

EFFICIENCY OF AS9100 IMPLANTATION IN MAJOR MIDDLE EASTERN AEROSPACE COMPANY: CASE STUDY

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ABSTRACT

This study evaluates the implementation of AS9100 within a significant Middle Eastern aerospace company, aiming to assess its efficiency and identify areas for improvement. Utilizing a mixed-method approach, the research integrates quantitative insights with qualitative perspectives to ensure a comprehensive analysis. A Likert-scale-based questionnaire, developed through a literature review of ISO 9001 and consultations with a quality management expert, was pilot-tested for clarity and reliability before being distributed to quality engineers via Google Forms. The data were analyzed using Exploratory Factor Analysis (EFA) to identify critical factors influencing successful implementation, followed by the Analytic Hierarchy Process (AHP) to prioritize these factors. The evaluation revealed that the company's AS9100 implementation scored an average of 3.10 out of 5, highlighting moderate success. The findings indicate that the company's AS9100 implementation achieved an average score of 3.10 out of 5, reflecting moderate success. Key recommendations to improve AS9100 implementation include enhancing the control of nonconforming products and fostering a more vital understanding of the business environment.

Keywords: Quality Management System, AS9100, Aerospace Sector, Quality Assurance, Analytic Hierarchy Process.

I. INTRODUCTION

The aerospace industry, known for its high-quality requirements and performance standards, heavily relies on robust quality management systems (QMS) to ensure safety, reliability, and compliance. Among the many QMS standards, AS9100 has become the benchmark for excellence in the aerospace industry, a framework for companies to improve quality, meet regulatory requirements, and drive continuous improvement. The importance of evaluating the efficiency of AS9100 implementation stems from its potential to significantly influence operational performance, product quality, and customer satisfaction. A successful AS9100 implementation can streamline processes, reduce defects, and improve traceability, ultimately leading to cost savings and enhanced reputations for organizations. Conversely, inefficiencies or gaps in implementation can result in non-conformities, increased costs, and even loss of market opportunities.

Most of the research on AS9100 has focused on its benefits, implementation challenges, and impact on organizational performance. Studies show that while the standard provides comprehensive guidance, effective deployment requires commitment from leadership, employee engagement, and alignment with organizational strategy. Researchers have also looked into sector-specific applications of AS9100, highlighting the variability in implementation efficiency across different regions and organization sizes.

This study aims to add to the body of knowledge by investigating the efficiency of AS9100 implementation in a major Middle Eastern aerospace company. Through a case study approach, this research will identify areas for improvement. It will also provide practical insights into AS9100 and actionable recommendations for aerospace companies to optimize their QMS. This is particularly relevant as the Middle East aerospace industry is growing and expanding its presence in the global market and requires high quality and compliance. The findings of this study will be crucial for the industry's future development and success, making it an important read for all stakeholders in the Middle East aerospace sector.

II. LITERATURE REVIEW

2.1 AS9100

AS9100 is an international standard for quality management systems for the aerospace industry. It is a beefed-up version of ISO 9001, custom-built for the aerospace sector to ensure their products hit customer expectations and regulatory marks while boosting satisfaction. The standard specifies requirements for a quality management system, including areas such as the management of processes, product development, and

product realization. Organizations need to show they are always getting better, managing risks well, and putting customer satisfaction first. It has been revised four times, with the latest released in 2016 (Revision D) to align with ISO 9001:2015. [1,2]. To achieve AS9100 certification, organizations must undergo a thorough audit by an accredited certification body. This audit assesses the organization's QMS against the requirements of the AS9100 standard. Successful certification demonstrates that the organization has implemented effective quality management practices and can consistently deliver high-quality products and services.

2.2 Evaluation of ISO 9001:2015 implementation Using the Analytic Hierarchy (AHP)

Implementing ISO 9001:2015, a widely recognized quality management standard known for significantly enhancing organizational performance and ensuring sustainable product and service quality, has received considerable attention in research. The overwhelming majority of literature emphasizes the necessity of systematically evaluating the implementation process to identify the main drivers of positive outcomes. While the importance of such evaluation for compliance is significant, the process approach to quality management also emphasizes continuous improvement, requiring implementers to understand the best ways to allocate resources effectively. One of the leading methodologies for evaluating the implementation of ISO 9001:2015 is the Analytic Hierarchy Process (AHP). AHP is a multi-criteria decision-making tool that systematically compares factors and sets priorities for their success. Several studies have used AHP rankings to evaluate ISO 9001:2015 implementation, providing multiple insights. For example, AHP has been found to identify the critical drivers of ISO 9001:2015 implementation. In most studies, these drivers include leadership commitment, employee involvement, process management, and continuous improvement. By setting these drivers in rank order, organizations gain valuable insights into areas requiring more effort to maintain quality. [3]

III. METHODOLOGY

This research aims to evaluate the implementation of AS9100. To achieve this, a mixed-method approach was selected to capture the quantitative insights and qualitative perspectives, making it appropriate for the study scope. A questionnaire was developed based on the review of ISO 9001 literature, with insights refined through consultations with a quality management expert to ensure its relevance to AS9100 standards. A Likert-scaled-based questionnaire measuring perceptions about different aspects of AS9100 implementation was pilot-tested with a sample of quality engineers for its reliability and clarity; this allowed for making necessary adjustments before full distribution. The questionnaire was distributed via Google Forms to quality engineers in organizations certified to AS9100 since the holders of such specialized positions are critical to applying AS9100. Data from the completed questionnaires was then analyzed using EFA to define the underlying factors contributing to implementation success. Following EFA, AHP prioritized those factors, providing a structured view of the most critical elements necessary to implement AS9100 successfully (modified assessment model). Ethical considerations regarding confidentiality and informed consent were followed throughout the study to guard the participants' integrity and privacy. This comprehensive and rigorous research process ensures the credibility and reliability of the study's findings.

IV. RESULTS AND DISCUSSION

The researcher evaluates the implementation of AS9100 in a significant Middle Eastern aerospace company by employing a modified assessment model—the company specializes in manufacturing aerospace components and systems. The table below shows the details of the assessment result for each factor and the overall result.

Table 1: Assessment Result for the company

No	Critical Factor	Result (out of 5)
1	Customer Loyalty and Relationship Management	4.39
2	Evidence-Based Improvement and Innovation	3.83
3	Standards Compliance and Assurance Excellence	3.09
4	Executive Leadership	3.26
5	AS9100 Conformity	2.1
6	Employee Satisfaction and Operational Efficiency	1.3

7	Knowledge Management	3.71
8	AS9100 Funding and Evaluation	2
9	Business Environment Awareness	1.75
10	Overall result	3.1054

It is recommended that the company strengthen its control over nonconforming products as part of its AS9100 implementation. This may be achieved through the formulation of solid procedures for the identification, documentation, and management of nonconforming products to prevent their unintended use or delivery. Executing practical corrective and preventive actions helps the organization decrease the rate of non-conformities and associated risks while maintaining the highest quality standards of its products. The stringent control of nonconforming products will also meet the requirements of AS9100 and enhance customer confidence in the commitment to the organization's quality. Also, the company must learn more about its business environment and the influences that impact its AS9100 implementation. It means looking at internal factors of the organization, such as its strengths, resources, and challenges, as well as external factors like market conditions, customer needs, rules to follow, and changes in technology. The organization can make appropriate changes to the quality management system by fully grasping these significant factors and effectively dealing with specific risks and opportunities. This would enhance the ability of the organization to meet the requirements of AS9100 and long-term quality goals. A thoughtful approach toward understanding the business environment helps improve decision-making and ongoing improvement efforts.

V. CONCLUSION

The results of the study indicated that AS9100 was implemented moderately in the major aerospace company in the Middle East with an average score of 3.10 out of 5. In the study, EFA and AHP were performed with rigors, and AS9100 Conformity, Knowledge Management, and Executive Leadership were identified as the critical factors for successful implementation. This will allow the company to fully exploit the accruable benefits from AS9100 through improved implementation practices of the standard. How it has gone about implementing AS 9100 has been lowly thought of to enable only a slight scope to realize total value from the standard. Such an organization should sensitize its employees to quality principles and the AS9100 requirements. Moreover, top management also plays a significant role in adequately implementing AS9100. Top management commitment and support are crucial for quality culture development and ensuring that the principles of AS9100 have been inculcated down the line. If top management is involved in quality affairs, provides adequate resources, and communicates the importance of AS9100, then employees will have the power to conform to quality objectives and give more significant strength toward following AS9100 standards. Finally, leadership involvement in quality is instrumental in fostering a more mature quality mindset within the organization, likely to achieve sustained improvements in quality, compliance, and customer satisfaction.

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