendations

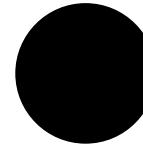
PROJECT GOALS

I

The primary goal of this project was to analyze defect data across vendors, plants, and material categories to gain insights into defect trends, identify areas for improvement, and set defect reduction targets. The analysis aimed to ensure data accuracy, consistency, and actionable insights for improving vendor and plant performance.



KEY FINDINGS



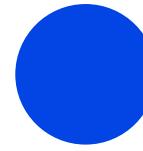
Vendor & Plant Performance

A significant portion of defects are concentrated among a small number of vendors and plants. A few vendors have higher defect rates, signaling the need for closer quality control and corrective measures.



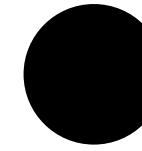
Defect Types and Categories

Mechanical and electrical defects were identified as the most frequent types. Defects associated with certain materials and components require attention.



Downtime Impact

A correlation was found between higher defect quantities and increased downtime, indicating that defect reduction could lead to operational efficiency improvements.



Target Defect Quantity

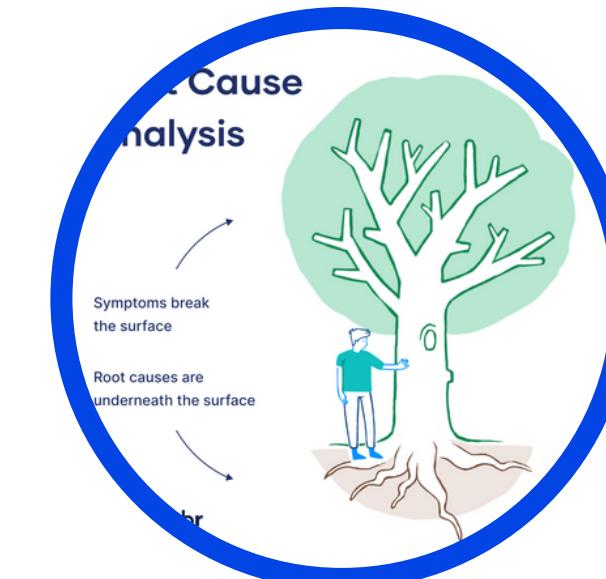
Through analysis, target defect quantities were set based on historical performance, with a focus on reducing defects by 10% in the next cycle.

RECOMMENDATIONS



Vendor Management:

Focus quality improvement efforts on vendors with consistently high defect rates.



Root Cause Analysis:

Conduct deeper investigations into mechanical and electrical defects to address recurring issues.



Monitor Target Defect Performance:

Regularly track defect rates against the set targets and adjust strategies accordingly.

DATA EXPLORATION IN PYTHON



[https://colab.research.google.com/drive/1RfpHeFDdbn9tkEy8kGvsI5Pc7Hygu2f-?
usp=sharing](https://colab.research.google.com/drive/1RfpHeFDdbn9tkEy8kGvsI5Pc7Hygu2f-?usp=sharing)





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DATA CLEANING



Link Of
Cleaning

DATA CLEANING



Null Values

`df.isna().sum()`

Date 0

Sub Category ID 0

Plant ID 0

Vendor ID 0

...

Defect Qty 0

Downtime min 1

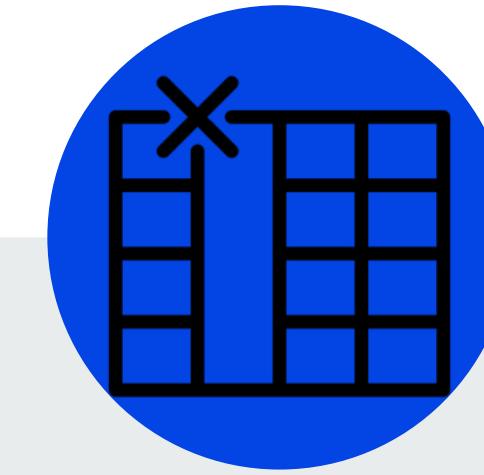
`dtype: int64`



Duplicates

`len(df[df.duplicated()])`

Number of duplicated
data : 193



Unnecessary Columns

`Sort Column` in Defect

Type Table

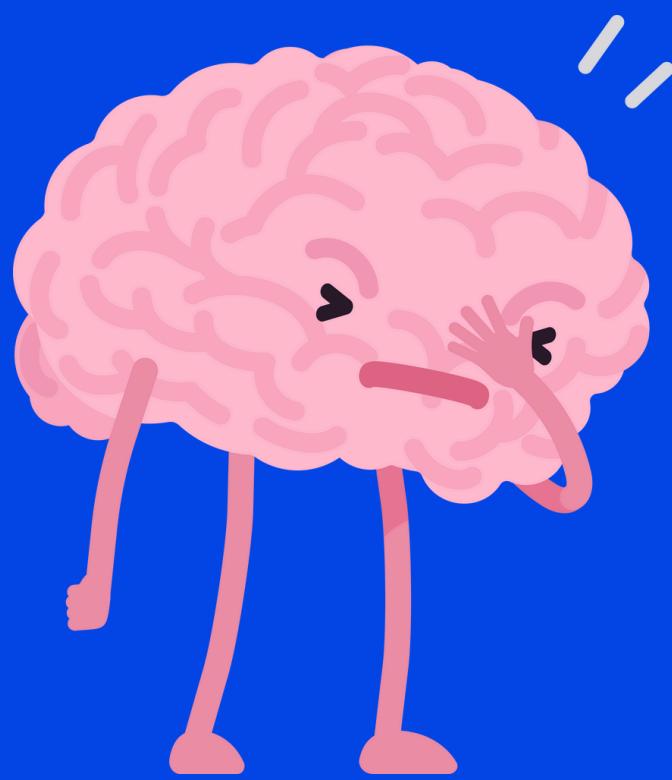
It doesn't used in the
main table (Defected
Items)

`Category Column` in

Category Table

Repeated Column

What is The Problem



The main problem addressed in this analysis was the high variability and inconsistency in defect quantities across vendors and plants, leading to operational inefficiencies. There were multiple defect IDs for the same defect names, leading to duplicate records and potential data integrity issues. The need to standardize this data and set meaningful performance targets was critical.

SOLUTION APPROACH OVERVIEW



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Data Standardization and Cleaning

Overview:

- **Two main tasks were undertaken:**
 - a. Standardize Defect IDs: Ensure that all records for the same defect refer to a single, consistent Defect_ID.
 - b. Standardize Vendor IDs: Ensure that all records for the same vendor refer to a single, consistent Vendor_ID.
- **Tools used:**
 - Power Query for efficient data manipulation and transformation. ([Power Query Solution Link](#))
 - SQL for direct updates to the database to ensure data integrity. ([SQL Solution Link](#))



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DASHBOARD



Link

Dashboard

Supplier Quality Analysis

Downtime (min)



137,584

Defect Qty



54.4M

Defect Type

Impact % 32.6%

No Impact % 39.4%

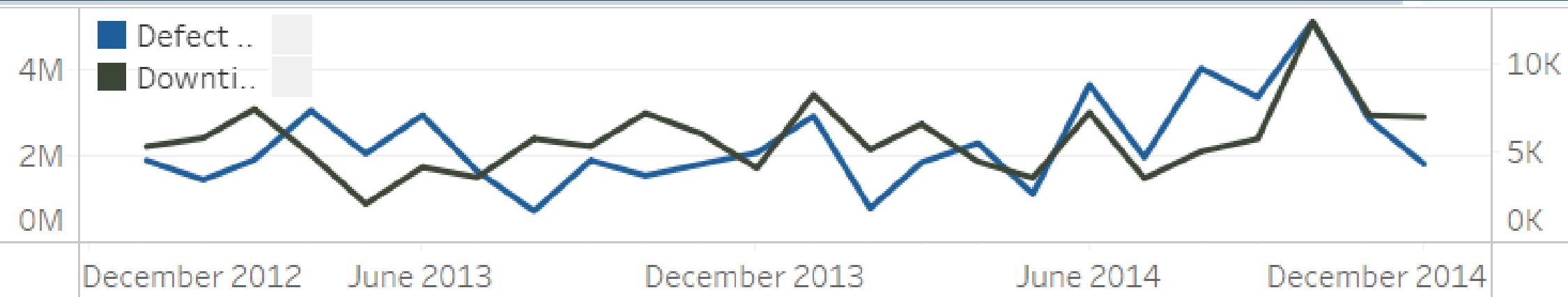
Rejected % 28%

Year

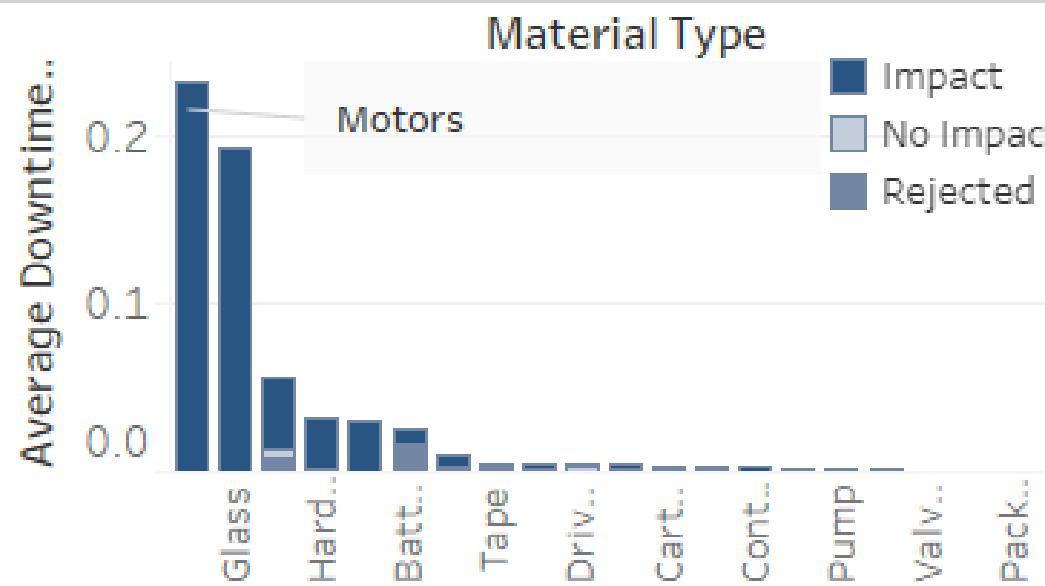
● 2013

● 2014

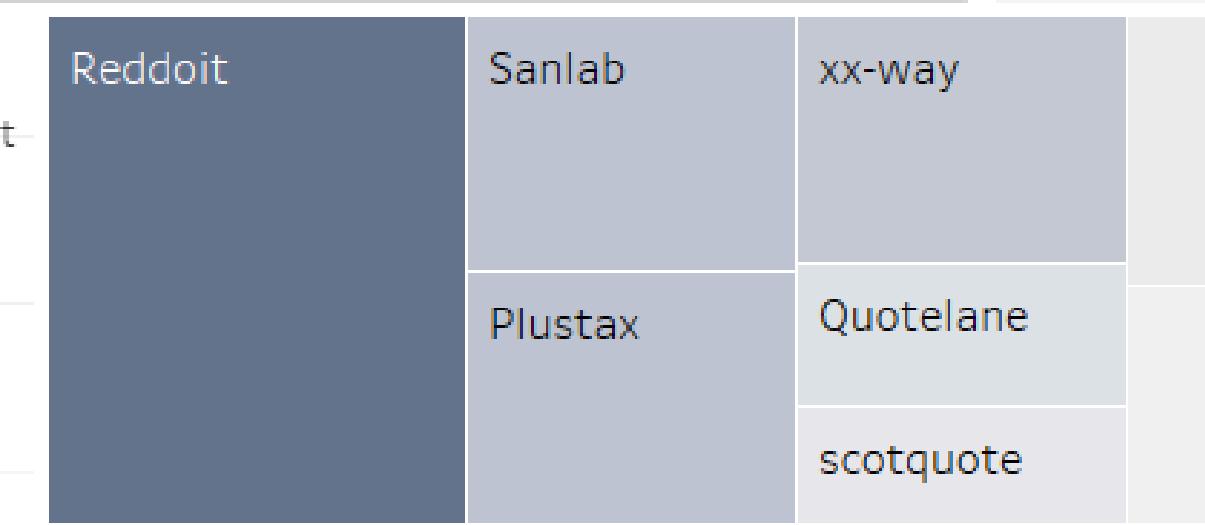
Defect Qty & Downtime Trend



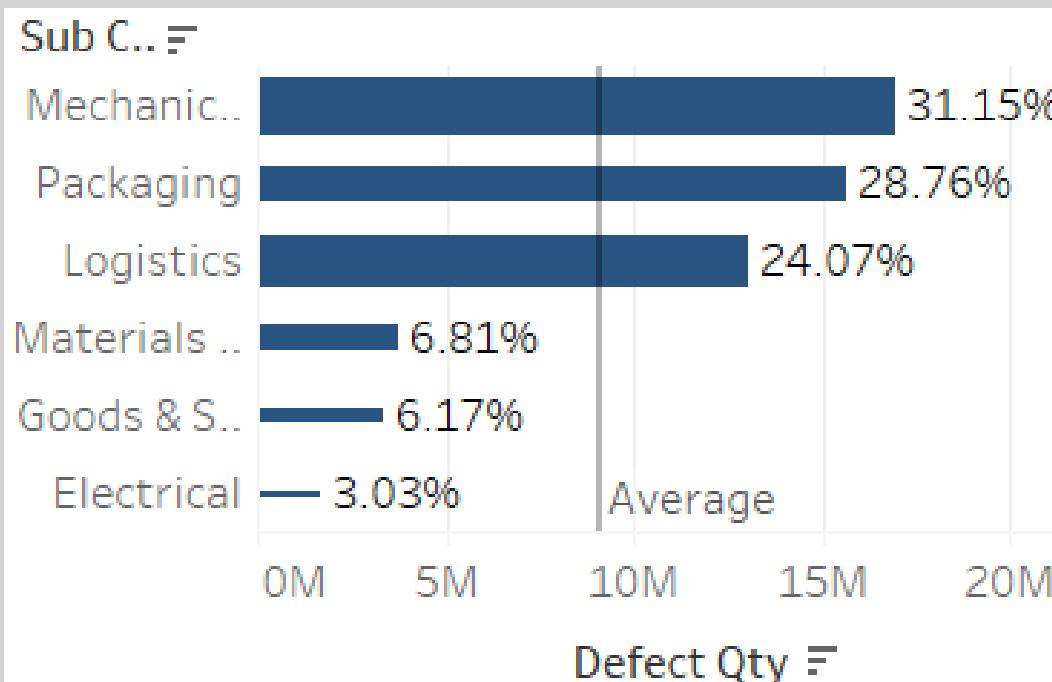
Downtime Analysis



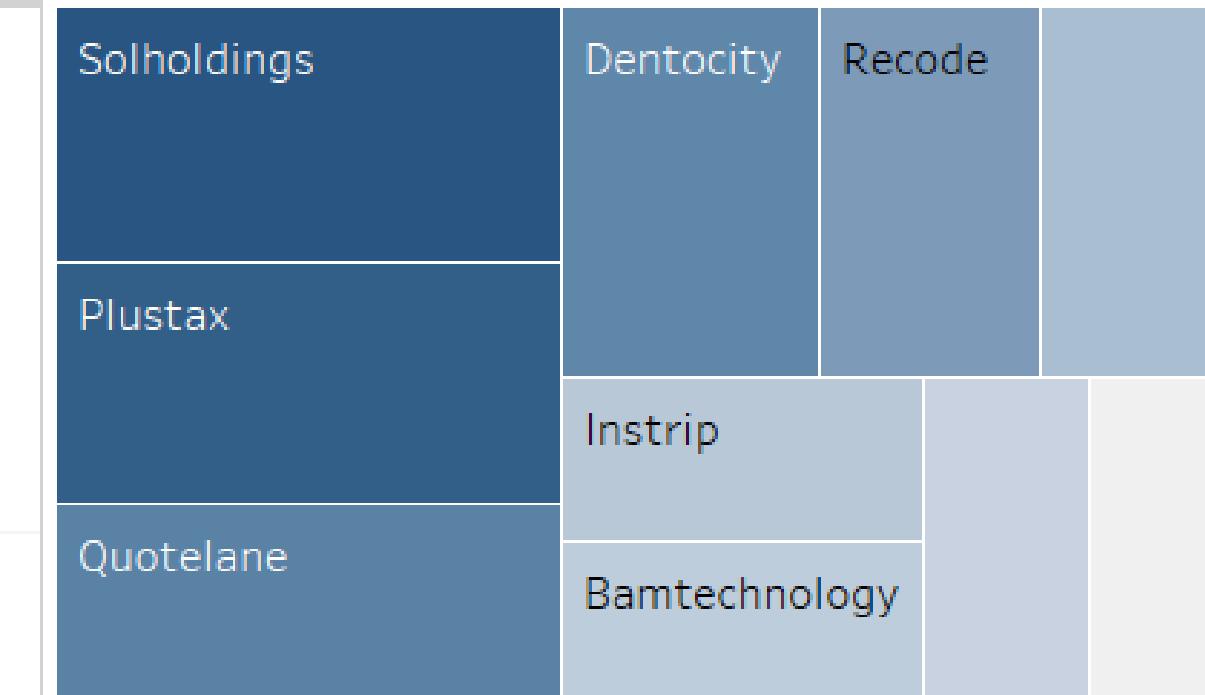
Vendor Downtime Ranking



Defect Qty by Sub Category



Vendor Defect Quantity Ranking





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INSIGHT

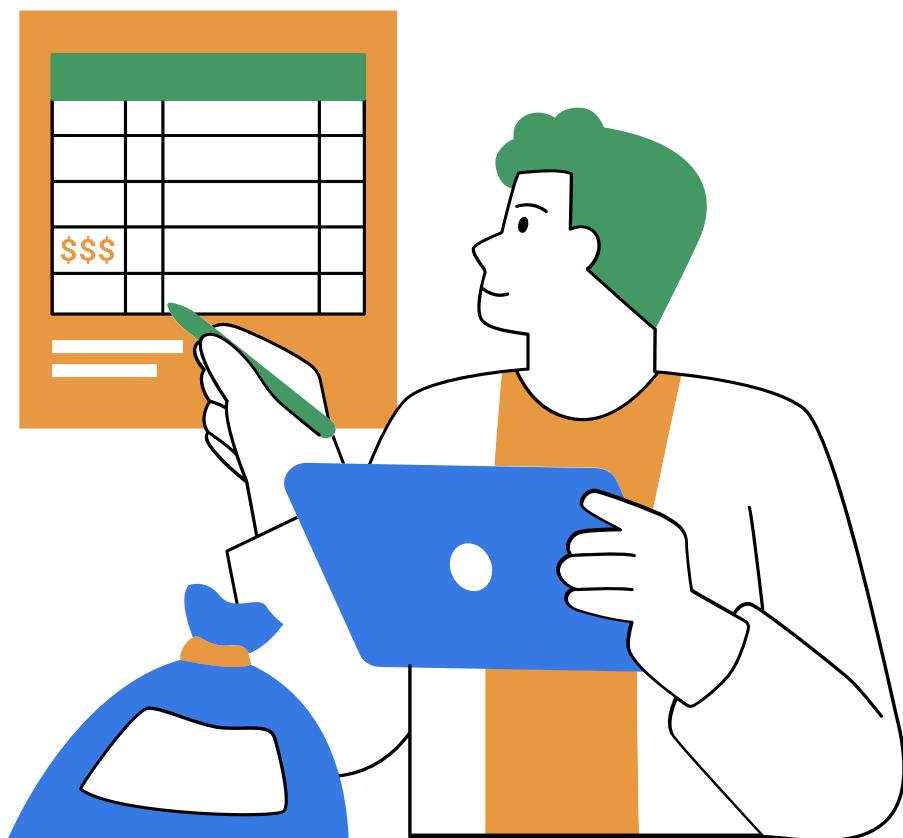
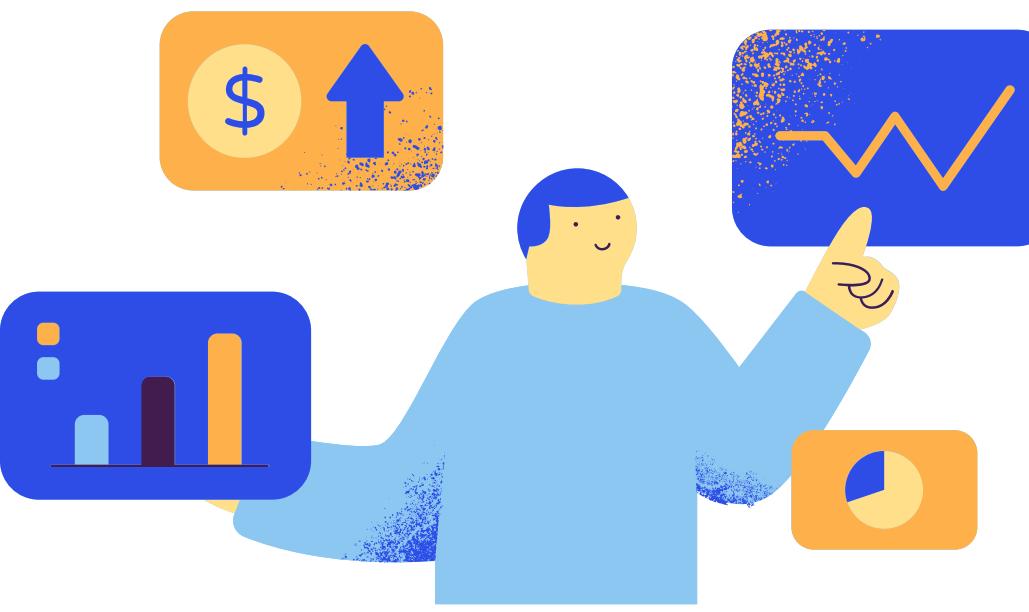


Link
Insight



Conclusion from Insights:

- The highest rejection rate was in May 2013 at 40.3%, while the lowest was in August 2013 at 15.9%.
- Defect quantities peaked in October 2014 at over 5 million, with the lowest in August 2013 at 721k.
- Interestingly, larger downtime didn't always result in higher defect counts—like when 25,960 minutes of downtime only resulted in 477k defects.
- The top defect-contributing vendors were Solholdings, Plustax, Quotelane, Dentocity, and Recode, while Reddoit and Sanlab led in downtime.
- Key defect categories include Mechanical, Packaging, and Logistics. Motors and Glass with 'Impact' defect types showed the highest downtime per defect.
- From May to October 2014, both defects and downtime grew significantly.
- Lastly, around 20% of vendors contributed to 80% of defects, with Solholdings and Plustax leading the group.





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RECOMMENDATIONS



Recommendations

1. Focus on Top Defective Vendors:

- Prioritize Solholdings, Plustax, Quotelane, Dentocity, and Recode for quality improvement initiatives, as they consistently show high defect rates.
- Conduct in-depth audits on these vendors' processes and implement stricter quality control measures.

2. Address Specific Sub-Categories:

- Concentrate efforts on reducing defects in high-contributing sub-categories like Mechanical, Packaging, Logistics, Material & Components, and Electrical.
- Evaluate material handling processes and training for sub-categories with higher defect rates.

3. Downtime Optimization:

- Investigate downtime related to motors, glass, and corrugate materials, as these have the highest average downtime per defect. Streamline production processes and invest in preventive maintenance to minimize downtime.

4. Seasonal Analysis:

- Since there is a noticeable increase in defects and downtime from May to October 2014, explore the root causes of this seasonal variation. Possible factors could be workforce issues, supply chain disruptions, or equipment failures.

5. Pareto-based Focus:

- Apply the Pareto Principle and focus corrective actions on the top 20% of vendors that contribute the most to defects. This would yield the highest impact with the least resource expenditure.



OUR TEAM



Our team is a diverse blend of creative minds, strategic thinkers, and industry experts committed to propelling your business to new heights. With a passion for innovation and a collective dedication to excellence, we bring a wealth of experience and fresh perspectives to every project.

Nancy Mongy

Ali Hassan

Anas Taha



Our Site





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THANK YOU

FOR YOUR ATTENTION

October 2024

