

Integration of Advanced Product Quality Planning in Quality Preparation for an Original Equipment Manufacturer in the Automotive Industry

A Case Study at Volvo Group Trucks Operations Powertrain Production in Skövde

Summary

This study examines the development of Volvo Group Trucks Operations Powertrain Production (Volvo GTO PTP) in Skövde, focusing on implementing processes for new products intended for internal and external customers. Previously, the company solely supplied products within the Volvo Group, functioning as an Original Equipment Manufacturer (OEM). With the opportunity to adhere to the supplier-specific quality standard IATF 16949:2016, an extension of the ISO 9001:2015 quality standard. Volvo GTO PTP aims to enhance product and process development by adopting the Advanced Product Quality Planning (APQP) method. Unlike the existing project models, Develop Product and Aftermarket Product Portfolio (DVP) and Project Steering Model (PSM), used by Volvo GTO PTP, the APQP method validates product and process development together.

Our journey

The project started with us thinking that we could give Volvo GTO PTP an IATF 16949:2016 certificate at the end of the project. After a few weeks, we realized that it would not be possible in a few months, so we scaled down the project to investigate how to apply APQP inside the organization and how well-established the model is. Although with the downsized project the focus was always to understand the human aspects and the softer values of quality assurance. This was very important for us to keep throughout the project as we consider this area of quality development underestimated. We also think that the combination of change management and quality development is a research area that are not well covered in previous literature.

In the study, we used interviews for data collection which gives a different view on quality issues that quantitative statistics would not tell us. The interviews were chosen so that we would cover the three main divisions at Volvo GTO PTP in Skövde, namely foundry, machining, and assembly. The interviews were also divided to cover all parts of the organizational structure, although with a focus on management and project managers. The data were analyzed through a thematic approach which we structured by following the methodology of an affinity diagram. This helped us create a structured approach and divide the themes into the three research questions that this project was built upon:

1. What is the current status of the DVP and PSM project models, which satisfy the requirements of ISO 9001:2015, and how do they compare to the desired APQP model that follows the IATF 16949:2016 standard?
2. To what extent has the APQP methodology been implemented within the organization, and how widely is it used across different functions?
3. How can gaps in organizational knowledge and implementation of the APQP model be bridged?

Furthermore, we did evaluation matrices to quantify the gap between the project models and quantify the organizational gap. This gave us an opportunity to see what areas needed more focus, which led to further compliance interviews with key competencies that gave us the opportunity to deep dive into certain topics, such as Measurement Systems Analysis, Product approval and Change development.

Contribution

The study examines the application of the APQP model in the operations of a specific company. The company under investigation was Volvo GTO PTP in Skövde. It should be noted that the findings of this study may not be universally applicable to all OEMs within the automotive industry due to the supplier-specific nature of IATF 16949:2016, which is an automotive industry standard. However, the study's findings and methodology could potentially be relevant to other automotive companies and manufacturing industries, although adjustments would need to be made to accommodate each organization's specific circumstances.

This study contributes by offering insights into the effective application of the APQP model by an OEM and its adherence to a supplier-specific quality standard. It is a rare opportunity for an OEM to achieve IATF 16949:2016, since it is a supplier-specific standard. Hence, there are limited scientific research on the subject and this study contributes to a new way of thinking from a scientific perspective. Previous research has given limited attention to this area, underscoring the value of the findings presented in this study. Furthermore, the existing literature on this topic is limited, and there is a lack of studies that combine the theoretical framework and gap analysis related to IATF 16949:2016.

In addition, the study emphasizes the importance of a Quality Management System and the potential challenges organizations may face when implementing and effectively communicating. For Volvo GTO PTP in Skövde, this study establishes a practical connection between theoretical concepts and real-world applications of project models, thereby enabling the organization to enhance its operations. Moreover, this study developed a practical gap analysis process for identifying and addressing common gaps that may exist within manufacturing organizations. Finally, the study draws attention to critical activities that require recognition and management, assisting Volvo GTO PTP in implementing necessary changes to improve its quality preparation procedures.

Application - Olle Jonson award 2023
Hanna Gertsson & Henrik Lindberg

Finally, we hope that this master thesis could broaden the view on quality and what type of quality issues that can occur inside an organization for other quality students. Furthermore, we would like to encourage students to write master's thesis on Quality Management System applications and development within organizations because it gives a broader understanding of quality applications within organizations.

Thank you for your time.

Best regards, Hanna & Henrik.