Chapter 7
The Green Finance: AI's Contribution to Environmental Sustainability

Chedlia Farhat
https://orcid.org/0009-0002-2451-3858
Faculty of Economic Sciences and Management of Tunis, Tunisia

Mouna Mouelhi
Faculty of Economic Sciences and Management of Tunis, Tunisia

ABSTRACT

This study examines the interplay between artificial intelligence, sustainable finance, and environmental sustainability in four OECD countries from 2007 to 2023. Using the panel ARDL method, our analysis shows that AI reduces carbon emissions, particularly in the long run. Initially, AI investments lead to a temporary rise in emissions due to implementation costs, but this trend reverses over time, aiding carbon neutrality and supporting SDGs, especially SDG 7 and SDG 13. The findings stress the need for short-term fiscal incentives and long-term regulatory frameworks integrating AI into sustainable finance. This research enriches the literature by addressing AI's overlooked role in sustainability and providing policy insights. Future studies could expand the geographic scope and examine AI's specific contributions to sustainable finance.

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INTRODUCTION

Artificial Intelligence (AI) is emerging as a driving force in advancing urban sustainable development. By simulating human behavior and cognitive processes, AI can provide decision-making recommendations based on specific human instructions and prompts (Babina et al., 2023). In addition, AI has the potential to enhance production technology, optimize layouts of industrial structures, and improve energy efficiency; ultimately, this leads to urban sustainable development.

Finance and technology are increasingly recognized as key components in the global effort to reduce greenhouse gas emissions by 40% by 2030. The escalating impacts of climate change pose a serious threat to global security. Rising sea levels and extreme weather conditions are alarming consequences of environmental degradation. This underscores the urgent need to take robust measures to protect the environment. Environmental protection includes all activities and actions that aim at preventing, reducing, and eliminating environmental degradation.

In addressing these environmental challenges, AI offers numerous opportunities. It plays a key role in transforming financial systems to promote environmental sustainability. In this vein, the concept of green finance has been hailed as an indispensable tool in the fight against global warming. Financial institutions, alongside international organizations and data providers, have a responsibility to align the financial sector with ambitious and timely climate objectives. The shift towards green and environmentally-friendly finance represents a proactive response by the financial markets to the climate crisis.

Previous research on green finance has focused on aspects such as the pricing of green bonds (Hachenberg & Schiereck, 2018), the practical aspect for the issuer (Gianfrate & Peri, 2019), the importance of the green bond premium and the market reaction to the issuance of green bonds (Tang & Zhang, 2020; Flammer, 2021). However, relatively few studies have investigated the role of green bonds in reducing the carbon footprint of non-financial companies (Fatica & Panzica, 2021; Flammer, 2021).

In the broader context of the zealous fight against global warming, the financial sector's role is crucial. In this regard, Article 21c of the Paris

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