

Artificial Intelligence as a Catalyst for Sustainable Development: A Quantitative Assessment in the European Union

Roman Batko

AGH University of Krakow, Department of Enterprise Management, Poland
rbatko@agh.edu.pl

Dagmara Lewicka

AGH University of Krakow, Department of Enterprise Management, Poland
lewicka@agh.edu.pl

Paweł Zajac

AGH University of Krakow, Department of Enterprise Management, Poland
pzajac@agh.edu.pl

Abstract

Artificial Intelligence (AI) is increasingly recognized as a driving force for achieving Sustainable Development Goals (SDGs) and ESG commitments in the European Union. This study examines how AI adoption correlates with progress in selected sustainability indicators across EU member states. Using Eurostat's SDG database, the Government AI Readiness Index, and the Digital Economy and Society Index, we perform correlation and regression analyses to identify key trends linking AI readiness to improvements in areas such as clean energy (SDG7), decent work (SDG8), industry and innovation (SDG9), sustainable cities (SDG11), and climate action (SDG13). Our preliminary findings suggest that higher levels of AI adoption are associated with faster gains in productivity, lower emissions intensity, and enhanced resource efficiency. However, challenges persist, including uneven digital infrastructure and ethical concerns regarding data use. By clarifying the relationship between AI advancements and sustainability outcomes, this research offers evidence-based insights for policymakers and stakeholders seeking to align emerging technologies with the 2030 Agenda. The analysis highlights the importance of supportive regulatory frameworks, targeted investments in research and development, and inclusive digital training programs to ensure equitable benefits. Ultimately, the study contributes to the ongoing debate on whether AI can serve as a practical catalyst for balanced and responsible growth in diverse socio-economic contexts throughout the EU. The results are expected to inform strategic decisions on harnessing AI for sustainable impact..

Keywords: AI, Sustainable Development, SDGs, ESG, European Union