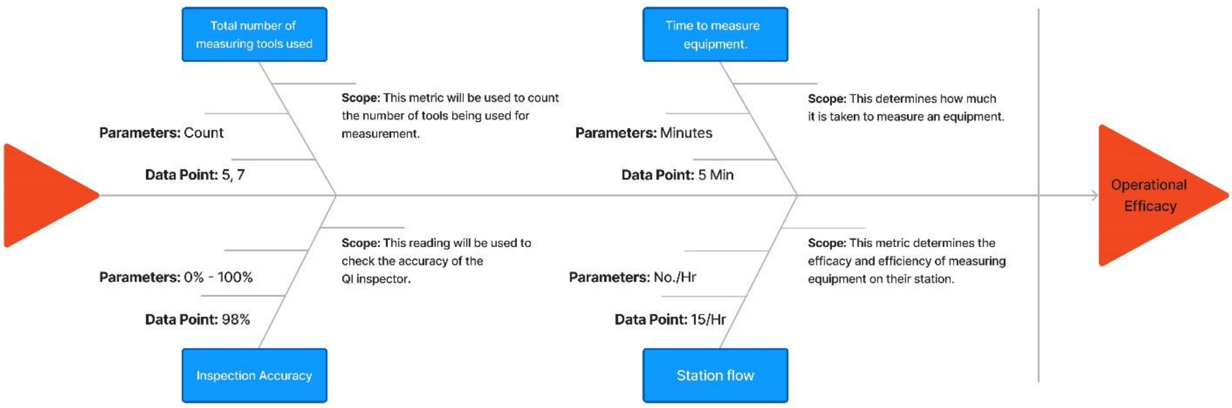
Business Analysis:

Case Study: Little Panda

Area of Focus: Operational Efficiency

Part 1: Data Identification- Fishbone Diagram



1. **Total number of measuring tools used:**
   - Scope: This metric will be used to count the number of tools being used for measurement.
   - Parameters: Count
   - Data Point: 5, 7

2. **Time to measure equipment:**
   - Scope: This determines how much it is taken to measure an equipment.
   - Parameters: Minutes
   - Data Point: 5 Min

3. **Inspection Accuracy:**
   - Scope: This reading will be used to check the accuracy of the QI inspector.
   - Parameters: 0% - 100%
   - Data Point: 98%

4. **Station flow:**
   - Scope: This metric determines the efficacy and efficiency of measuring equipment on their station.

- Parameters: No./Hr
- Data Point: 15/Hr

Part 2: Data Collection

1. Total number of measuring tools used:

Data Rationale: This metric provides insights into different types of measurement tools that quality inspectors have used. Understanding the total number of tools used can help determine the inspection's complexity and resource requirements.

Data Collection Plan:

- Assigned a designated person or team responsible for tracking and reporting the number of tools used for measurement.
- Conducting regular audit of inventory of tools and recording it in a database.

Risk Management:

- Misplacement of measuring tool
    - **Management**: Implementation of rule for storage, use and putting it back
- Incorrect tracking tool usage.
    - **Management**: Provide proper training to the team for data collection

2. Time to measure equipment:

Data Rationale: This is considered the efficiency of the measurement process by quantifying the time taken to measure each component. It helps to recognize potential bottlenecks in the inspection process.

Data Collection Plan:

- Use digital time tracking tools or tablet software to record the time taken for each measurement.
- Data collected in a centralized database with the component time measured.

Risk Management:

- Inconsistent or inaccurate data entry
  - **Management**: Provide training and educate people to how to input data
- Equipment malfunction or technical glitch affecting measurement reading
  - **Management**: Check regularly on devices, maintain software, and have backup procedures to restore data.

3. Inspection Accuracy:

Data Rationale: These metrics evaluate the accuracy of inspection of QI, ensuring that the automotive equipment is being appropriately examined and defects are being registered accurately. This directly impacts the quality of the QI process and the reliability of the inspectors.

Data Collection Plan:

- Implementing a standardized scoring system to evaluate the accuracy of QI inspectors.
- By creating an inspection checklist for checking defective components and for accepted components as well.
- Conduct a quality audit to verify the accuracy of inspection results and provide feedback to QI.

Risk Management:

- Subjective interpretation of QI criteria following inconsistent data verification
  - **Management**: Acknowledge the QI inspection and criteria.
- Oversighting results in a decline in QI inspection quality over time.
  - **Management**: Provide a system for regular performance review.

4. Station flow:

Data Rationale: This metric is used to evaluate the flow and efficiency of QI station where measuring equipment is done. This helps to rectify potential lack back, optimized station workflow.

Data Collection Plan:

- Conduct time base study to visualize the flow of activities at each station of QI.
- Gathering feedback from the QI inspection supervisor regarding any challenges faced by QI during the inspection process.
- Use management software (Tablet software) to monitor station flow real time.

Risk Management:

- Congestion leads to delays in component usage and reduced productivity.
  - **Management**: Frequently review station layout and conveyor belt maintenance, ensuring proper component supply to QI inspectors.
- Improper resource allocation
  - **Management**: Preplanning of capacity of equipment inflow so management can allocate to each station. Monitoring workload and distribution of components and adjusting sufficient stuff.

Reflection

The given case study presents a need to enhance operational efficiency with the implementation of an effective and efficient method to reduce the time and inaccuracy that occurs by Implementing a laser machine, which can be seen as a potential solution as a result of which work will be done with more efficiency and effectiveness.

There is potential human intervention, which may lead to data inaccuracy, data inconsistencies, Missing data, and malicious data. To mitigate this problem, caution and planning are much needed. Auditing the process periodically is vital to rectify new challenges and develop better solutions.

These metrics can be used to identify core issues and areas in which improvement is needed. However, studying the measurement tools and the time consumption required to toggle between them creates a problematic situation for the QI inspector and the organization. A solution for this is providing sensors and various automotive tools that help measure equipment faster, more accurately, and more efficiently.

All the above areas of improvement and points on which the efficiency and effectiveness of a particular process can be increased emphasize time constraints with accurate results. At the same time, machines can be fast but inaccurate and unreliable. On the other side, humans can be honest when guided and can be held accountable for so to mitigate the above problem, I would suggest a combination of Human supervision and machine work tactics to mitigate the situation and achieve this potential solution might result in improved productivity and consistency which will work as a benchmark set by the company. Also, with these significant improvements might result in a better work culture which is priceless.

Knowledge Creation

Part 1: Root Cause Analysis:

A root cause analysis using the 5 Whys method to understand why the time to measure equipment is more and what the key aspects contributing to lower performance.

Time To Measure Equipment

Problem: To identify the time taken to measure equipment

Five Whys Analysis:

Q1. Why does it take more time to measure equipment?

Ans 1: It is because measuring equipment involves multiple steps or complex procedures.

Q2. Why might the measurement process be complex?

Ans 2: Because the inspector has to toggle between different tools and data entry is complex due to unsuitable particles or matter sticking with the inspector's hands

Q3. Why are tools affecting measurement time?

Ans 3: This is because sometimes tools are misplaced and break down frequently.

Q4. Why do tools break down or get misplaced frequently?

Ans 4: Because of a need for more accurate measuring training and good quality of tools.

Q5. Why more accurate measuring training is required?

Ans 5: This is important because it mitigates equipment failure, downtime, and potential safety hazards by conducting surveys and retraining inspectors who have low accuracy.

Part 2: Business Impact Analysis

The aim is to visually guide the client, in this scenario, the Operations manager, through the progression from the baseline metric to meaningful insights.

Annotation Insights from the Five Why Analysis:

Measurement Complexity:

The root cause of extended time measurement is the complexity of the process. This can be affected by multiple reasons:

- **Multiple steps:** The process might involve multiple steps that must be followed accurately.
- **Unsuitable measuring environment:** Factors like sticky hands or dust particles could slow the data entry process.

Tooling Issues:

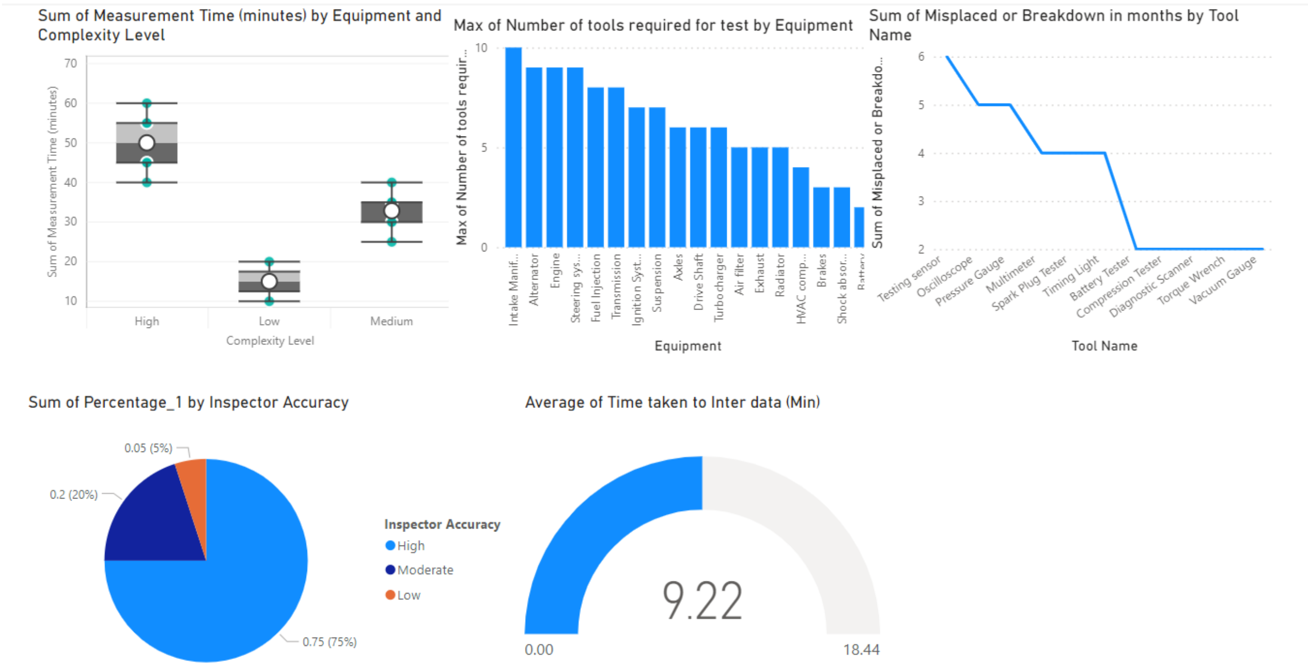
Misplaced or broken tools: This analysis reveals that those phenomena can contribute significantly to the time taken for measurements.

Training and Quality:

The focus on accurate measuring training indicates a potential problem with the current measurement practices. This can lead to:

- **Equipment Failure:** Faulty measurement can cause equipment to fail prematurely before it degrades.
- **Downtime:** Due to inaccurate measurement can lead to production delays.
- **Safety Hazards:** Inaccurate measurements can lead to safety risks if equipment is not functioning as promised.

Part 3: Data And Analysis



1. Time to Measure Equipment:

Visualization: Box plot showing the distribution of measurement times for different complexity levels.

Rationale: Each complexity level's measurement times are visualized using box plots.

Purpose: This visual allows the audience to compare measurement times, variability, and central tendency across different complexity levels. It provides insights into the range of measurement times and identifies any.

2. Number of tools for each Equipment:

Visualization Histogram showing the frequency distribution of the number of tools required.

Rationale: A histogram is used to visualize the frequency distribution of the required tools, providing insight into the general distribution pattern.

Purpose: This diagram helps understand the distribution and central tendency of the number of tools needed for equipment testing. It determines whether the data is skewed or regularly distributed, which helps discover standard requirements and outliers.

3. Number of tools for each Equipment:

Visualization: The line chart shows the trend of misplaced or broken-down tools over time.

Rationale: Data on tool misplacement or breakdown incidents is available; a line chart indicates it.

Purpose: The chart helps recognize patterns or trends in tool breakdown or misplacement over time. It helps us to determine the frequency of maintaining and relocating resources.

4. Inspection Accuracy:

Visualization: The pie chart depicts the distribution of inspectors based on their performance.

Rationale: This chart represents the distribution of inspectors across performance areas, offering a glimpse of overall performance.

Purpose: The chart helps people understand how inspectors are distributed based on their performance. It enables the analyst to identify the ratio of inspectors that need training.

5. Time taken to enter data:

Visualization: A gauge chart is used to represent the average time taken to input data for all equipment.

Rationale: This chart represents the distribution of inspectors across performance areas, offering a glimpse of overall performance.

Purpose: The chart helps people understand how inspectors are distributed based on their performance. It enables the analyst to identify the ratio of inspectors that need training.

Conclusion

By amalgamating all the points, it concludes that the root cause analysis conducted using the 5 Why methods has provided valuable insights into the factors contributing to the increased time taken for equipment measurement; it has highlighted the complexity of the measurement process, including multiple steps and environment factors affecting data. Moreover, tooling issues, such as breakdown, have been identified as significant contributions to measuring time. Additionally, more accurate measuring training has been emphasized to mitigate equipment safety hazards.

The business impact analysis underscores the importance of addressing these issues, as faulty measurement practices can lead to safety risks. Data visualization of measurement time, tool requirement, tool maintenance trend, inspector performance, and data entry time provided actionable insights for improving measurement efficiency and accuracy.

Moving forward, addressing the identified root causes and implementing targeted solutions, such as improved training programs, better tools management practices, and other enhancements of data entry technology, will be crucial for optimizing equipment measurement and taking proactive measures; the organization can enhance operational efficiency, ensuring product quality, and maintain a safe working environment.