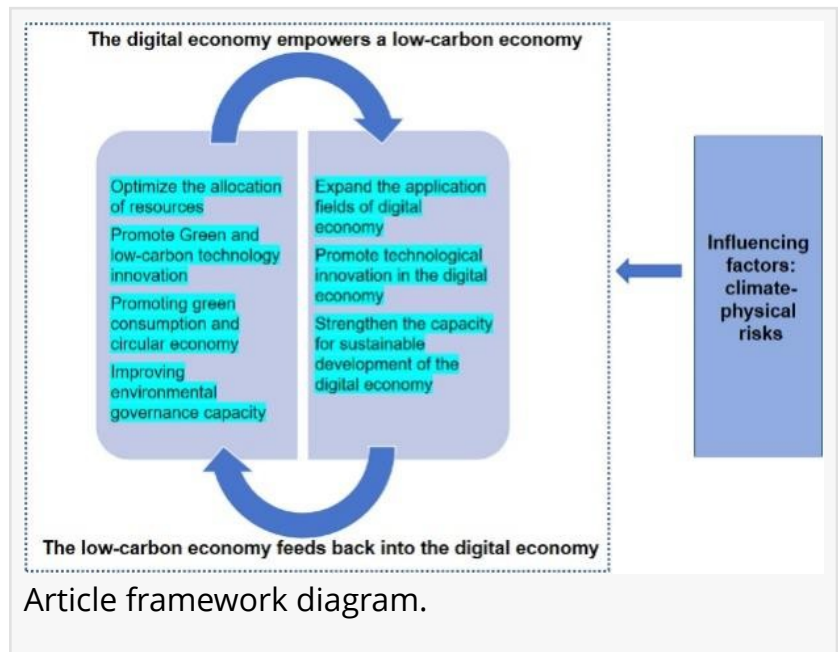


Climate risks: a double-edged sword for digital and low-carbon economies

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/EINPresswire.com/ -- A recent study explores the intricate relationship between [climate physical risks](#) and the merging of digital and low-carbon economies in China. By examining the disruptive effects of extreme weather events such as severe cold spells and droughts, the research reveals how these climate challenges obstruct the seamless development of both sectors. Utilizing cutting-edge models, the study identifies regional disparities and outlines the mechanisms through which climate risks hinder technological innovation and economic integration, calling for urgent adaptive strategies to ensure sustainable economic growth.



Digital and low-carbon economies are central to the global shift toward sustainable development. The digital economy leverages information technology to boost productivity and create new business models, while the low-carbon economy focuses on minimizing greenhouse gas emissions and enhancing energy efficiency. However, these economies face increasing threats from climate-related physical risks, such as extreme weather events and natural disasters. These disruptions can damage infrastructure, derail supply chains, and destabilize energy systems, posing serious challenges to the seamless integration of digital and low-carbon sectors. Given these mounting threats, there is an urgent need for deeper research into how climate risks are affecting the development of these intertwined economic paradigms.

Published (DOI: 10.1016/j.dsm.2025.01.004) on January 23, 2025, in Data Science and Management, the study was conducted by researchers at Lanzhou University of Finance and Economics. They employed a coupling coordination degree model and Tobit regression analysis to explore the dynamics between China's digital and low-carbon economies in the face of climate physical risks. The study sheds light on the regional differences in economic development and uncovers the mechanisms through which climate risks affect the integration of these key

sectors.

The study reveals that while the integration of China's digital and low-carbon economies has generally been on the rise, the overall development remains relatively underwhelming, with marked regional disparities. The eastern region leads in coordinated development, while the western region lags behind. Extreme weather conditions—particularly severe cold spells, heavy rainfall, and droughts—were found to significantly hinder the progress of both economies. Risks that the study concludes, primarily disrupt green technological innovation, which is critical for the synchronization of digital and low-carbon sectors. The research also highlights a distinct regional pattern in how climate risks are distributed: areas with more advanced development tend to positively influence neighboring regions, creating a “high-high, low-low” correlation. This underscores the critical role of regional development in the broader integration of these economies, suggesting that while digital innovation can aid the low-carbon transition, climate risks create significant barriers to this synergy.

"Climate physical risks are not just environmental concerns; they are economic barriers that can derail the progress of both digital and low-carbon economies," explained Dr. Bo Yang, the lead author of the study. "Our research underscores the importance of developing adaptive strategies to mitigate these risks and ensure the sustainable integration of these critical economic sectors." Dr. Yang's insights highlight the broader implications of the study's findings, emphasizing the urgent need for targeted solutions to overcome these economic obstacles.

The study's conclusions carry profound implications for policymakers and industry leaders. To mitigate the detrimental effects of climate physical risks, the research advocates for strengthening infrastructure resilience, promoting green technological innovation, and tailoring development plans to specific regional climate challenges. Additionally, fostering greater inter-regional collaboration and optimizing industrial structures can help accelerate the integration of digital and low-carbon economies. Raising public awareness and engaging communities in climate risk management are also crucial for building a more sustainable and resilient economic future. The study provides a comprehensive framework for addressing the complex relationship between climate risks and economic development, offering valuable insights for achieving global sustainability goals.

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