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Engineers' Ability to Lead Effectively the Transformation to Sustainable Manufacturing: A Case Study of Saudi Arabia

Authors : Mohammed Alharbi, Clare Wood, Vasileios Samaras

Abstract : Sustainability leadership is a controversial topic, particularly in the engineering context. The theoretical and practical technical focus of the engineering profession impacts our lives. Technologically, engineers significantly contribute to our modern civilization. Industrial revolutions are among the top engineering accomplishments that have contributed to the flourishing of our life. However, engineers have not always received the credit they deserve; instead, they have been blamed for the advent of various global issues, among them the global warming phenomena that are believed to be a result of the industrial revolutions. Global challenges demand engineers demonstrate more than their technical skills for effective contribution to a sustainable future. As a result, engineering leadership has emerged as a new research field. Sustainable manufacturing is a cornerstone for sustainable development. Investigating the change to more sustainable manufacturing practices is a significant issue for all, and even more in the field of engineering leadership. Engineers dominate the manufacturing industry; however, one of the main criticism of engineers is the lack of leadership skills. The literature on engineering leadership has not highlighted enough the engineers' leadership ability in leading sustainable manufacturing. Since we are at the cusp of a new industrial revolution -Industry 4.0, it is vital to investigate the ability of engineers to lead the industry towards a sustainable future. The primary purpose of this paper is to evaluate engineers' sustainability leadership competencies utilizing The Cambridge University Behavioral Competency Model. However, the practical application of the Cambridge model is limited due to the absence of a reliable measurement tool. Therefore, this study developed a valid and reliable survey instrument tool compatible with the Cambridge model as a secondary objective. More than 300 Saudi engineers from the manufacturing industry responded to an online questionnaire collected through the Qualtrics platform and analyzed using SPSS software. The findings provide a contemporary understanding of engineers' mindset related to sustainability leadership. The output of this research study could be valuable in designing effective engineering leadership programs in academia or industry, particularly for enhancing a sustainable manufacturing environment.

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