

Chapter 5

Scientific Production in Waste Management and Ecological Sustainability From a Bibliometric Approach

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ABSTRACT

This study employs a bibliometric approach to examine the scientific production trends in waste management and ecological sustainability, encompassing publications from 1995 to 2024. The research employs the VOSviewer software to analyse 778 academic articles indexed in the Web of Science database. By identifying key journals, influential authors, major keywords and citation networks, the study elucidates the academic evolution and emerging directions in waste management research. The findings indicate a significant increase in publication activity post-2014, which reflects the growing importance of sustainability issues. The key themes identified include waste management, environmental sustainability, life cycle assessment, and the circular economy. The study underscores the need for interdisciplinary approaches and enhanced global collaboration in advancing sustainable waste

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management practices. Through its comprehensive analysis, this research provides valuable insights for academia and policymakers to address environmental challenges effectively.

1. INTRODUCTION

The construction industry presents significant challenges to environmental sustainability due to the consumption of natural resources and the generation of waste from construction and demolition processes (Ismaeel & Kassim, 2023; Shen et al., 2004). Construction and demolition waste accounts for more than 30% of global solid waste and, although recyclable, can have negative impacts on the environment and human health due to its toxic content (Ginga et al., 2020; Wu et al., 2019). This highlights the need to reduce waste generation and develop sustainable management practices (Ding et al., 2021).

Developed countries have made significant progress in the implementation of construction and demolition waste management, but have faced challenges such as gaps in waste management strategies, high costs and cultural barriers (Ajayi et al., 2015; Aslam et al., 2020). On the other hand, there is a growing body of research on waste management in developing countries, focusing on local problems such as inadequate supervision, low worker skills and lack of on-site storage (Abarca-Guerrero et al., 2017; Hasan et al., 2022; Nawaz et al., 2023)

Technological developments with the Industrial Revolution, rural-urban migration, population growth and unplanned urbanization processes have led to problems such as infrastructure deficiencies and the decrease in green areas in cities. Activities such as housing and road construction have led to the destruction of green areas and increased concretization, triggering global problems such as ecosystem degradation, global warming, ozone depletion and environmental pollution. Since natural resources are limited and the rate of consumption is increasing, the search for solutions to ensure the sustainability of these resources has been on the agenda worldwide.

In this context, environmentally compatible sustainability policies have gained importance in the nature-human-society relationship. In new urbanization concepts, approaches such as reducing waste consumption, using renewable energy sources and promoting non-motorized transportation systems play a critical role to support the sustainable development of cities (Kurt Konakoğlu & Keskiner, 2021).

The concept of sustainability aims to prevent environmental problems that arise due to economic and technological developments and to protect ecosystems. The concept is based on the ability to maintain a certain balance and continuity. Although there are different definitions in the literature, sustainability is generally defined

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