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A Comparative Analysis of Green Finance Initiatives and Their Impact on Banking Performance: A Study of RHB Bank, ICBC, and Deutsche Bank

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Abstract: The banking industry is placing increasing emphasis on green finance to address climate change, support sustainable development, and align with environmental, social, and governance (ESG) goals, as well as sustainable investments to fund environmentally friendly projects. In an era of growing regulatory pressure and rising demand for sustainability from investors and stakeholders, green finance has become a vital tool for banks to enhance operational efficiency. It can reduce operational costs by financing energy-saving projects, improve asset quality by funding low-risk sustainable projects, and even attract capital from environmentally responsible capital markets. Additionally, green finance helps improve risk management frameworks by financing projects that align with long-term sustainable development objectives. This paper explores the relationship between green finance and the operational efficiency of three major banks—RHB Bank, Industrial and Commercial Bank of China (ICBC), and Deutsche Bank. The article focuses on analyzing how these banks integrate green finance into their strategies and the overall impact of these initiatives on operational performance, primarily cost reduction.

Keywords: Green finance; Operational efficiency; Risk management framework; Operational performance

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1. Introduction

The banking sector is increasingly focusing on green finance to fight climate change, support sustainable development, and align its Environmental, Social, and Governance (ESG) objectives [1]. Green finance includes products of green loans and bonds, as well as sustainable investments that finance environmentally beneficial projects [2]. It has become a vital tool for banks to improve their operational efficiencies in the era of heightened regulatory pressure and increased demand from investors and stakeholders around sustainability.

Although it is difficult to calculate the direct financial impact of green finance on operational efficiency by reasons of a lack of data, its benefits are widely acknowledged. They can help cut operational costs on energy-efficient projects, improve asset quality through the financing of low-risk, sustainable projects, and even attract capital from environmentally responsible capital markets. Also, by financing projects compatible with long-term sustainability goals, green finance can improve risk management frameworks.

The essay explores the relationship between green finance and operational efficiency at three central banks: RHB Bank, ICBC, and Deutsche Bank. The essay focuses on qualitative insights into how these institutions embed green finance in their strategy and what the overall impacts are on operational performance, mainly cost reduction.

2. Methodology

The study analyses the effect of green finance initiatives on the operational efficiency of three major banks, RHB Bank (Malaysia), ICBC (China), and Deutsche Bank (Germany), from 2019 to 2023 [3–5]. Notably, the relationship between green finance activities, for example, green loans, green bonds, and green investments, and key financial performance indicators is analyzed, including total revenue, operational expenses, and operating profit.

2.1. Data sources

For the study, the data is taken from the annual and green finance-related reports from the official websites of the three banks, as they offer thorough and publicly accessible financial performance and green finance initiatives reports. These official documents are treated as reliable, and they present the bank's activity on financial management and sustainability.

The data used in the study runs from 2019 through 2023 to give a view of both the financial performance of the banks and their green finance performance for a five-year horizon. The purpose of the dataset is to understand how green finance initiatives are embedded within the operational models of the banks and to assess what impact they have on financial outcomes.

2.2. Analysis methods

The study employed a primarily descriptive and trend-based analysis method. First, key financial indicators such as total revenue, operating expenses, operating profit, and profit-to-income ratio are summarized for each bank, as well as their green finance activities, including green loans, green bonds, and investments. This gives an overview of the banks' green finance involvement and financial performance over the five years.

Green finance activities and the corresponding financial indicators are then analyzed with trend extrapolation. For the purpose, Excel and Python software are used in the calculation, analysis, and results visualization. The study identifies year-on-year changes in green finance investments and the corresponding variations in financial performance. It demonstrates whether improved operational efficiency correlates with increased green finance investments. The trend analysis also enables readers to understand if green finance initiatives are accompanied by higher revenue, operating profit, and net profit over time.

3. Analysis of green finance's impact on operational efficiency

3.1. Bank RHB (Malaysia)

3.1.1. Green finance initiatives at RHB Bank

As the green finance leader in Malaysia, RHB Bank has supported environmentally sustainable projects through different green financing products [3]. They comprise green loans and bonds to fund renewable energies, energy efficiency, sustainable infrastructures, and climate resilience projects. RHB's green finance initiatives align with Malaysian national sustainability objectives and leverage government policy, including the Green Technology Financing Scheme (GTFS) and Sustainable Banking Guidelines.

RHB Bank was one of the first Malaysian banks to issue green bonds under the Climate Bond Initiative framework in 2017. The green bond issuance represents part of the bank's attempt to raise capital for projects helping to reduce carbon and improve energy efficiency. RHB's green finance portfolio covers renewable energy, sustainable agriculture, waste management, energy-efficiently buildings, etc. The bank also offers green loans to businesses and individuals, with terms targeted towards financing environmentally friendly projects that meet established sustainability criteria.

Sustainability principles are integrated into RHB Bank's corporate governance and risk management frameworks. By national and international green finance standards, including the Green Bond Principles and the UN Principles for Responsible Banking, the bank works closely with clients to check that the projects they finance are green. RHB's approach is a commitment to incorporate ESG factors into its operations.

3.1.2. Operational efficiency and green finance

Since RHB Bank's green finance initiatives have an indirect financial impact on its operations as they contribute to cost management, risk reduction, and market positioning, direct quantification of the financial impact they generate on operational efficiency is impossible.

One of the most obvious benefits of green finance is that it helps reduce costs. RHB Bank finances its customers' energy-efficient and renewable energy projects, which allows its customers to reduce their operational costs, consisting of energy use and environmental liabilities. Lower default rates on these projects stem from the positive regulatory incentives and government support, which make RHB's green loan portfolio more stable and less prone to default. Such stability lowers credit risk and may improve the bank's Non-Performing Loan (NPL) ratio, but direct correlations are difficult to identify. Green finance also means that RHB Bank can reach the growing market of ESG-minded investors. The surge in demand for green bonds on a global scale has seen RHB positioning itself as a sustainable leader. This improves the bank's capital market presence, liquidity, and access to the markets.

In addition, RHB Bank's green finance helps control climate risks. The bank's financing of renewable energy and energy-efficient infrastructure projects places it in sectors less susceptible to changes in regulations around carbon emissions. In addition to these areas, fewer risks associated with stranded assets, such as those connected to fossil fuels are present. By focusing on these low-carbon sectors, RHB lowers its exposure to the higher-risk industries and strengthens operational stability.

Besides, RHB's green finance focus also helps set it apart from other market participants. RHB's reputation as a green finance leader not only improves customer loyalty and brand value but also becomes increasingly important as sustainability becomes a key factor for consumers and investors. This can, over time, lead to more revenue and profitability. The following figure depicts the relevant trend for the bank:

As shown in the figure, RHB Bank's green finance, along with its revenue and operating profits, showed a similar uptrend from 2019 to 2023 (**Figure 1**). While the bank strongly supported sustainable finance by investing in green projects, revenue grew steadily, proving the positive influence of such green activity on the bank's business performance. At the same time, the bank sees green finance investment rebounding in line with the upturn in operating profit, indicating that these sustainable investments are helping it meet its green objectives and have a positive financial impact. This shows that the bank's economic growth strongly correlates with its green finance initiatives.

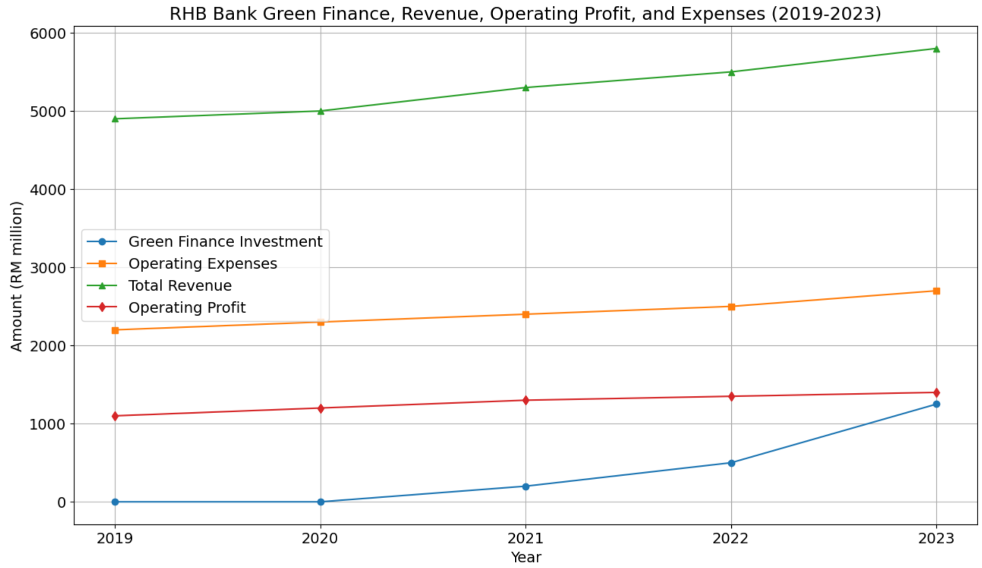

Figure 1. RHB Bank green finance, revenue, operating profit, and expenses (2019–2023)

3.2. ICBC (China)

3.2.1. Green finance initiatives at ICBC

ICBC, one of the largest commercial banks in China, has been a protagonist in developing China's green finance sector [4]. The bank has invested heavily in green projects, including renewable energy, energy efficiency, and environmentally responsible infrastructure. Aligned with China's ambitious environmental goals, to reduce carbon emissions and propel its sustainable development, ICBC's green finance activities aim to comprehensively respond to the green initiatives.

Recently, ICBC has been actively developing its green finance portfolio. From issuing green bonds to funding large-scale projects in renewable energy, electric vehicles, and sustainable agriculture, the bank has initiated the green process. Project outcomes from these green bonds are certified to international standards, such as the Green Bond Principles, which means they are assessed with the most stringent environmental criteria. In addition, ICBC has offered green loans to both domestic and foreign customers, which support activities related to energy saving and lowering carbon emissions. ICBC incentivizes the move to more sustainable business methods and broader environmental and social responsibility goals by offering favorable financing terms for these projects.

3.2.2. Operational efficiency and green finance

Measuring the direct financial impact of ICBC's green finance initiatives on operational efficiency is difficult, given that adequate data does not exist. Still, by qualitative analysis, we can uncover how such initiatives play a role in cost management.

Cost reduction is one of the main approaches that green finance helps to increase ICBC's operational efficiency. ICBC finances green projects, including renewable energy installations and energy-efficient technologies, that help its clients save costs over the long term. The savings are usually realized through lower running costs, energy consumption, and carbon tax costs, as well as government incentives for environmental practices. Although the savings are not always revealed in ICBC's financial statements, it can tighten loan performance and possibly lessen the default rate on green loans. Any project that can lead to cost savings is less likely to default and will help ICBC's bottom line. The following table shows the operational performance of the bank:

Green finance also provides substantial risk mitigation advantages. Green projects are viewed as being relatively low risk, particularly in today's world, where the focus is increasingly on lowering carbon emissions and the transition to more sustainable energy sources. This allows ICBC to improve the credit risk of its portfolio of green finance compared to traditional loans. The more predictable cash flow of green projects (especially those supported by government incentives or focusing on energy-efficient infrastructure) will be less prone to default. This means the non performing loan (NPL) ratio in ICBC's green finance portfolio could be lower than traditional loans.

In addition, the rapid growth in green finance also assists ICBC in enhancing its market positioning. ICBC's growing strength in green finance underscores its leadership in sustainable finance as China seeks to make green finance a crucial means for meeting its climate goals. The strategic positioning also allows the bank to tap a new pool of investors interested in considering environmental, social, and governance (ESG) criteria. With the growing popularity of sustainable investments, ICBC's green finance activities place it at a competitive advantage in domestic and international capital markets. To differentiate from other banks in the market, ICBC has boosted its reputation and its long-term standing of operational stability.

Furthermore, green finance helps ICBC control long-term environmental risks. The bank mitigates its exposure to sectors suffering from regulatory control, i.e., fossil fuel industries, by financing projects in tune with global sustainability goals. In addition, the transition to low-carbon energy sources and sustainable infrastructure also enables ICBC to avoid investing in stranded assets that will become less valuable or even worthless in a future low-carbon economy. Through its green finance portfolio, ICBC manages potential risks that a project or investment could pose to the environment, consequently ensuring the sustainability of its operations in the long term. The following figure depicts the relevant trend of the bank:

As can be seen from the diagram, the bank's revenue and operating profit have a clear upward trend from 2019 to 2023 (**Figure 2**), and so does green finance investment. The diagram shows that green finance initiatives have a positive effect on the bank's financial performance, where the bank's investment in green finance initiatives results in high revenue and better profit. When the bank enlarges its green finance portfolio, it probably benefits from regulatory incentives and cost savings from energy-efficient projects, all of which serve long-term profitability. Lastly, the trend also reveals that the role of green finance is to aid sustainable growth and ensure the bank's financial success.

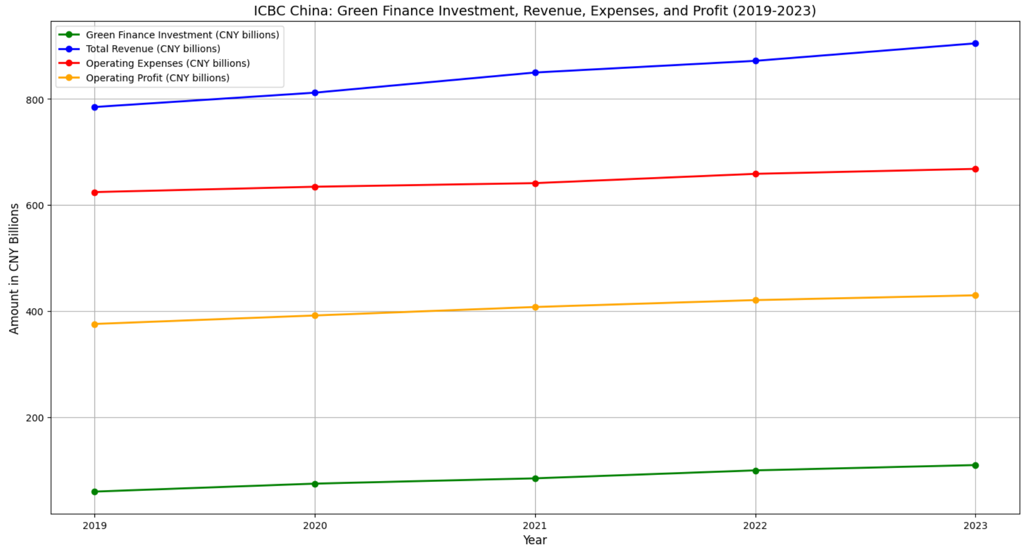

Figure 2. Trend of green finance investment, revenue, operating expenses, and operating profit of ICBC China (2019–2023)

3.3. Deutsche Bank (Germany)

3.3.1. Green finance initiatives at Deutsche Bank

As a leading provider of green finance and an active participant in sustainable development and the shift to a low-carbon economy, the German financial institution Deutsche Bank has significantly impacted Europe. The bank offers several green finance products, such as green bonds, sustainable investment funds, and green loans, to finance projects that promote environmental sustainability. The bank's objective is to contribute to global climate goals by reducing carbon emissions and boosting green technologies [5].

Green bonds are issued by Deutsche Bank for projects in renewable energy, energy efficiency, and sustainable infrastructure. These bonds are structured to international standards, such as the Green Bond Principles, which guarantee the funds go to projects with measurable environmental benefits. The bank has also created sustainable investment funds aimed at companies and projects that keep a close eye on environmental, social, and governance (ESG) benchmarks, attracting an increasing number of investors. Many investors consider ESG criteria the top investment priority to create a long-term sustainable impact.

Besides green bonds, Deutsche Bank provides green loans to companies and governments to implement energy efficiency, reduce emissions, and adopt renewable energy. The close client relationship enables financed projects to meet strict environmental standards. It helps the bank pursue its sustainability objectives and, thus, a sustainable economy.

3.3.2. Operational efficiency and green finance

The direct, quantifiable impact of Deutsche Bank's green finance initiatives on operational efficiency is hard to define. Still, their qualitative impact on long-term financial stability, cost management, and risk reduction is clear.

The key benefit of green finance is cost reduction. Deutsche Bank supports its clients in benefiting from reduced long-term operational costs relating to energy consumption, emissions, and access to government incentives. These savings reinforce positive loan performance, especially when projects beneficial to the environment have lower operating costs and are, therefore, less likely to default on loans. This, in turn, reduces credit risk and, thus, may lead to an improved bank's nonperforming loan (NPL) ratio.

Risk management also comes under the ambit of clean finance. Green finance funds are less vulnerable to regulatory changes on carbon emissions and another environmental standards. Deutsche Bank reduces its exposure to high-risk sectors, such as fossil fuels, which are facing increasing regulatory scrutiny that requires financing renewable energy and energy-efficient projects. Low risks are associated with green projects, especially in renewable energy, thereby significantly reducing the bank's overall risk exposure.

Moreover, Deutsche Bank improves its financial market's reputation through its green finance initiatives. The increased demand for sustainable investment products enables the bank to win a new segment of ESG-inclined investors. More generally, this enhances the bank's capital-raising powers, expands the investor base, and provides more liquidity. As an industry pioneer, Deutsche Bank has seen growing investor interest. It enhances its role as a sustainable bank, which fosters long-term business growth.

Deutsche Bank has a competitive edge thanks to its green finance offerings. The differentiation also helps attain customer loyalty and the momentum to increase revenue. It becomes operationally efficient to sustain the bank's long-term success in the market. The following figure depicts the relevant trend of the bank:

The diagram below illustrates the trend of green finance, revenue, expenses, and profit for Deutsche Bank, which is on a steady upward trajectory between 2019 and 2023 (**Figure 3**). The growth patterns of green finance investments, revenues, and operating profit are similar, so there is a strong correlation between the bank's higher green finance activities and its improved operational performance. When Deutsche Bank's green finance portfolio expanded, the revenue and profit increased accordingly. This demonstrates how these environmentally friendly investments are positively affecting revenue and profit. By aligning green finance with environmental goals and the bank's business growth, we can see that green finance not only serves as a support to the bank's environmental goals but also becomes an engine for driving the bank's business development and further enhances the bank's competitive position in the market. A similar upward trend shows that green finance is strategically crucial for financial stability and market performance.

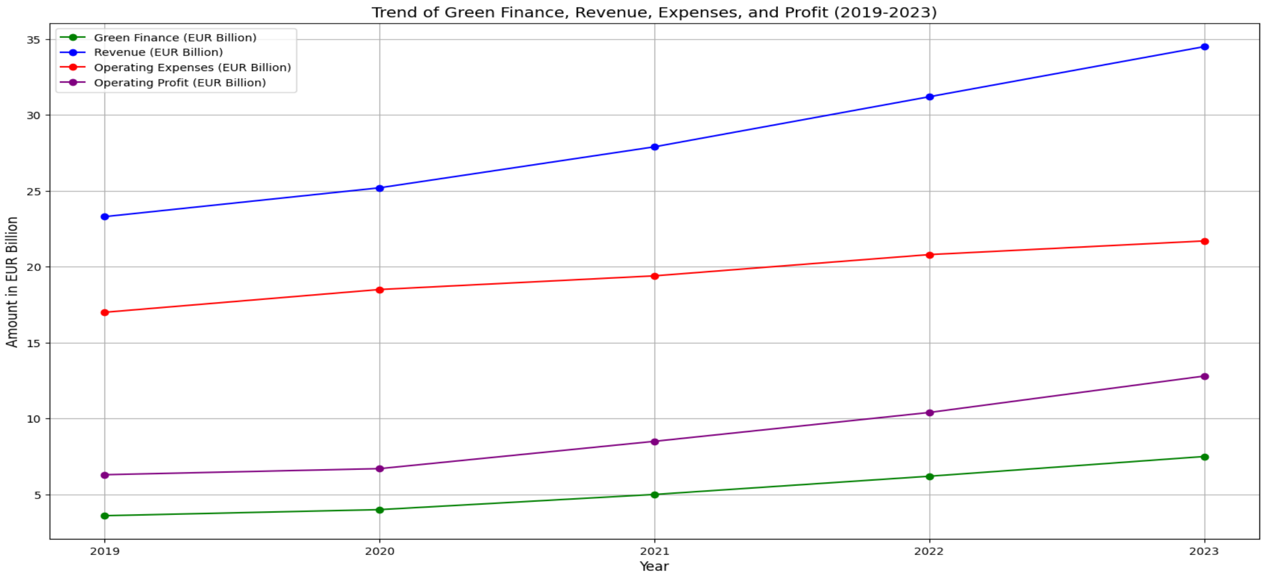

Figure 3. Trend of green finance, revenue, expenses, and profit for DB (2019–2023)

4. Policy recommendations

4.1. Policy recommendations for China

China's carbon-neutral objective by 2060 is consistent with ICBC's leadership in green finance [6]. However, green finance requires more definite and transparent regulations, especially in green loan definitions and bond issuance. However, promoting the process will require us to strengthen the Green Credit Guidelines and the Green Bond Endorsement Catalogue to ensure that the money is going to green projects. What's more, there is no ready access to green finance for most small and medium-sized enterprises in China, despite the critical role they will play in China's green transition. In such circumstances, policymakers may wish to adopt targeted incentives like tax breaks or risk-sharing mechanisms to encourage SME financing by banks for green projects (immaculate energy and green technology). Lastly, China can incentivize banks to realize their green finance targets with preferential risk weights on green loans, accelerating the transition to a green economy.

4.2. Policy recommendations for Malaysia

Although RHB Bank has been one of the biggest banks in the green finance sector in Malaysia, the green market as a whole is still underdeveloped [7]. Stronger infrastructure and regulation that is clearer regulations are required to stimulate green finance. Certification schemes for green bonds could be introduced in Malaysia to provide market transparency and increase investment. And the country also needs to back green innovations, for example, by supporting cleantech startups with government incentives. In this way, the country can lower investor risks and boost private sector participation. Apart from that, Malaysia should use incentives like tax breaks or subsidies for renewable energy and energy-efficient projects to lower the risk taken by green investments. This will increase the attractiveness and contribute to sustainable economic development.

4.3. Policy recommendations for Germany

The successful implementation of sustainable finance at Deutsche Bank shows that policies favoring such finance help. Standards and mandatory reporting are needed to improve transparency and investor confidence and help Germany fully utilize the green bond market. More financing is needed for smaller-scale projects and projects led by SMEs. To make sure Germany's green economy is inclusive, there should be the introduction of low-cost financing to accommodate these ventures. In addition, Germany must concentrate on financing projects that support job creation and sustainable activities in a just transition. Last but not least, integrating environmental, social, and governance (ESG) criteria in all financial sectors will allow the whole financial industry in the country to become aligned with the EU's ambitions regarding climate neutrality by 2050 [8].

4.4. Comparisons of three countries

The performance of the above three typical commercial banks in green finance is presumed to represent the overall situation of the corresponding countries. In the consideration, the author provides a table to show the policy recommendations for the three countries as follows. The following table summarizes relevant policy recommendations for the three countries (**Table 1**).

Table 1. Policy recommendations for advancing green finance

Policy area	China	Malaysia	Germany
Green finance regulations	Clarify green loan definitions and bond issuance. Strengthen Green Credit Guidelines and Green Bond Endorsement Catalogue.	Establish green bond certification schemes to increase market transparency and attract investment.	Standardize green bond definitions and reporting requirements to boost transparency and investor confidence.
Support for SMEs	Provide targeted incentives (e.g., tax breaks or risk-sharing mechanisms) for banks to finance green projects for SMEs, especially in clean energy and green tech.	Support green innovation through government-backed incentives for clean tech startups.	Provide low-cost financing or incentives for smaller-scale green projects, particularly those led by SMEs.
Incentives for green finance	Offer preferential risk weights for green loans to encourage banks to exceed green finance targets.	Offer incentives like tax breaks or subsidies for renewable energy and energy-efficient projects.	Focus on financing projects that promote job creation in sustainable sectors to ensure a just transition.
Sustainability integration			Integrate environmental, social, and governance (ESG) criteria across all financial sectors.
Economic growth and transition	Support the transition to a green economy, aligning with China's carbon neutrality goal.	Encourage private sector participation and foster sustainable economic growth through green investment.	Align with EU goals for climate neutrality by 2050, promoting an inclusive green economy.

5. Conclusion

The essay presents a comparative study to assess the impact of green finance on the operational efficiency of ICBC (China), RHB Bank (Malaysia), and Deutsche Bank (Germany) (**Table 1**). The results show that green finance increases operational efficiency through the reduction of costs, risk management, and enhanced market positioning, enabling banks to support sustainability and gain a competitive edge.

Disclosure statement

The author declares no conflict of interest.

References

[1] Galletta S, Mazzu S, Naciti V, 2022, A Bibliometric Analysis of ESG Performance in the Banking Industry: From the Current Status to Future Directions. Research in International Business and Finance, 62: 101684.

[2] Akomea-Frimpong I, Adeabah D, Ofosu D, et al., 2022, A Review of Studies on Green Finance of Banks, Research Gaps and Future Directions. Journal of Sustainable Finance & Investment, 12(4): 1241–1264.

[3] RHB Group, n.d., RHB Bank Berhad, viewed April 28, 2025, https://www.rhbgroup.com/

[4] Industrial and Commercial Bank of China, n.d., *ICBC*, viewed April 28, 2025, https://www.icbc.com.cn/

[5] Deutsche Bank, n.d., *Deutsche Bank*, viewed April 28, 2025, https://www.deutsche-bank.de/

[6] Sun L, Cui H, Ge Q, 2022, Will China Achieve its 2060 Carbon Neutral Commitment from the Provincial Perspective? Advances in Climate Change Research, 13(2): 169–178.

[7] Fu W, Irfan M, 2022, Does Green Financing Develop a Cleaner Environment for Environmental Sustainability: Empirical Insights from Association of Southeast Asian Nations Economies. Frontiers in Psychology, 13: 904768.

[8] Wiese F, Thema J, Cordroch L, 2022, Strategies for Climate Neutrality. Lessons from a Meta-analysis of German Energy Scenarios. Renewable and Sustainable Energy Transition, 2: 100015.