Summary of Master's Thesis:

The Root of an Effective Root Cause Analysis

A Case Study Identifying Barriers and Enablers in Root Cause Analysis of a Manufacturing Instability

Sandra Jaksic

August 2025

1 Introduction

Despite decades worth of quality management methods and tools, some manufacturing problems just keep coming back, and that raises an important question: Why aren't these tools enough? It signals the existence of some deeper challenges and raises questions about barriers beyond just the technical aspects. To explore this issue, a real case in one of Volvo Groups knock down plants was looked into.

In this particular case, the plant had been experiencing variation in the adhesive bond between the windshield and the cab of the trucks. Every truck must pass a water leakage test before it can leave the factory. If any leakages are found around the windshield, the entire windshield has to be removed and replaced. This is not only time consuming, but also costly, creates waste and has led to a lot of frustration among employees involved in the issue. What makes this case especially interesting it that the problem has persisted for several years, despite multiple problem solving efforts. This thesis therefore aims to explore what practical challenges and opportunities are faced during root cause analyses, to categorize them into key factors, as well as to illustrate how these factors interrelate.

2 Literature gap

A literature review was conducted to better understand factors affecting root cause analyses. Three categories were identified and explored: technical factors, organizational factors, and behavioral factors. The literature review concluded that while the body of knowledge on root cause analysis methods is well developed, there is a gap in studies specifically examining the effectiveness of root cause analyses. Available literature is also fragmented, where some studies dive into the technical aspects of root cause analyses, and some studies explore other potential influencing factors, although not specifically in the context of root cause analysis. This master's thesis therefore addressed this research gap by exploring influencing factors across multiple dimensions.

3 Methods

This study was conducted using an action research approach, meaning that the results were co-created with the organization. The findings were a result of both inputs based on previous research and theories, as well as the organization itself. Six Sigma and DMAIC was used to conduct a root cause analysis on the variation on the windshield adhesive bond, which led to the identification of barriers and enablers that affected the effectiveness of the root cause analysis.

4 Outcomes

The study resulted in the identification of 20 enablers and 30 barriers affecting root cause analyses. These barriers and enablers were grouped into categories and a conceptual model was created to illustrate how they interrelate, see Figure 1.

5 Conclusion

A conceptual model of the results are shown in Figure 1. The findings indicate that the effectiveness of a root cause analysis will be partly based on the chosen problem solving method, but the success of any method will be dependent on having accurate facts. These facts can come from data, but that requires that process data is available, or that procedures for manual data collection are adequate. Facts can also come from accessing the organizational knowledge through collaboration. Collaboration will depend on the company procedures for cross-functional problem solving, but also on the employees themselves. The system, consisting of e.g. processes, procedures, and employees, will steer how people in the system act, and therefore also impact the effectiveness of root cause analyses. Managers have the responsibility of the system and to optimize its parts to the desired result. To summarize, the effectiveness of a root cause analysis does not only lie in the chosen method, but in the whole organizational system that shapes how problems are framed, understood and addressed.

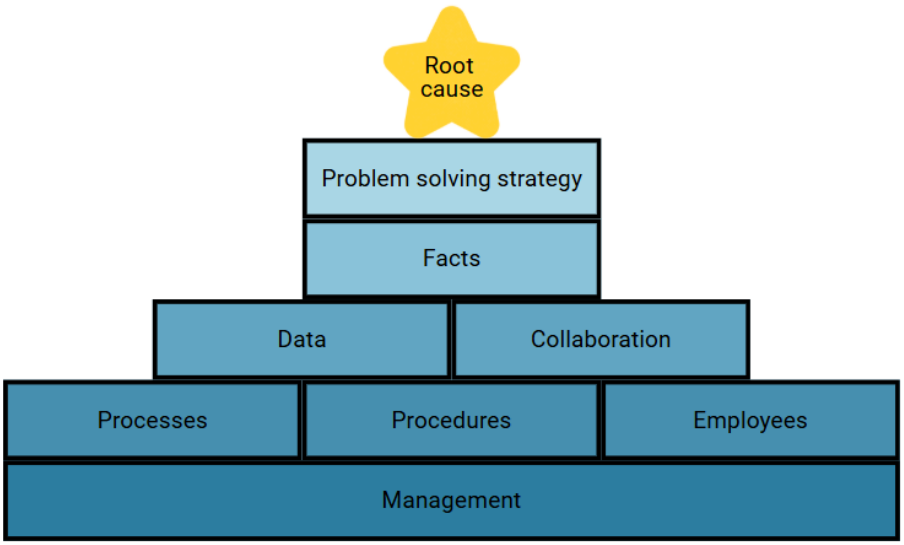

Figure 1: A model illustrating factors that influence the effectiveness of a root cause analysis