

ABSTRACT

Industry 4.0 is portrayed to be a new paradigm of smart and autonomous manufacturing. It more profoundly integrates manufacturing operations systems with communication, information and intelligence technologies. Circular economy practices are very important for implementation of green practices in production to achieve significant improvement in performance of the manufacturing organizations in Industry 4.0 era. The aim of this study is to find the structural relationship between the Industry 4.0 technologies, Circular economy practices and performances of the manufacturing organizations using structural equation modelling. Additive manufacturing (AM), Big data analysis (BDA) and Internet of Things (IoT) were considered as determinants of Industry 4.0 technologies. Green practices, 10R Practices and Sustainability culture were considered as the constructs of the Circular economy practices. Environmental, Economic, Social and Organizational performances in manufacturing industries were taken into consideration as output construct. This study analyzes how significant the Industry 4.0 technologies like AM, BDA and IoT along the Circular economy practices such as green practices, 10R practices and sustainability culture influences the environmental, economic, social and organizational performance of the manufacturing organizations. A theoretical framework with 24 hypothesis statements were developed using the literature study. The survey questionnaire had been circulated among 150 manufacturing industries. It reached 115 potential respondents and around 65 valid responses had been received. A measurement model and structural model had been developed and analyzed using Smart-PLS. The study reveals AM, IoT, Green practices, 10R practices and sustainability culture had significant results with environment, economic, social and organizational performance. Moreover big data analytics influenced positively on environment, economic and organizational performance and has insignificant relationship with social performance. The practical and managerial implication are highlighted. In the digital era, the industrial practioners and policy makers may utilize

the finding from the study to establish structural relationship between Industry 4.0 technology and circular economy practices in their institution. Moreover conclusion, limitation and future research direction are presented.

Keywords: Industry 4.0 technologies, Circular Economy practices, Structural Equation Modeling.