ENVIRONMENTAL AND ENERGY ECONOMICS: CLIMATE CHANGE MITIGATION AND ADAPTATION, GREEN TRANSITION AND CIRCULAR ECONOMY

BOOK OF ABSTRACTS

Editors
Petar Mitić
Slavica Stevanović
Jovana Kojić
Aida Hanić

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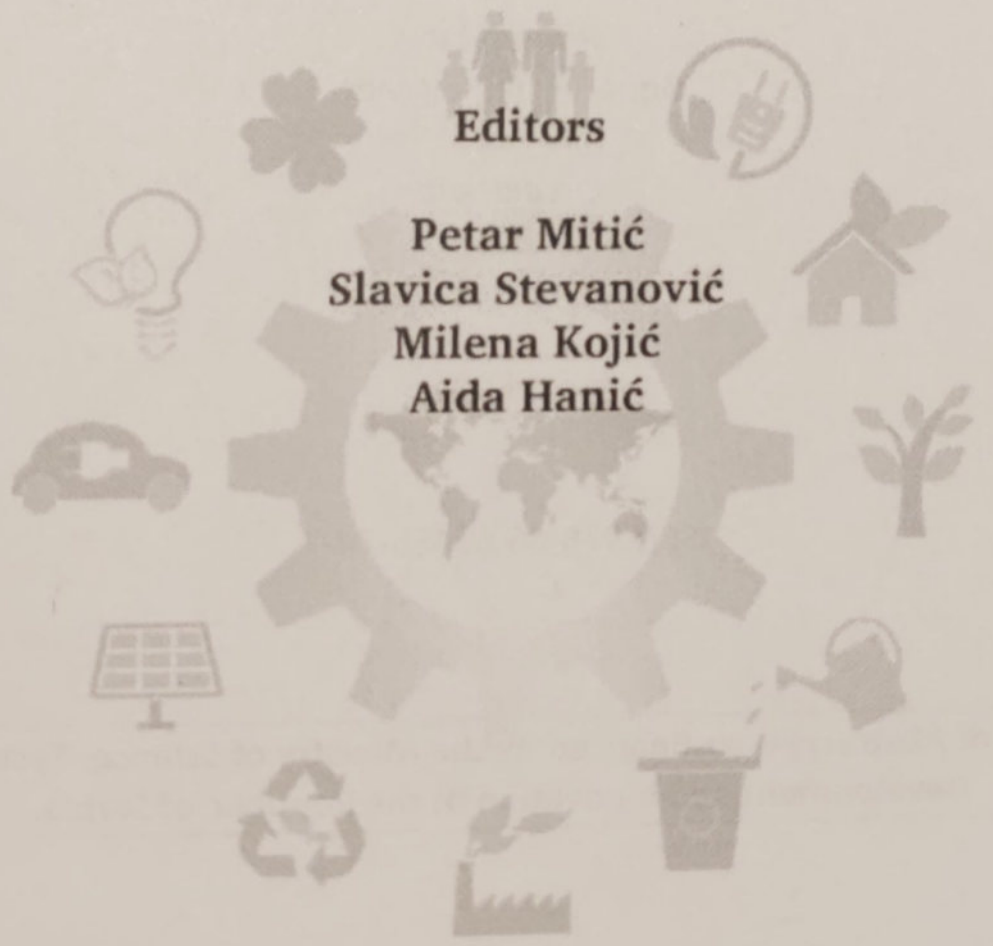

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CONTENT

THE MCDM-BASED ASSESSMENT OF SOLUTIONS FOR TRANSITION TO SUSTAINABLE INDUSTRY 4.0

Gabrijela Popović[1]
Faculty of Applied Management, Economics and Finance, Belgrade, Serbia
Aleksandra Fedajev[2]
University of Belgrade, Technical Faculty in Bor, Bor, Serbia
Dragiša Stanujkić[3]
University of Belgrade, Technical Faculty in Bor, Bor, Serbia

INTRODUCTION

Industry 4.0 implies the transformation of organizations into digital entities (Sony & Naik, 2020). It represents a new level of industrial development that has changed demands, competition, industry structure, and sustainability awareness (Dalenogare et al., 2018). The primary objective of this paper is to use Multiple-Criteria Decision Making (MCDM) to identify the principal obstacles and solutions for successfully adopting the technologies that will facilitate a transition of the Serbian industry to sustainable Industry 4.0.

LITERATURE REVIEW / THEORETICAL BACKGROUND

Until now, the authors have used the MCDM approach to analyze different issues regarding Industry 4.0. The topics that gained the researcher's attention are as follows: comparing the Industry 4.0 maturity models (Elibal & Özceylan, 2022), supply chain improvement (Hsu et al., 2022), strategy prioritization (Kumar et al., 2021; Erdogan et al., 2018), technology assessment (Javaid et al., 2022; Chang et al., 2021), cybersecurity evaluation (Torbacki, 2021), and sustainability (Eldrandaly et al., 2022).

[1] E-mail address: gabrijela.popovic@mef.edu.rs
[2] E-mail address: afedajev@tfbor.bg.ac.rs
[3] E-mail address: dstanujkic@tfbor.bg.ac.rs

METHODOLOGY

The barriers and solutions submitted to the evaluation are borrowed from Javaid et al. (2022). The barriers' significance was defined using the Preference Selection Index – PSI (Maniya & Bhatt, 2010). The assessment of the solutions is performed by three decision-makers and the following MCDM methods: PSI, Compromise Ranking of Alternatives from Distance to Ideal Solution – CRADIS (Puška et al., 2022), and Integrated Simple Weighted Sum Product Method—WISP (Stanujkic et al., 2021).

RESULTS

The results revealed that logistics and reverse logistics management, and technology integration are the most significant barriers. The significance of logistics and warehousing management lies in its role as a crucial facilitator for the sustainable development of industries, ensuring efficient and responsible movement, storage, and distribution of goods. Also, the application and development of new technologies can improve efficiency and reduce environmental impact of Serbian industry.

DISCUSSION / POLICY IMPLICATIONS

The used framework, based on the MCDM methods, enabled the assessment of the barriers and solutions for technology adoption in light of the current business conditions in the Republic of Serbia. The managers and policymakers could easily perceive the main obstacles and optimal actions to fulfill the requirements of Industry 4.0 and to promote sustainable operating. The propositions for future research are directed at introducing the fuzzy MCDM models to better express the decision-maker's opinions.

CONCLUSION

The identification of main barriers and solutions for adopting technologies by application of MCDM-based framework are crucial for the transition to sustainable Industry 4.0. The paper proposed significant methodological framework for barriers and solution identification based on combined application of the PSI, CRADIS, and WISP methods. Its application on the data of three competent decision-makers presented its usability in the decision-making process.

KEYWORDS

Sustainable Industry 4.0, PSI, WISP, CRADIS, Technologies

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