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Sustainable Banking Models and the Role of ESG Integration in the Financial Sector

Summary

This paper explores how banking models integrating environmental, social, and governance principles contribute to long-term financial competitiveness. The research is based on case studies of Berlin Hyp, BNP Paribas, and HSBC. Using qualitative methodology, it tests four hypotheses: the effectiveness of sustainable finance, risk reduction in lending, the role of regulation, and differences in adaptation speed. The results confirm that large banks adopt sustainability strategies more quickly and effectively, while smaller institutions face greater challenges. The study concludes that beyond regulatory compliance, the transfer of best practices is crucial for the success of sustainable banking models.

Keywords: sustainable banking models, ESG strategy, green bonds, risk management, EU taxonomy
JEL codes: L20, Q01

Introduction

Sustainable banking models and green finance have become central in transforming the global financial system. Financing aligned with environmental, social and governance (ESG) goals not only supports sustainability but can offer long-term financial advantages. Regulatory frameworks such as the EU Taxonomy and ESG guidelines increasingly require financial institutions to integrate sustainability into core operations (European Commission, 2025).

Understanding how sustainable banking operates across different financial institutions is essential. Research suggests that integrating green loans, bonds, and investments can enhance financial stability, customer loyalty, and investor trust (OECD, 2025). However, ESG adaptation strategies vary, influenced by institutional scale, market context, and regulatory pressures.

This study explores the key factors behind successful ESG strategy implementation through case studies of Berlin Hyp, BNP Paribas, and HSBC – three leaders in sustainable finance. Their experiences may serve as reference points for banks in Central and Eastern Europe. The analysis is structured around four hypotheses:

H1: Sustainable financing strategies improve financial performance.
Green bonds and ESG-linked loans may attract long-term investors and clients, enhancing stability and profitability (OECD, 2025). The study examines how these tools affect market positioning in the selected institutions.

H2: ESG-based lending reduces banks' risk exposure.
Sustainable projects often involve more stable cash flows and lower regulatory risk. All three case studies are analyzed to assess how ESG lending contributes to lowering credit risk.

H3: EU sustainability regulation positively influences ESG strategy.
While compliance may impose costs, it can also stimulate innovation and competitive advantage. The study evaluates how regulation shaped ESG practices in each bank.

H4: ESG integration progresses at different speeds.
Large banks typically have more capital, better data systems, and broader client portfolios, which support ESG adoption. Smaller banks face resource constraints, data gaps, and limited regulatory oversight (European Banking Authority, 2025).

Effective ESG implementation helps banks not only meet regulatory expectations but also achieve long-term competitiveness. The case studies show that ESG enhances not just environmental and social performance but also strengthens risk management and market resilience. Adopting best practices enables less advanced institutions to align with evolving regulatory and market expectations. Sustainable finance is thus not merely a compliance task, but a strategic asset for resilient banking models.

Methodology

This study applies a qualitative case study approach to examine how ESG strategies are implemented in three leading banks: Berlin Hyp, BNP Paribas, and HSBC. Each represents a distinct ESG profile – Berlin Hyp as a pioneer in green covered bonds, BNP Paribas as a leader in ESG-based lending, and HSBC with global net-zero commitments and broad ESG integration. Sources include official reports, ESG disclosures, and investor presentations to map each bank's sustainability trajectory.

The analysis identifies shared success factors and common challenges. Four hypotheses are tested regarding the impact of sustainable finance on performance and risk, and the influence of institutional size and regulatory context on ESG adoption. The study concludes with adaptation strategies tailored to the specific conditions of financial institutions in Central and Eastern Europe.

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Sustainable Finance and the ESG Regulatory Framework

Sustainable finance has become a cornerstone of the financial sector's transformation, as ESG considerations grow more prominent in banking and investment. EU regulations—such as the EU Taxonomy, the Sustainable Finance Disclosure Regulation (SFDR), and the Green Bond Standard—aim to standardize ESG criteria and improve transparency (European Commission, 2025). These frameworks increasingly shape global financial markets and institutional strategies.

This section reviews the instruments, structures, and regulatory principles defining ESG finance, emphasizing the EU's potential to set global benchmarks.

ESG finance provides loans, investments, and bonds to support climate-resilient and socially inclusive projects. These instruments are gaining popularity due to long-term stable returns and lower risk (OECD, 2023). Green bonds are the most established form: Berlin Hyp was among the first to issue green covered bonds, particularly in real estate (Berlin Hyp, 2023A). BNP Paribas and HSBC have also developed large, diversified ESG portfolios (BNP Paribas, 2023A; HSBC, 2023). Partnerships between banks and corporations help accelerate sustainable economic activity, especially via lending models aligned with low-carbon transitions.

The EU Taxonomy defines six environmental objectives—ranging from climate mitigation to biodiversity protection—and classifies sustainable economic activities (European Commission, 2023). Alongside this, the SFDR imposes disclosure obligations to improve ESG transparency (European Banking Authority, 2025).

A key objective is reducing "greenwashing" by ensuring that products labelled green meet substantive standards. To measure alignment, the Green Asset Ratio (GAR) was introduced as a key indicator. BNP Paribas and HSBC have steadily increased their GARs by expanding ESG financing (BNP Paribas, 2023B; HSBC, 2023).

Green Tagging is a data tool for tracking the real-world sustainability impact of ESG portfolios. It supports better portfolio understanding and regulatory compliance (European Commission, 2025). Berlin Hyp uses Green Tagging in real estate finance; BNP Paribas and HSBC apply similar techniques to optimize sustainable asset management (Berlin Hyp, 2023A; BNP Paribas, 2023B; HSBC, 2023). New data analytics help banks assess outcomes more precisely.

Berlin Hyp: Green covered bonds and sustainable real estate financing

Berlin Hyp AG is one of Germany's oldest and most significant commercial real estate financing banks, founded in 1868 in Berlin (Rumpf, 2019). Initially specializing in financing the local real estate market, the bank has continuously expanded its operations over the years and is now active across both the German and European markets. One of the most critical turning points in Berlin Hyp's long history occurred after German reunification when the institution had to adapt to a new economic and financial environment. In 1996, the merger of Berliner Hypotheken- und Pfandbriefbank AG and Braunschweig-Hannoversche Hypothekenbank AG led to the establishment of the present-day Berlin Hyp AG.

Over the past decade, Berlin Hyp has placed significant emphasis on developing and implementing sustainability strategies. The bank's historical adaptability laid the foundation for its later leadership in sustainable finance. In 2015, the bank pioneered the sustainable finance sector by issuing the world's first green covered bond ("Green Pfandbrief"), setting a precedent for other banks to develop similar ESG-based financial instruments (Rumpf, 2019). Since then, Berlin Hyp's strategy has been built on principles of energy efficiency and sustainability, which have not only reshaped its lending portfolio but have also had a significant impact on the European financial and real estate markets.

Berlin Hyp and the Green Covered Bond Market

Covered bonds, known as *Pfandbriefe*, are among the safest financial instruments in the German banking system. These long-term debt securities provide a stable financial foundation for issuing banks, as they are backed by high-value mortgage loans (Satka, 2022). Berlin Hyp transformed this traditional financing tool into a sustainable financial instrument when, in 2015, it issued the world's first green covered bond (*Green Pfandbrief*). This bond was exclusively dedicated to financing real estate projects that meet strict energy efficiency and sustainability standards (Sweatman & Robins, 2017).

In recent years, Berlin Hyp has consistently expanded its green bond portfolio. By the end of 2022, the total value of its green bond holdings had reached €7.3 billion, and by 2023, ESG-linked bonds accounted for 37% of the bank's refinancing structure (Berlin Hyp, 2023 B). With the rise of sustainable finance, the bank has not only strengthened its market position but also gained a competitive advantage through lower financing costs.

The Green Asset Ratio (GAR) is one of the most critical indicators of ESG integration for Berlin Hyp, measuring the proportion of the bank's total assets that meet sustainable financing criteria. The *Figure 1* illustrates the value of green bonds (in billion EUR) over recent years on the left axis, while the size of the bubbles represents the GAR percentage. The visualization highlights the increasing emphasis on sustainable finance in the bank's strategy, showing a steady rise in ESG-compliant assets. The data indicate that Berlin Hyp has become a significant player in green asset-based financial markets, reinforcing its commitment to sustainability year after year.

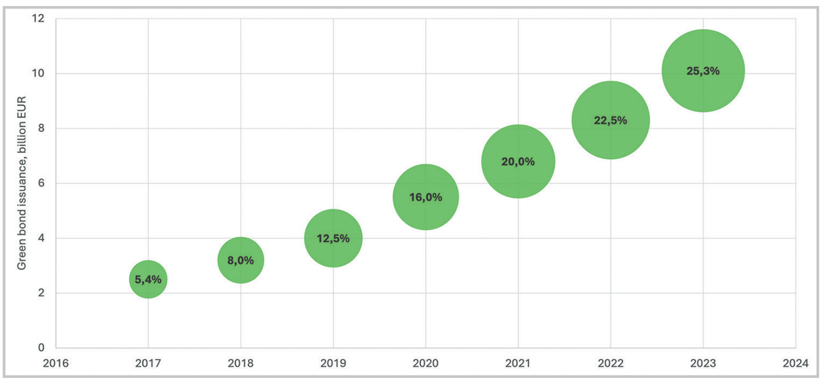

Figure 1. Green asset ratio (GAR) % and green bond issuance.
Source: Berlin Hyp ESG Bond Reports 2017–2023.)

Due to the continuous increase in demand for green bonds, Berlin Hyp has also experienced the greenium effect, which means that investors are willing to accept lower yields for sustainable investment instruments. This pricing advantage reflects investors' growing preference for low-risk, ESG-aligned assets, even at the cost of reduced yields (Satka, 2022). This phenomenon has not only strengthened Berlin Hyp's financial stability but has also contributed to the wider adoption of sustainable finance across Europe.

Berlin Hyp's sustainable real estate financing strategy

One of the key advantages of sustainable financing is its potential to reduce the ratio of non-performing loans (NPL). Berlin Hyp employs a rigorous credit assessment system that places particular emphasis on the energy efficiency and sustainability features of the properties it finances (Berlin Hyp, 2023). Empirical studies (e.g., Boussaada et al., 2023) confirm that sustainable lending correlates with lower NPL ratios due to more resilient asset values.

Another central element of Berlin Hyp's strategy is the Green Tagging system, which enables the bank to transparently categorize and track loans associated with sustainable real estate projects (Sweatman & Robins, 2021). This system not only supports the achievement of sustainability objectives but also strengthens risk segmentation and facilitates more accurate loan pricing.

By integrating sustainability principles into its financing approach, Berlin Hyp strengthens its market position while simultaneously reducing financial risks. The bank's experience demonstrates that sustainable finance is not merely about regulatory compliance but also offers a competitive advantage by improving credit risk management and fostering investor confidence.

The impact of the EU Taxonomy on Berlin Hyp's ESG strategy

The requirements of the EU Taxonomy have significantly influenced Berlin Hyp's ESG strategy. The regulation aims to establish a standardized classification system for sustainable financial products and ensure that ESG-based financing instruments genuinely contribute to achieving environmental and social objectives (European Commission, 2025).

Following the introduction of the EU Taxonomy, Berlin Hyp began publishing more detailed ESG reports that clearly outline the bank's sustainable lending practices and environmental impact (Sweatman & Robins, 2017). As a result of this regulatory framework, the bank also introduced new financial products, such as sustainability-linked bonds and ESG loans, which signal stronger ESG alignment and enhance the bank's credibility among sustainability-focused investors (Boussaada et al., 2023).

BNP Paribas: ESG-based financing models and sustainable lending

BNP Paribas is one of the leading global financial institutions, playing a prominent role in developing sustainable financial solutions. Over the past decade, the integration of ESG (environmental, social, and governance) considerations has become central to the bank's business strategy, positioning it as a key player in the European sustainable finance market. BNP Paribas' sustainability policy is built upon three main pillars: green finance, social responsibility, and transparent corporate governance (BNP Paribas, 2023C). Within this framework, the bank has developed innovative products such as green bonds, sustainability-linked loans, and ESG-based investment strategies, facilitating the transition to a low-carbon economy.

Historical background and ESG integration

The sustainability strategy of BNP Paribas has evolved progressively over the past two decades. The bank began integrating responsible investments as early as the early 2000s, and in 2015, in alignment with the objectives of the Paris Climate Agreement, it made significant commitments to reduce its carbon footprint (BNP Paribas, 2020). In 2017, BNP Paribas announced its ambition to align its entire lending and investment portfolio with the United Nations Sustainable Development Goals (SDGs) by 2030 and to gradually phase out the financing of fossil fuels.

The integration of ESG factors has increasingly penetrated corporate governance at BNP Paribas, as evidenced by the fact that since 2022, ESG criteria have been incorporated into all new lending decisions. One of the bank's most significant innovations is the incorporation of ESG risk assessments into the credit evaluation processes for corporate clients. As a result, the environmental performance of clients has a direct impact on their loan conditions (BNP Paribas, 2022).

ESG products and financing models

BNP Paribas' sustainable financing strategy encompasses a wide range of ESG-based financial products:

- Green bonds, for which BNP Paribas is one of the largest issuers in the European green bond market. In 2023, the bank issued over €15 billion in sustainable bonds. These bonds are used to finance projects that comply with the criteria set by the EU Taxonomy. (BNP Paribas 2023B).

The BNP Paribas green bond portfolio has shown continuous growth in recent years, driven by the bank's sustainability strategy and increasing investor demand. *Figure 2* illustrates the annual change in the green bond portfolio (billion EUR) alongside the yearly growth rate (%). The bars represent abso-

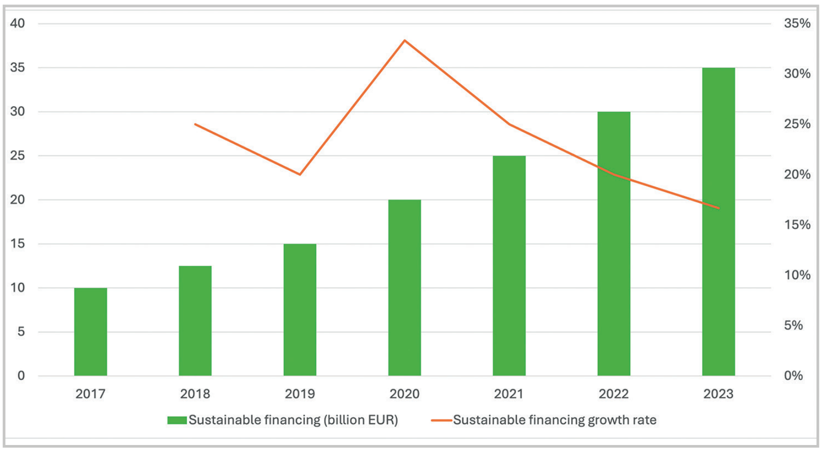

Figure 2. BNP Paribas Sustainable Financing Growth (2017–2023)
Source: BNP Paribas 2017-2023, Climate Bonds Initative 2023.

lute changes in the portfolio, while the line graph highlights the growth dynamics. BNP Paribas has emerged as a key player in the expansion of the sustainable bond market, fueled by the global rise in ESG-based investments.

- Sustainability-Linked Loans (SLLs) – These loans tie financing conditions to clients' ESG performance, incentivizing companies to achieve sustainability targets (Sweatman & Robins, 2017).
- Green Mortgages and Retail ESG Products – BNP Paribas offers sustainable housing finance solutions that promote energy efficiency and the development of eco-friendly real estate.
- ESG-Based Investment Funds – The bank has a strong presence in sustainable investment funds, which select assets based on ESG ratings (Rumpf, 2019).

Regulatory Compliance and ESG Reporting

BNP Paribas actively aligns with European and global sustainability regulations, including the EU Taxonomy, SFDR (Sustainable Finance Disclosure Regulation), and CSRD (Corporate Sustainability Reporting Directive). Since 2022, the bank has implemented a comprehensive ESG reporting framework, ensuring transparency in its sustainability performance. BNP Paribas holds one of the strongest ESG ratings among European banks, as recognized by Sustainalytics (2023) and MSCI ESG Ratings (BNP Paribas, 2025).

Future Challenges and Opportunities

Key challenges for BNP Paribas include enhancing ESG data management, raising client awareness, and consistently achieving sustainability objectives. The bank's long-term strategy focuses on making ESG-based financial products accessible across all customer segments while strengthening its position as a global leader in sustainable finance.

The BNP Paribas case demonstrates that ESG integration is not merely about regulatory compliance but also a driver of long-term business success.

HSBC: Sustainable financial strategies and ESG integration

HSBC (Hongkong and Shanghai Banking Corporation) was established in 1865 in Hong Kong by Sir Thomas Sutherland to support financial connections between British trade and Asian markets (Kynaston & Roberts, 2015). Initially focusing on transactions between British trading houses and Chinese enterprises, the bank quickly expanded with branches in Hong Kong and Shanghai, becoming a key actor in regional infrastructure financing (Nishimura, Suzuki & Michie, 2012).

By the early 20th century, HSBC operated across Southeast Asia, India, and Europe, becoming a central financial institution of the British Empire (Tschoegl, 2005). Though World War II brought significant losses, the bank rebuilt post-war operations and strengthened Hong Kong as a financial center (Koller, 2007). The 1990s marked its global expansion and relocation of its headquarters to London in 1992 (Sugawara & Nishimura, 2020).

Following the 2008 crisis, HSBC emphasized sustainability risk management. In 2020, it announced a $1 trillion commitment for green and sustainable investments by 2030 (HSBC, 2023). The bank is now an active participant in global sustainability initiatives, including the UN Principles for Responsible Banking, the Equator Principles, and the EU Taxonomy (Lu, Toms & Wei, 2021). HSBC aims to achieve net-zero emissions by 2050 and has pledged $750 billion to $1 trillion in sustainable financing by 2030, prioritizing energy efficiency and low-carbon technology development (HSBC, 2024).

Sustainability strategies and ESG financing

One of HSBC's key objectives in its sustainable financing strategy is to support a low-carbon economy and develop green financial products. ESG-based financing principles have become deeply embedded in the bank's operations, characterised by innovative financial products and stringent sustainability criteria (Billio et al., 2022).

HSBC offers a diverse range of sustainable financial products, including:

- Green loans, which provide preferential interest rates to encourage energy-efficient real estate developments and infrastructure projects.
- Sustainability-linked bonds, where issuers can secure more favourable interest rates if they improve their ESG performance indicators.
- Green mortgages, financing sustainable construction projects that comply with EU Taxonomy requirements (Chiang &Tsai., 2024).
- Sustainable corporate loans, offering businesses preferential financing to achieve their environmental and social objectives.

In 2023, HSBC allocated over $30 billion in green loans, making it one of the largest initiatives of its kind in the financial sector (Ng, 2021). ESG-based financing not only promotes environmental sustainability but also enhances the bank's long-term financial stability.

Figure 3 illustrates the development of HSBC's ESG investments and sustainable lending volumes from 2017 to 2023. The area chart's two layers depict how different components of ESG financing contribute to the bank's sustainability portfolio growth. The lower, darker layer represents ESG Investments, which steadily expanded from $5 billion in 2017 to $25 billion in 2023. The upper, lighter layer illustrates the Sustainable Lending Volume, which experienced even more substantial

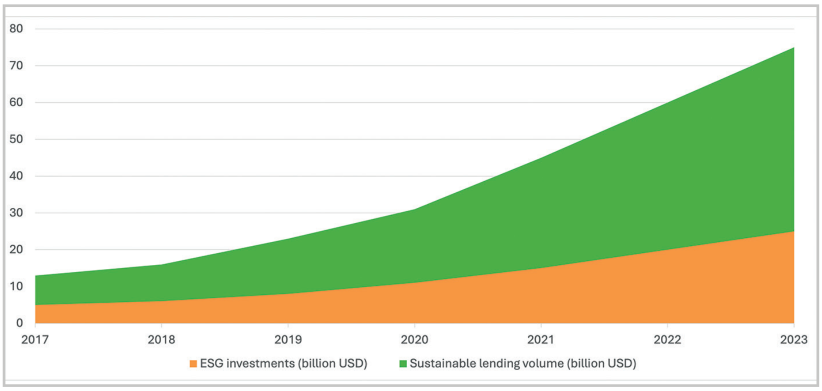

Figure 3. HSBC ESG Investments and Sustainable Lending Growth (2017–2023).
Source: HSCB Sustainalitycs, Annual Reports 2017-2023.

growth, rising from an initial $8 billion to $50 billion. An analysis of the data indicates that post-2020, the volume of sustainable lending increased more rapidly, likely driven by regulatory incentives and rising market demand.

The impact of HSBC's ESG financing on bank risk management
HSBC's ESG financing practices are closely linked to credit risk management and financial stability. By incorporating sustainability criteria, the bank has reduced the proportion of non-performing loans (NPLs), as green projects are generally less susceptible to financial instability (Huang, 2024).

HSBC's Green Tagging system enables precise categorization and tracking of ESG-compliant projects. This not only enhances transparency but also improves portfolio quality, as projects that pass ESG screening tend to yield better long-term returns (Saxena et al., 2021).

The impact of the EU Taxonomy and ESG regulations
The EU Taxonomy has significantly influenced HSBC's sustainability strategy by providing clear guidelines for classifying sustainable financial assets. ESG regulations aim to ensure that financial institutions adopt more transparent sustainability metrics, thereby reducing the risk of greenwashing (Bąk & Cheba, 2020).

In response, HSBC has:
- Increased its ESG reporting commitments to provide investors with a clearer picture of its sustainability performance.
- Developed new ESG-compliant investment products to facilitate corporate green transitions.
- Introduced sustainability assessment frameworks that allow for measuring and evaluating clients' ESG adaptation (Bąk & Cheba, 2020).

HSBC's case demonstrates that ESG regulations not only impose new compliance requirements on banks but also offer long-term financial benefits by improving transparency, risk management, and investor confidence.

The Varying Pace of ESG Financing Adoption Among Banks
The fourth hypothesis posits that the pace of ESG integration varies significantly across banks, with larger institutions adopting sustainability principles more rapidly and comprehensively than smaller ones. The case studies confirm this asymmetry.

Faster ESG Integration by Large Banks
BNP Paribas and HSBC demonstrate that major international banks commit extensive resources to ESG strategy development. BNP Paribas has built its sustainable finance portfolio over decades, offering ESG loan programs, sustainability-linked bonds, and green asset financing (OECD, 2023). It also actively engages in regulatory alignment at the EU level.

HSBC has similarly embedded ESG into its core strategy. Its net-zero emissions goal for 2050 and commitment to mobilize over $1 trillion in ESG financing reflect its market leadership (HSBC, 2023). Thanks to its global reach and capital reserves, HSBC acts as a driver in ESG expansion.

Adaptation Challenges for Smaller Banks
Berlin Hyp illustrates that smaller banks can lead in certain ESG areas, such as green covered bonds (Rumpf, 2019). However, its progress has been supported by strong institutional backing. Generally, smaller banks encounter limitations in ESG data collection, reporting capacity, and strategic integration (Al-Qudah, Hamdan & Al-Okaily, 2023). Compared to larger peers, their ability to innovate and comply is restricted by resource constraints.

Disproportionate Regulatory Burden
Larger banks adapt more easily to EU regulations like the Taxonomy, SFDR, and CSRD due to their established sustainability reporting systems. Smaller banks, by contrast, often lack the financial and human capacity needed to meet complex ESG disclosure standards.

Structural Advantage of Large Banks
The study identifies key factors behind the ESG integration advantage of large banks:
- Greater capital reserves and investment capacity,
- Well-developed ESG reporting infrastructure,
- Regulatory expertise and global influence,
- Faster adaptation to EU frameworks.

In contrast, smaller banks face barriers in data access, product development, and institutional know-how. These findings confirm the fourth hypothesis: large banks integrate ESG financing more effectively, while smaller institutions encounter a slower and more difficult transition.

Conclusions
This study examined the impact of integrating environmental, social, and governance (ESG) principles into banking strategies and financial performance, focusing on three leading banks: Berlin Hyp, BNP Paribas, and HSBC. The case studies confirmed the first three hypotheses and partially the fourth, revealing the following conclusions:

Financial performance
Sustainable financial products such as green bonds and ESG-linked loans contribute to long-term profitability, financial stability, and improved market perception.

Risk reduction
ESG-compliant lending practices lower credit risk, supported by systems like Green Tagging that improve portfolio monitoring and reduce non-performing loan ratios.

Regulatory influence
EU-level ESG regulations act as both constraints and opportunities, encouraging innovation and boosting banks' reputational and strategic positions.

Bank size and ESG adaptation
Larger banks implement ESG strategies more swiftly due to stronger capital positions and broader infrastructure, while smaller institutions face greater structural and resource-based challenges.

Overall, the study confirms that ESG financing is not only compatible with but enhances banking competitiveness. Adoption of best practices plays a critical role in the successful transition to sustainable financial models.

Recommendations

Based on the findings, the following actions are recommended to support the development and broader adoption of sustainable banking models:

At the institutional level:

- Expand the green bond market by increasing the share of sustainable bonds in refinancing structures.
- Integrate Green Tagging systems into credit evaluation processes to enhance transparency and reduce credit risk.
- Improve ESG reporting through advanced data systems and consistent disclosure practices to build investor confidence.
- Promote product innovation, including ESG-based investment funds and sustainable mortgage instruments.

At the regulatory level:

- Harmonize EU and national ESG frameworks to ease implementation burdens, particularly for smaller banks.
- Establish incentive programs (e.g., taxonomy-aligned guarantees) and technical assistance to support ESG capacity building.

Special attention should be paid to the Central and Eastern European context, where financial institutions may lack the resources or regulatory readiness seen in Western Europe. Targeted support and best-practice transfer are essential for equitable ESG integration across the EU banking sector.

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