

# **Evaluating 5S Implementation Across Industrial Environments with Different Automation Levels - A Comparative Case Study**

**Emtenan Al Munassir, Danya Hadi Ali Mutared, Mona Alghasib, Rana Falah Al Shahrani,  
Reema Khalid Alshahrani and Shaima Alharmali**

Department of Industrial Engineering  
College of Engineering, King Khalid University, Abha, Saudi Arabia  
[444806783@kku.edu.sa](mailto:444806783@kku.edu.sa), [444806289@kku.edu.sa](mailto:444806289@kku.edu.sa), [442809615@kku.edu.sa](mailto:442809615@kku.edu.sa),  
[444809185@kku.edu.sa](mailto:444809185@kku.edu.sa), [444807813@kku.edu.sa](mailto:444807813@kku.edu.sa), [444807807@kku.edu.sa](mailto:444807807@kku.edu.sa)

**Saleh Yehya Alghamdi**

Associate professor  
Department of Industrial Engineering  
College of Engineering, King Khalid University, Abha, Saudi Arabia  
[Syalghamdi@kku.edu.sa](mailto:Syalghamdi@kku.edu.sa)

**Boshra Taha**

Assistant Professor  
Department of Industrial Engineering  
College of Engineering, King Khalid University, Abha, Saudi Arabia  
[btaha@kku.edu.sa](mailto:btaha@kku.edu.sa)

## **Abstract**

This study presents a comparative evaluation of 5S implementation across industrial environments with different levels of automation, focusing on how automation influences the effectiveness of individual 5S elements. A multi-factory case study was conducted in a semi-automated cement factory and a highly automated beverage factory with approximately 80% automation. The evaluation was based on on-site field visits, detailed workplace and workflow observations, and structured interviews with technical and administrative staff, supported by the review of SAP systems and visual management tools. The analysis reveals that automation significantly strengthens Sort, Set in Order, and Standardize by enhancing process visibility, accuracy, and consistency, while Shine and Sustain remain largely dependent on human involvement, training practices, and management supervision to ensure long-term sustainability of 5S implementation.

## **Keywords**

Evaluating, Implementation, Across Industrial Environments, Automation, Case Study