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Developing Industry 4.0 Management Skills for Digital Transformation

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Abstract

Industry 4.0 (I4.0) represents the new era of economy, characterized by the extensive networking and digital integration of suppliers, products, customers, and other components across all supply chain stages. The success of this digital transformation strongly depends on a workforce and leaders equipped with the knowledge and capabilities to learn, develop, and enhance their qualifications continuously. Academic programs, especially engineering and technology schools, have already begun adapting their programs and courses to include the I4.0 concepts and technologies. However, it's essential to recognize that I4.0 goes beyond technology; it is a data-driven economy facilitated by interconnected systems and organizations powered by big data, machine learning and artificial intelligence. This necessitates students equipped with strong systems management skills and competencies, in addition to proficiency in I4.0 tools and digital technologies.

Therefore, this paper aims to introduce a project-based approach to develop the critical skills, competencies, and knowledge required to lead digital transformation within organizations. The project involves a series of academic activities, such as coursework and research, complemented by industry projects, internships, and lab practices. Based on the well-established digital transformation models and I4.0 reference architectures, particular focus was placed on the following topics: Digital strategies and leadership, organization and workforce development, innovation, project and change management, and concepts of smart factories, processes, products, and services. The outcomes of the project, implemented internationally at the graduate school level, have provided valuable insights and implications regarding emerging skills, as well as the roles of academic and industrial organizations toward digital transformation.

Keywords: industry 4.0, digital transformation, skill development, project-based approach