Chapter 11
RETRACTED
The Intersection of Virtual Currencies and Green Finance:
A Sustainable Development Perspective

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ABSTRACT

Examining the interplay between virtual currencies and green finance in promoting sustainable development is more crucial as the global economy confronts digital revolution and climate change. This study fulfills that need by offering a comprehensive bibliometric analysis of published works on virtual currency and green finance from 2020 to 2025. The study examines publication trends, prominent authors, and thematic patterns through performance analysis and scientific mapping techniques

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utilizing VOSviewer and Excel. The results indicate a rapid increase in scholarly output, significantly driven by substantial contributions from China, India, and the United Kingdom. Thematic evolution reveals emerging trends in distributed finance (DeFi), sustainability, and blockchain-based green innovation. The study presents policy recommendations for integrating blockchain-based virtual currencies into environmental finance systems and explores the theoretical implications of linking virtual financial technologies with green economic models.

1. INTRODUCTION

The fast digital change of the worldwide financial ecosystem has sparked growing scholarly interest in the junction of digital innovation and environmental sustainability. Among these innovations, the function of cryptocurrencies inside the more general framework of green finance and carbon emission reduction has been a major focus of research. Integrating digital financial technologies with sustainable environmental practices presents both a possibility and a difficulty as countries try to reach climate targets and follow low-carbon development paths. More recently, research on this intricate interface has started. Krishnamurthy (2023) and Zhang et al. (2025) present a blockchain-based incentive system using cryptocurrencies that honors carbon-reducing behavior, therefore presenting a novel yet contentious tool for sustainable finance. Although their approach shows how digital tokens could be used to support environmentally friendly behavior, it also emphasizes ongoing issues such regulatory uncertainty and bitcoin volatility that would prevent general use. By using more traditional financial instruments and carbon offset systems, Aliet al. (2024) and Evite (2023) concentrate on green finance techniques, therefore providing less interaction with digital assets or blockchain-based innovations.

A increasing section of the research has looked at the effects of bitcoin activities on the surroundings. Koemtzopoulos et al. (2025) point to a paradigm change from fintech to greentech and imply that, with suitable design, blockchain technologies can help with energy transition and carbon neutrality. Driven mostly by energy-intensive proof-of- work (PoW) mining techniques, investigations by Alabi and Ibañez et al. (2024) and Khosravi et al. (2023) show striking evidence of the high carbon footprint connected with cryptocurrencies as Bitcoin and Ethereum. These results support mounting requests for technological changes and legislative frameworks including carbon taxes, energy-efficient consensus procedures, and the movement of mining activities to areas run on renewable energy sources. Although some contributions, like those by Zhao et al. (2024) and Chamnara et al. (2023), highlight the efficacy of green finance in lowering industrial emissions under China's dual carbon objectives, they mostly ignore the consequences of digital currencies in this regard. On