

# Digital Workforce Training Framework for Manufacturing Process Assurance Systems in Automotive Smart Manufacturing

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**Abstract:** *The increasing trend of implementing Industry 4.0-based technologies has led to a major change in the manufacturing environment through the integration of information technology and operational technology. Manufacturing Process Assurance Systems play a vital role in enabling real-time monitoring, traceability, error-proof assembly, and production quality control. However, the complexity of these systems poses major challenges in workforce development and competency creation. This research aims to develop a digital workforce training framework for Manufacturing Process Assurance Systems using interactive e-learning methodologies and simulation-based learning environments. This framework is designed to facilitate the development of engineer proficiency using software-based operational simulations in a smart manufacturing environment. A systematic instructional development methodology using the ADDIE model and agile learning design principles is used to develop and evaluate the training architecture. This research aims to develop a training framework that demonstrates the potential of digital learning environments to support workforce development and competency creation in advanced automotive manufacturing systems*

**Keywords:** Digital workforce training; Smart manufacturing; Manufacturing process assurance; Industry 4.0; E-learning systems; Workforce onboarding

