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-RESEARCH ARTICLE-

RESEARCH ON GREEN FINANCE ON INDUSTRIAL TRANSFORMATION AND HIGH-QUALITY ECONOMIC GROWTH: EVIDENCE FROM THE NEW ENERGY INDUSTRY IN SOUTHWEST CHINA

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─Abstract─

Green finance drives high-quality industrial change and economic prosperity, especially in renewable energy. This study primarily investigates the impact of green finance adoption (GFA) on industrial transformation, alongside the effect of green finance investment (GFI) on economic growth in the new energy sector across Southwest China (specifically Guizhou and Yunnan). Employing a quantitative methodology, data were gathered from 250 industry professionals through a structured questionnaire. Green finance positively correlated with industrial transformation and economic growth, according to regression study. The findings underscore the role of green financial instruments —in fostering innovation, sustainability, and investment within the hydropower, wind, and solar energy industries. This research offers valuable policy implications for financial institutions, governments, and investors advocating for the reinforcement of green finance strategies to support sustainable development. The recommendations emphasise the expansion of financial accessibility, the refinement of regulatory frameworks, and the promotion of investment in green technologies.

Keywords: Green Finance, Industrial Transformation, Economic Growth, Renewable Energy, Southwest China, Green Bonds, Sustainable Investment, Financial Markets

INTRODUCTION

Green finance has emerged as a significant driving force behind sustainable economic growth and the transition from traditional industrial frameworks to environmentally

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sustainable and innovation-oriented sectors. Green credit refers to loan products and financial incentives provided by banks and financial institutions to support environmentally responsible projects and enterprises (Gu et al., 2021). Green finance significantly contributes to industrial restructuring by promoting high-quality economic growth, where innovation, efficiency, and environmental sustainability replace mere quantitative expansion. Zhou et al. (2022) highlight that China's strategic commitment to green investment and industrial transformation is aligned with its objectives of peaking carbon emissions by 2030 and attaining carbon neutrality by 2060. In recent years, financial markets have extensively supported green initiatives, a trend largely driven by policy-backed green credit mechanisms, government incentives, and private sector investment in renewable energy projects (Bhutta et al., 2022). Beyond its financing function, green finance also influences corporate behaviour, encouraging firms to adopt clean energy sources, improve production efficiency, and invest in environmentally friendly technologies (Yin & Xu, 2022). This transition is particularly critical in China's Southwest region, where industrial upgrading must be pursued in harmony with ecological conservation.

This study focuses on the role of green finance in facilitating the sustainable transformation of the new energy industry within Southwest China, specifically in the provinces of Sichuan, Yunnan, Guizhou, Chongqing, and Tibet. China's renewable energy policy places strategic emphasis on the development of new energy sectors. The region possesses substantial natural resources conducive to clean energy production—Sichuan is particularly known for its hydropower potential; Yunnan for its solar capacity; and Guizhou for the advancement of wind energy (Luo et al., 2021). Furthermore, as outlined in China's 14th Five-Year Plan and Green Finance Guidelines, the Southwest region has received increased financial support, positioning it as a key zone for accelerating the transition to a low-carbon economy (Peng et al., 2023). However, the empirical effectiveness of green finance in driving industrial transformation and promoting green economic growth in the region remains insufficiently explored (Wang & Wang, 2021; Zou et al., 2024).

This research offers contributions across academic, policy, financial, and industry stakeholder domains. By examining the financial mechanisms underpinning industrial transformation, the study enriches the existing economic and financial literature on green finance (Ren et al., 2022). Additionally, the findings yield policy recommendations for governmental regulatory agencies aimed at strengthening financial governance, while also providing practical guidance to enterprises and investors in evaluating the current state of green finance in China (G. Zhao et al., 2022). The research operates on the premise that, through empirical analysis, the interaction between financial incentives and legal frameworks significantly shapes the trajectory of high-quality economic growth within the new energy industry of Southwest China.

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Research Objectives

- "To analyse the impact of green finance adoption (GFA) (IV) on industrial transformation (DV) in Southwest China's new energy sector."
- "To examine the effect of green finance investment (GFI) (IV) on high-quality economic growth (DV) in the renewable energy industry of Southwest China."

LITERATURE REVIEW

Green finance possesses an inherently evident capacity to drive industrial transformation and foster high-quality economic growth. It encompasses a range of mechanisms and instruments designed to channel investments into sustainable sectors (Gu et al., 2021), including renewable energy, low-carbon technologies, and environmentally responsible infrastructure. This section presents a review of the relevant literature, examining green finance as a strategic instrument for industrial transformation, its contributory role in promoting economic growth, and its specific application within the new energy sector in Southwest China.

Green Finance and Economic Development

Governments and financial institutions are actively seeking to harmonise economic development with ecological protection. The theoretical foundation for green finance is supported by Porter's Hypothesis, which posits that environmental regulation and green financial instruments can enhance industrial efficiency, foster innovation, and ultimately improve productivity (Bhutta et al., 2022). Similarly, the endogenous growth theory suggests that sustained investment in innovation contributes to long-term economic stability and industrial advancement (Dong & Akhtar, 2022). In China, green finance is integrated into the national economic development strategy, with state-led policies and financial incentives explicitly targeting sustainable investment.

The growth of green bonds and other environmentally oriented financial instruments has been propelled by regulatory frameworks promoted by the People's Bank of China (Yin & Xu, 2022). These mechanisms have been instrumental in financing renewable energy infrastructure, facilitating industrial upgrading, and advancing pollution control technologies, thereby promoting economic modernisation and structural transformation (Ren et al., 2022). According to G. Zhao et al. (2022), green finance can drive industrial development by mobilising capital specifically for sustainability-focused projects. For instance, Sun et al. (2022) argue that green credit policies in China's banking sector have redirected capital flows towards renewable energy initiatives, thereby generating employment and advancing technological innovation (Adamo et al., 2025). Moreover, financial markets function as a crucial platform for attracting private sector investment in clean energy activities (Peng et al., 2023), and the evolution of green finance is increasingly linked to the transformation of traditionally heavy industrial sectors.

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Industrial Transformation and Green Finance

Industrial transformation is broadly characterised as the transition of industries towards more innovative, structurally advanced systems with a reduced environmental footprint. Green bonds, in particular, serve as a principal mechanism for financing low-carbon and renewable energy projects under the broader framework of industrial transformation (Bhutta et al., 2022; Sartzetakis, 2021). Zhou et al. (2022) note that the issuance of green bonds in China has been instrumental in advancing investments in wind, solar, and hydropower sectors. Moreover, banks have increasingly implemented green credit policies that discourage investment in energy-inefficient technologies through preferential lending rates and financial support mechanisms (Ren et al., 2022). Evidence from empirical surveys indicates that such financial measures have positively impacted industrial efficiency, reduced production costs, and enhanced overall competitiveness, particularly in the renewable energy sector (G. Zhao et al., 2022). Similarly, Luo et al. (2021), in their study on China's energy transition, emphasise that financial support from green banks has led to increased energy output and positive economic performance. Additionally, regulatory inconsistencies and the fragmented nature of policy frameworks have constrained the effective deployment of green financial instruments (Peng et al., 2023). While green bonds and green credit represent innovative financial tools with strong potential to drive industrial change (Mao & Li, 2024), the aforementioned difficulties—particularly those related to SMEs' financing access and regulatory coherence—pose significant limitations to the broader development and implementation of green finance.

High-Quality Economic Growth and Green Finance

Green finance offers a more sustainable, efficient, innovative, and socially inclusive alternative to traditional GDP-focused growth. It is increasingly seen as a key driver of green and technologically advanced economic development (Yin & Xu, 2022). Ren et al. (2022) highlight its long-term benefits, including reduced environmental degradation and enhanced energy efficiency. Kunapatarawong and Martínez-Ros (2016) note that green financial policies support clean industry development, job creation, and innovation. Moreover, green finance contributes to financial market stability by lessening economic shocks (Zhou et al., 2022). Research shows that regions with robust green finance policies attract more R&D, patent activity, and industrial upgrading (Wang & Wang, 2021). For instance, Sichuan has become a hub for hydropower advancement due to green financing. Additionally, green finance promotes employment in new energy sectors and helps reduce income inequality. Kumar. J and Majid (2020) reports significant job creation in renewable energy across both urban and rural China. However, challenges remain, including uneven regional investment and disparities in financial access (Mao & Li, 2024). In sum, green finance drives sustainable growth, but its full potential depends on addressing regional and financial imbalances.

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Green Finance in Southwest China's New Energy Sector

Southwest China—including Sichuan, Yunnan, Guizhou, Chongqing, and Tibet—is strategically vital for renewable energy development, given its rich hydropower, wind, and solar resources (Peng et al., 2023). Although the region has drawn considerable green financial investment, disparities in policy execution, financial access, and industrial infrastructure pose both challenges and prospects.

Hydropower Investments in Sichuan

Sichuan province produces over 30% of China's total hydroelectric power, making it the leading region in national hydropower generation. Environmental credit policies, alongside direct government financial support, have significantly contributed to the sector's growth in the area (Hennig et al., 2013). However, challenges such as environmental sustainability concerns and the displacement of local communities highlight the need for more balanced financial and social policy frameworks.

Solar and Wind Energy Development in Yunnan and Guizhou

Solar and wind energy projects in Yunnan and Guizhou have expanded, driven by green bonds and private sector investments (Liang et al., 2023). Despite challenges such as grid connectivity issues and technological limitations hindering the sector's full potential (Ding et al., 2023), the sector has seen significant financial growth.

Barriers to GFA in the Region

Green finance plays a crucial role in advancing Southwest China's development and promoting green investments and projects. However, several limitations hinder its full potential (Dai & Chen, 2023). SMEs often encounter high investment risks and insufficient credit assurances, limiting their ability to develop sustainable energy projects (Mo et al., 2023). Additionally, inconsistent regulatory frameworks create uncertainty among investors and financial institutions, reducing confidence and slowing the development of green financial markets (Li & Zhang, 2022). Moreover, integrating renewable energy into the national grid remains problematic due to infrastructure limitations and grid stability concerns. To overcome these challenges, uniform policy frameworks, improved financial access, and grid modernisation are necessary (Chen, 2024). Addressing these barriers requires stronger government policies, enhanced financial incentives, and infrastructure improvements.

Summary and Research Gaps

Academic research highlights that green finance is crucial for driving industrial evolution and promoting high-quality economic development. However, studies on Southwest China's new energy sector are limited, both empirically and theoretically.

While existing research addresses green finance at the national level, it lacks a detailed analysis of its impact on local industries, particularly regarding renewable energy development in Sichuan, Yunnan, and Guizhou (Peng et al., 2023). This study aims to fill this gap by empirically examining the role of green finance in transforming Southwest China's new energy sector. Using professional and institutional quantitative data, the research will provide new insights into green finance, industrial development, and economic growth in the region.

RESEARCH METHODOLOGY

This study employs a questionnaire-based survey to examine the relationship between green finance, industrial transformation, and high-quality economic growth in Southwest China's new energy sector, using an empirical quantitative approach. The focus is on three industries: hydropower in Sichuan, solar energy in Yunnan, and wind energy in Guizhou, regions that have attracted significant green financial investments (Luo et al., 2021). The survey targets 250 participants, including representatives from green banks, private investors, government policymakers in energy and financial regulation, and industry professionals such as CEOs and project managers of renewable energy companies (Peng et al., 2023). The questionnaire covers four main areas: green finance awareness and adoption, industrial transformation indicators (e.g., investment trends and production efficiency), economic impact indicators (e.g., profitability and employment), barriers to green finance adoption (GFA), and policy recommendations. Descriptive statistics and regression analysis, using SPSS and hypothesis testing, assess the impact of green finance on industrial transformation and economic growth in Southwest China.

ANALYSIS

Green Finance, Industrial Transformation, and High-Quality Economic Growth

Frequency Table

As presented in Table 1, 31.2% of respondents are employed by large firms, 34.8% by medium-sized organisations, and 34% by small organisations.

Table 1: What is the size of your organization?

Organization Size		
	Frequency	Percent
Small (less than 50 employees)	85	34.0
Medium (50–500 employees)	87	34.8
Large (more than 500 employees)	78	31.2
Total	250	100.0

This demonstrates a relatively even distribution of company sizes within the new energy

sector of Southwest China, ensuring a broad range of perspectives on GFA and industrial transformation. Moreover, the distribution of industry experience reveals that 23.6% of participants are newcomers with less than a year of experience, while 27.2% have over six years of experience.

The largest group (30.8%) has 1–3 years of experience, followed by 18.4% with 4–6 years. The details are summarized in Table 2.

Table 2: How long have you been involved in the new energy industry?

Experience in New Energy Industry		
	Frequency	Percent
Less than 1 year	59	23.6
1–3 years	77	30.8
4–6 years	46	18.4
More than 6 years	68	27.2
Total	250	100.0

Reliability Analysis

The reliability analysis indicates satisfactory internal consistency for the three scales—GFA, Industrial Transformation, and High-Quality Economic Growth (Table 3). The respective "Cronbach's Alpha" values of 0.787, 0.786, and 0.806 demonstrate that the scales are reliable for measuring the intended constructs. A "Cronbach's Alpha" above 0.70 is generally deemed acceptable, indicating that the items within each scale are cohesive and reliable. The High-Quality Economic Growth scale shows the highest reliability (0.806), reflecting strong consistency, while the other two scales also exhibit adequate reliability for research purposes. These findings confirm the robustness of the measurement tools for subsequent analysis.

Table 3: Reliability Values

Reliability Statistics		
	Cronbach's Alpha	Items
Green Finance Adoption (GFA)	.787	5
Industrial Transformation	.786	5
High-Quality Economic Growth	.806	5

Normality Analysis

The Kolmogorov-Smirnov and Shapiro-Wilk tests reveal that all three variables (GFA, Industrial Transformation, and High-Quality Economic Growth) significantly deviate from normality (p-values = 0.000, less than 0.05). However, given the large sample size (n = 250), parametric tests such as regression analysis remain valid, in accordance with the Central Limit Theorem (Table 4).

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Table 4: Normality Analysis

Tests of Normality						
	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Green Finance Adoption (GFA)	.103	250	.000	.952	250	.000
Industrial Transformation	.100	250	.000	.948	250	.000
High-Quality Economic Growth	.113	250	.000	.940	250	.000
a. Lilliefors Significance Correction						

GFA and Industrial Transformation in New Energy Sector

The adoption of green finance and industrial transformation are strongly positively correlated, as evidenced by the R value of 0.843. The R-squared value of 0.711 indicates that GFA explains 71.1% of the variation in Industrial Transformation. This highlights a significant impact, confirming that green finance plays a crucial role in driving industrial transformation in the new energy sector of Southwest China. The Adjusted R-squared value of 0.709, which is very close to the R-squared value of 0.711, suggests a stable and reliable model (Table 5).

Table 5: Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.843[a]	.711	.709	.576997019024717
a. (Constant), GFA				

Furthermore, the ANOVA results confirm the statistical significance of the regression model (F = 609.021, p = 0.000). The exceptionally high F-statistic and p-value of 0.000 indicate that green finance adoption (GFA) has a highly significant effect on industrial transformation. This underscores the pivotal role of green finance in facilitating the transformation of the new energy sector (table 6).

Table 6: ANOVA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	202.759	1	202.759	609.021	.000[b]
	Residual	82.566	248	.333		
	Total	285.324	249			
a. DV: Industrial Transformation						
b. (Constant), GFA						

The coefficient for GFA (B = 0.853, p = 0.000) is positive and statistically significant, signifying that an increase in GFA leads to a substantial improvement in industrial

transformation. The Beta coefficient (0.843) reflects a strong effect size, indicating that GFA is a major predictor of industrial transformation. Additionally, the constant (0.460, p = 0.000) suggests that some level of industrial transformation would still occur even in the absence of GFA (table 7).

Table 7: Coefficients

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.460	.114		4.028	.000
	Green Finance Adoption	.853	.035	.843	24.678	.000
a. DV: Industrial Transformation						

GFI and High-Quality Economic Growth in Renewable Energy Industry

The correlation coefficient between GFI and High-Quality Economic Growth is 0.809, indicating a strong positive relationship between the two variables. The coefficient of determination, 0.655, suggests that GFI explains 65.5% of the variation in High-Quality Economic Growth. The Adjusted R-squared value of 0.653, which closely aligns with the R-squared value, further supports this conclusion (table 8). The analysis reveals a high F-value of 470.330 (p = 0.000), indicating the statistical significance of the model. The very small p-value of 0.000 further confirms that GFI has a strong correlation with High-Quality Economic Growth.

Table 8: Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.809[a]	.655	.653	.631093564329465
a. (Constant), GFI				

This relationship underscores the role of GFI in promoting sustainable economic stability, supporting GDP growth, and creating jobs in the new energy sector (table 9).

Table 9: ANOVA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	187.323	1	187.323	470.330	.000[b]
	Residual	98.773	248	.398		
	Total	286.096	249			
a. DV: High-Quality Economic Growth						
b.(Constant), GFA						

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Moreover, the coefficient for GFI (B = 0.820, p = 0.000) is highly significant, indicating a strong positive effect on High-Quality Economic Growth. The Beta coefficient (0.809) suggests that GFI is a key driver of economic growth in the renewable energy sector. Additionally, the t-value of 21.687 further reinforces the strength of this relationship (table 10).

Table 10: Coefficients

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	.654	.125		5.229	.000
	Green Finance Adoption	.820	.038	.809	21.687	.000
a. DV: High-Quality Economic Growth						

FINDINGS

This section presents the findings of the study on the role of green finance in industrial upgrading and the development of a high-quality economy within the new energy sector in Southwest China. It includes an analysis of the empirical results and their comparison with existing literature. The section identifies key conclusions, issues, and policy implications. The regression analysis reveals that green finance accounts for 71.1% of industrial transformation, aligning with previous studies which have highlighted green finance as a catalyst for industrial modernization, technological advancement, and sustainable production (Gu et al., 2021; Luo et al., 2021). The Cronbach's Alpha values of 0.787 (GFA), 0.786 (Industrial Transformation), and 0.806 (High-Quality Economic Growth) demonstrate high internal consistency, confirming the reliability of the constructs. Furthermore, investment patterns in the hydropower, solar, and wind energy sectors have been driven by green bonds and government-backed financial incentives. Green banks and state-supported funds have played a crucial role in facilitating the transition of companies from fossil fuels to clean energy sources (Zhou et al., 2022). This finding reinforces the view that green finance not only provides capital but also influences corporate decision-making by promoting sustainable practices (Wang & Wang, 2021). However, the study also identifies significant barriers to industrial transformation, particularly the limited access to finance for SMEs.

Policies aimed at promoting green finance for large firms are not conducive to SMEs due to strict regulations and high collateral demands. SMEs often lack the assets required to meet collateral requirements, such as land or machinery, which large firms can offer. Moreover, lengthy approval processes, complex documentation, and stringent environmental assessments pose further challenges. High loan thresholds and strict creditworthiness criteria also exclude SMEs, particularly those in the early stages of green innovation (Ding et al., 2023). To foster inclusive industrial transformation,

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targeted financial support mechanisms, such as risk-sharing programmes and lower-interest loans, are needed for SMEs. Additionally, regulatory inconsistency across regions, especially in Southwest China, undermines the effectiveness of green finance policies and creates uncertainty among investors. Aligning national policies with better financial incentives and public-private partnerships could enhance the impact of green finance (Peng et al., 2023).

The article concludes that GFI is a significant predictor of high-quality economic activity in Southwest China's renewable energy sector. The regression analysis reveals that GFI accounts for 65.5% of the variation in economic growth ($R^2 = 0.655$, $p = 0.000$), aligning with previous research on the role of green finance in stimulating industry growth, job creation, and economic development (Ren et al., 2022; L. Zhao et al., 2022). The findings highlight how green finance promotes employment within renewable energy, particularly in solar, wind, and hydropower sectors, creating opportunities for skilled professionals in technology, engineering, and clean energy (Bhutta et al., 2022). This supports the notion that green technology fosters a knowledge economy, where innovation drives job creation (Yin & Xu, 2022).

Moreover, the study indicates that green finance facilitates environmental conservation while ensuring economic stability, with companies adopting green financial tools showing improved energy performance, reduced carbon footprints, and better financial outcomes (Zhou et al., 2022). These findings are consistent with the Porter Hypothesis, which suggests that environmental regulations and financial incentives promote long-term industrial innovation (Wang & Wang, 2021). However, challenges remain in achieving balanced economic growth through green finance. Investment is uneven across Southwest China, with regions like Sichuan and Yunnan benefiting from large-scale hydropower and solar projects, while Guizhou and Tibet require increased infrastructure investment to boost economic development (Peng et al., 2023). Addressing these disparities will require enhancing financial inclusion, investing in infrastructure, and offering targeted incentives. Furthermore, the lack of sufficient sustainable investment products, such as green insurance, carbon pricing, and impact investing, limits the full potential of green finance in the region. While traditional tools like green bonds have been effective, there is a need for new instruments to support the renewable energy sector's sustainability and long-term growth.

CONCLUSION AND RECOMMENDATIONS

This article examines how green finance can support industrial upgrading and promote healthy economic development in Southwest China's new energy sector. Evidence indicates that green finance instruments, such as green bonds, green credit, and ESG investment, play a critical role in enhancing technology development, investment, and productivity within the hydro, photovoltaic, and wind power industries. Additionally, the long-term growth of GFIs has been shown to positively influence GDP growth,

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employment levels, and environmental conservation. However, challenges persist, including the high costs incurred by SMEs in financing green projects, policy incoherence, and regional disparities in green investment. To address these concerns, it is essential to improve SMEs' financial access by offering green finance mechanisms like affordable credit and cash-guarantee facilities, ideally through government-backed programs with low interest rates. Moreover, a central regulatory framework should be established to ensure uniformity in green finance policies across Southwest China, reducing policy inconsistencies and improving investor confidence. Public-private partnerships should also be strengthened to attract more investment into the system, while increasing institutionalisation of green finance practices. Special attention must be given to regions like Guizhou and Tibet, where green finance attraction remains weak; subsidies should be provided to these areas to stimulate development. Finally, increasing awareness and financial literacy regarding available green financial products will help SMEs seize opportunities in emerging market.

STUDY IMPLICATIONS

The findings of this study have significant policy, financial, and practical implications for green finance and sustainability across various stakeholders in both policy and industry sectors. For policymakers, the results suggest a need to enhance green finance policies, standardise regulations at both the state and provincial levels, and offer favourable financial incentives to stimulate SME investment in green industries. This would facilitate a more supportive environment for the adoption of green technologies. Financial institutions can apply these findings to develop new and innovative green financial products tailored to the needs of the renewable energy sector. This would promote greater financial inclusion and investment in green technologies. Specifically, they can create products such as low-interest green loans, sustainability-linked credit, and risk-mitigated investment schemes that cater to SMEs in the renewable energy sector. Additionally, financial institutions could explore innovative funding models, including green bonds and venture capital funds, to support start-ups working on clean energy technologies, thus fostering the growth of the green economy.

REFERENCES

Adamo, R., Federico, D., & Notte, A. (2025). Green Finance for Sustainable Financing. In H. Baber & M. Fanea-Ivanovici (Eds.), *Sustainable Financing—A Contemporary Guide for Green Finance, Crowdfunding and Digital Currencies: Sustainable Financing* (pp. 39-59). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-80969-9_4

Bhutta, U. S., Tariq, A., Farrukh, M., Raza, A., & Iqbal, M. K. (2022). Green bonds for sustainable development: Review of literature on development and impact of green bonds. *Technological Forecasting and Social Change*, *175*, 121378. https://doi.org/10.1016/j.techfore.2021.121378

Dai, Y., & Chen, X. (2023). Evaluating green financing mechanisms for natural resource management: Implications for achieving sustainable development goals. *Resources Policy*, *86*, 104160. https://doi.org/10.1016/j.resourpol.2023.104160

Ding, Q., Huang, J., & Chen, J. (2023). Does digital finance matter for corporate green investment? Evidence from heavily polluting industries in China. *Energy Economics*, *117*, 106476. https://doi.org/10.1016/j.eneco.2022.106476

Dong, X., & Akhtar, N. (2022). Nexus between financial development, renewable energy investment, and sustainable development: Role of technical innovations and industrial structure. *Frontiers in psychology*, *13*, 951162. https://doi.org/10.3389/fpsyg.2022.951162

Gu, B., Chen, F., & Zhang, K. (2021). The policy effect of green finance in promoting industrial transformation and upgrading efficiency in China: analysis from the perspective of government regulation and public environmental demands. *Environmental Science and Pollution Research*, *28*(34), 47474-47491. https://doi.org/10.1007/s11356-021-13944-0

Hennig, T., Wang, W., Feng, Y., Ou, X., & He, D. (2013). Review of Yunnan's hydropower development. Comparing small and large hydropower projects regarding their environmental implications and socio-economic consequences. *Renewable and Sustainable Energy Reviews*, *27*, 585-595. https://doi.org/10.1016/j.rser.2013.07.023

Kumar. J, C. R., & Majid, M. A. (2020). Renewable energy for sustainable development in India: current status, future prospects, challenges, employment, and investment opportunities. *Energy, Sustainability and Society*, *10*(1), 1-36. https://doi.org/10.1186/s13705-019-0232-1

Kunapatarawong, R., & Martínez-Ros, E. (2016). Towards green growth: How does green innovation affect employment? *Research Policy*, *45*(6), 1218-1232. https://doi.org/10.1016/j.respol.2016.03.013

Liang, S., Wang, P., Jia, C., & Zhu, J. (2023). Studying green financing, factor allocation efficiency, and regional productivity growth in renewable energy industries. *Renewable Energy*, *214*, 130-139. https://doi.org/10.1016/j.renene.2023.05.072

Luo, S., Hu, W., Liu, W., Xu, X., Huang, Q., Chen, Z., & Lund, H. (2021). Transition pathways towards a deep decarbonization energy system—A case study in Sichuan, China. *Applied Energy*, *302*, 117507. https://doi.org/10.1016/j.apenergy.2021.117507

Mao, T., & Li, Q. (2024). The impact of sustainable development and spatial rationality planning of urban buildings under the guidance of local government policies: Environmental policy and green building design principles. *Lex localis-Journal of Local Self-Government*, *22*(1), 197-216. https://doi.org/10.52152/22.1.197-216(2024)

Mo, Y., Sun, D., & Zhang, Y. (2023). Green Finance Assists Agricultural Sustainable

Development: Evidence from China. *Sustainability*, *15*(3), 2056. https://doi.org/10.3390/su15032056

Peng, M., Tan, L., Li, H., Wu, J., Ma, T., Xu, H., Xu, J., Zhao, W., & Hao, J. (2023). Energy Transitions in Yunnan Province Based on Production Function Theory. *Energies*, *16*(21). https://doi.org/10.3390/en16217299

Ren, S., Hao, Y., & Wu, H. (2022). How Does Green Investment Affect Environmental Pollution? Evidence from China. *Environmental and Resource Economics*, *81*(1), 25-51. https://doi.org/10.1007/s10640-021-00615-4

Sartzetakis, E. S. (2021). Green bonds as an instrument to finance low carbon transition. *Economic Change and Restructuring*, *54*(3), 755-779. https://doi.org/10.1007/s10644-020-09266-9

Sun, Y., Guan, W., Cao, Y., & Bao, Q. (2022). Role of green finance policy in renewable energy deployment for carbon neutrality: Evidence from China. *Renewable Energy*, *197*, 643-653. https://doi.org/10.1016/j.renene.2022.07.164

Wang, X., & Wang, Q. (2021). Research on the impact of green finance on the upgrading of China's regional industrial structure from the perspective of sustainable development. *Resources Policy*, *74*, 102436. https://doi.org/10.1016/j.resourpol.2021.102436

Yin, X., & Xu, Z. (2022). An empirical analysis of the coupling and coordinative development of China's green finance and economic growth. *Resources Policy*, *75*, 102476. https://doi.org/10.1016/j.resourpol.2021.102476

Zhao, G., Zhou, P., & Wen, W. (2022). What cause regional inequality of technology innovation in renewable energy? Evidence from China. *Applied Energy*, *310*, 118464. https://doi.org/10.1016/j.apenergy.2021.118464

Zhao, L., Chau, K. Y., Tran, T. K., Sadiq, M., Xuyen, N. T. M., & Phan, T. T. H. (2022). Enhancing green economic recovery through green bonds financing and energy efficiency investments. *Economic Analysis and Policy*, *76*, 488-501. https://doi.org/10.1016/j.eap.2022.08.019

Zhou, G., Zhu, J., & Luo, S. (2022). The impact of fintech innovation on green growth in China: Mediating effect of green finance. *Ecological Economics*, *193*, 107308. https://doi.org/10.1016/j.ecolecon.2021.107308

Zou, X., Ali, K. A. M., & Hussain, W. M. H. W. (2024). Assessing the compliance and competitive prospects of China's manufacturing industry's digital transformation under the WTO agreement on trade-related aspects of intellectual property rights. *China and WTO Review*, *10*(2), 70-83. https://doi.org/10.52152/cwr.2024.10.2.05