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EVALUATION OF IMPLEMENTATION STRATEGIES IN THE CONTEXT OF ZERO-WASTE CITY AND CIRCULAR ECONOMY CONCEPT

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Abstract

In recent years, there is a growing interest for waste systems in many countries around the world due to inevitable consequences of major environmental concerns. Urbanization, consumption styles, rapid developments of technologies have increased the consumption inevitably brings about the waste generation, which significantly poses risks to the environment. Although most papers have focused on waste management problems, there is a great gap of evaluation of implementation strategies for the zero-waste city and circular economy concepts. The goal "zero-waste" is strategically achieved with enriched engineering methods including all stakeholders to overcome the challenging waste issues. In this context, this study presents a systematic approach of implementing the policies and strategies focused on the most essential dimensions analysis associated with zero-waste and circular economy based on the PESTEL (political, economic, social, technological, environmental, and legal). In the study, Best-Worst Method (BWM) is first provided to evaluate a range of zero-waste implementation strategies which are essential for planners and policymakers. In addition, computational results are compared with the Stepwise Weight Assessment Ratio Analysis (SWARA), and the Fuzzy Analytical Hierarchy Process (F-AHP) methods to validate the results, and the results of the methods were found to be consistent. Environmental, economical and technological dimensions were obtained as the most influential strategies. According to the results of BWM and Fuzzy AHP methods, the four most important sub-strategies are S16 (Implementing a closed loop chain), S13 (Promoting sustainability), S5 (Investing in waste management infrastructure) and S12 (Green energy technologies). It is seen that these strategies are mostly environmental. According to the SWARA method, the most important sub-strategies under the economic dimension are S5, S4 (Providing economic incentives), and S6 (Development of green finance initiatives). The findings should also encourage the practitioners and researchers, as the detailed evaluation of strategies in terms of the zero-waste and circular economy provides a database to transform current cities into zero waste cities.

Key words: BWM, circular economy, F-AHP, SWARA, waste management, zero-waste city

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