

Solar Energy and Sustainability: Bibliometric Insight

Kristijan Breznik

International School for Social and Business Studies, Slovenia

kristijan.breznik@mfdps.si

Janne Harkonen

Industrial Engineering and Management, University of Oulu, Finland

International School for Social and Business Studies, Slovenia

Janne.harkonen@oulu.fi

Kalle Nuortimo

Department of Marketing, Turku School of Economics, University of Turku, Finland

International School for Social and Business Studies, Slovenia

Oulu University of Applied Sciences, Finland

kalle.p.nuortimo@utu.fi

Abstract

Solar energy and sustainability are discussed in the literature as they offer solutions to pressing global challenges such as climate change, resource depletion, environmental degradation, energy poverty, and social inequality. This study carries out a rigorous bibliometric analysis, revealing a discernible upward trajectory in the scientific community's focus on this critical topic. A comprehensive collection of 4748 documents pertaining to solar energy and sustainability was collected from the Web of Science. The analysis identified landmark documents and journals with a pronounced inclination toward solar energy and sustainability, underlining the field's academic significance. Notably, the United States and China emerged as frontrunners in both productivity and citation impact within this research domain, with India closely following suit. Surprisingly, within Europe, Italy is recognized as the leading country in terms of productivity, with the United Kingdom, Germany, and Spain closely trailing. This geographic distribution underscores the global interest and collaborative potential in advancing solar energy research. A testament to the topic's resonance within the scientific and broader societal contexts, five pivotal documents have amassed over a thousand citations each, highlighting the community's vested interest in solar energy

sustainability. The frequent occurrence of keywords such as "performance," "energy," and "system" in the analyzed documents points to a focused discourse on the operational and systemic aspects of solar energy. Moreover, the integration of network analytic techniques has shed light on the intricate relationships between keywords, unveiling significant clusters that epitomize the core thematic focuses of the field. This analytical dimension has not only enriched our understanding of the topic's landscape but has also pinpointed emerging trends and gaps within the literature. The intersection of AI with solar energy research promises to revolutionize sustainability practices, offering novel insights and methodologies that could significantly enhance energy efficiency, reduce costs, and facilitate the seamless integration of renewable energy sources into the economy and everyday life. Thus, our bibliometric journey not only charts the current state of solar energy research but also beckons the dawn of an AI-enhanced era in sustainable human-technological-economic development.

Keywords: solar energy, renewable energy, sustainability, bibliometry, network analysis.