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Hybrid fuzzy multi-attribute decision making model for evaluation of advanced digital technologies in manufacturing: Industry 4.0 perspective

Medić, N.[a,*], **Anišić, Z.**[a], **Lalić, B.**[a], **Marjanović, U.**[a], **Brezocnik, M.**[b]

[a]University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia
[b]University of Maribor, Faculty of Mechanical Engineering, Maribor, Slovenia

ABSTRACT

Manufacturing is currently at a turning point from mass production to customized production. The implementation of the Industry 4.0 concept, leading to automation and digitalization of manufacturing processes, is therefore considered vital for companies that aim to follow emerging trends in production. Research in this field is primarily focused on companies from developed countries, while companies from transition countries have difficulties to adapt to new business environment. The aim of this paper is to evaluate the use of advanced digital technologies in manufacturing companies from transition countries (i.e. Serbia) in the context of Industry 4.0. To address this problem, an evaluation method based on Fuzzy Analytic Hierarchy Process (FAHP) and Preference Ranking Organization Method for Enrichment Evaluations (PROMETHEE) is proposed. FAHP was used to determine criteria weights as an input for PROMETHEE method which was then used to evaluate advanced digital technologies. For this purpose, the dataset from the European Manufacturing Survey gathered in 2018 from Serbian manufacturing companies is used. The results of this empirical research revealed that production planning and scheduling, digital exchange of data with suppliers/customers, and production control systems play vital role for manufacturers in the context of industry 4.0. These results could serve to manufacturers for their strategic orientation and decision making.

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**Corresponding author:*
medic.nenad@uns.ac.rs
(Medić, N.)

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