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Article

Sustainable development through green finance—An exploratory investigation in the financial industry of France

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Abstract: In order to meet the Sustainable Development Goals (SDGs) of the United Nations and address the growing global concern for ecologically responsible activities, this study examines the role that French financial institutions play in financing a green future and promoting sustainable development (SD). Through semi-structured interviews with twelve participants from banks and Fintech companies, the research investigates their familiarity with green financing commitments to international organizations and associations, their views on the growth potential of green finance, and the provision of green finance products. Additionally, it explores the connection between green finance and its positive influence on SD. Data analysis was performed using NVivo 12. The findings highlight a strong commitment to green finance and sustainable practices among these institutions, emphasizing the significance of integration and utilization of green finance products across various sectors. This research emphasizes the crucial role of financial institutions in France in driving a greener and more sustainable future through green finance.

Keywords: green finance; sustainable development; Environmental, Social, and Governance (ESG); financial institutions

1. Introduction

The presence of pollutants in the environment exerts a significant influence on both the economy and the overall well-being of society. Pollution has extensive ramifications, such as detrimental impacts on human health, hastening the depletion of resources, and amplifying the frequency and intensity of natural disasters caused by the rapid progression of clivmate change (Shahbaz et al., 2018). In the name of economic progress, the proliferation of industries has brought about a number of unfavourable outcomes, such as resource depletion, social displacement, and environmental deterioration (Bhutta et al., 2022). The hazard that comes with the advent of major ecological issues and energy challenges is that they will impede human society's ability to develop sustainably, which will have an effect on environmental stability and energy security (Wu et al., 2021). The financial industry has placed more of an emphasis on investing in sustainable growth in recent years by incorporating environmental, social, and governance (ESG) factors into investment choices (Wu et al., 2021). The financial flow of the economy is supported by the banking industry. Green financial products can contribute to the building of a greener planet. The phrases "green finance", "sustainable finance", and "climate financing" are interchangeable (Habiba and Xinbang, 2022). The term "green

finance" refers to investments that benefit the environment (Chishti and Sinha, 2022). It is necessary to invest in clean and renewable energy projects to reduce carbon pollution and its negative impact on the environment and human health (Akbar et al., 2024; Irfan and Ahmad, 2022).

Environmental challenges and protection are crucial today. Anthropogenic global ecological stress can potentially trigger conflicts such as disputes over resource access, competition for land and water resources, and social tensions arising from environmental degradation. The UN has proclaimed global warming the "red code of humanity," and climate change will be a major political and economic problem for years. Governments, investors, corporations, and citizens are taking steps to stop global warming at 1.5 Celsius by decarbonizing. To reduce carbon emissions and assist firms in adapting to climate change, a decarbonized economy will need investment capital, notably green financing (Cheberyako et al., 2021). Sustainable development (SD) which seeks to meet present needs without compromising future ones is a major global concern. SD reflects the belief that everyone has equal access to the earth. Green finance helps SD by considering financial and environmental benefits (Agirman and Osman, 2019). Green finance integrates environmental concerns into financial decisions. The use of green financing to fund climate-neutral and resource-efficient technology will strengthen these sustainability and environmental considerations (Bhardwaj et al., 2022). Eco-friendly finance is a crucial element of the move to sustainability, and its progress strives to strengthen specific financial characteristics to improve the quality of the environment (Wei et al., 2022).

The concept of "green finance" focuses on strengthening the financial industry's role in reducing hazardous environmental circumstances by distributing capital to environmentally friendly businesses, hence generating 'green' growth (Mumtaz and Smith, 2019). Green financing drives a sustainable economy through banking, corporate financing, asset management, and insurance, fostering economic and environmental growth (Jayathilake, 2019). The perceived advantages of green finance highlight the importance of integrating sustainable financial processes. Cities may expedite their transition to smarter, more sustainable urban settings by using green funds, resulting in increased economic growth, improved livability, and a better world for future generations (He et al., 2020). By promoting equitable and resilient growth, green financing facilitates inclusive economic expansion that benefits all segments of society by generating employment and entrepreneurship prospects, as well as enhanced access to critical services (Wang and Wang, 2020). Investment in green projects reduces carbon pollution short- and long-term. Such investments enable short-term solutions like renewable energy deployment and energy efficiency, reducing emissions quickly. Long-term investment in green initiatives helps develop and deploy innovative technology and sustainable practices, reducing carbon emissions and mitigating climate change (Li et al., 2021). Green financing can benefit impact investors by promoting ecologically friendly projects, following market trends, and ensuring financial stability (Barber et al., 2021). Green financing allows businesses and governments to participate in a variety of sustainable initiatives, diversify their portfolios, reduce risk, and capitalise on green economy prospects (Reboredo, 2018). Green financing supports energy efficiency

and sustainable infrastructure while reducing funding for fossil fuel activities, therefore aiding a carbon-neutral economy and aligning financial plans with climate objectives (Ozili, 2022).

The selection of France as the focal point for this study is grounded in its noteworthy commitment to environmental sustainability and active participation in global efforts to address climate change, as evidenced by its alignment with key international agreements such as the Paris Agreement (Wang et al., 2023). France's leadership within the European Union (EU) in shaping green finance policies further justifies its selection, offering valuable insights into regional dynamics and the influence of EU frameworks on sustainable financial practices. Additionally, the diverse financial landscape in France, featuring both traditional banking institutions and innovative Fintech companies, presents a nuanced perspective on the adoption of green finance across different segments of the financial industry. This choice positions France as a compelling case study, providing a comprehensive understanding of how various financial entities contribute to sustainable development in alignment with national and EU-level initiatives (Arslan et al., 2022; Hassan et al., 2022; Zhang et al., 2022).

France adopted EU sustainable financing strategic measures. According to an Autorite des Marches Financiers (AMF) study on French perceptions of sustainable and responsible financial products, most French people are interested in green finance, but only a minority own these investments. The research recommended greater awareness and transparency (AMF, 2021).

Due to rising energy, health, social, and economic challenges and the current IPCC report's climate and environmental emergency, French policymakers must maintain and accelerate their ambition in European and worldwide green finance negotiations. French and European laws have promoted environmental and social impacts, but more must be done to mobilize sustainable investments and force corporations to adapt their business models during environmental crises. However, sustainable development and climate targets remain neglected, and the Paris financial centre must continue to mobilize to bring about French, European, and international improvements so finance can play a real role in a fair and sustainable economic transition (PRI, 2022).

France and the EU have made great strides in regulating green financing to reduce climate change and social issues worldwide. Europe introduced novel financial products and alternative funding sources that were adopted worldwide. Previous research and detailed discussion about EU's and France's role, status, and achievement towards green finance shows that the key stakeholders, who drive and enable change and transition to green finance, have been fulfilling their individual responsibilities by initiating and implementing sustainability steps. The French government has implemented new regulations and frameworks, banks have reduced fossil fuel lending, development banks have redirected funds to green projects, investors have been cautious, and capital markets have introduced innovative sustainable products like green bonds in response to EU commitment. However, these key stakeholders must collaborate for better and faster results. The government's framework should consider each key stakeholder's capabilities, roles, and responsibilities, create a cohesive strategic plan, and communicate their

deliverables to achieve the unified vision of sustainable finance with long-term financial, social, and environmental benefits. Other stakeholders must ensure their projects follow these requirements. Institutional investors own most sustainable investment in France, with individuals having a small minority. All main players working together would give investors a clear picture, confidence, awareness, and motivation to invest sustainably (Kader and Nobanee, 2022).

1.1. Research gap

Afzal et al. (2022) recognized a research gap concerning the necessity for more investigation into the connection between green finance and sustainable development. A request has been made to broaden variables for a more thorough understanding and to diversity sample selection to include various socio-economic circumstances. Addressing these gaps would enhance understanding of how effective green finance is in advancing sustainability worldwide. Future researchers should use a different method since their study used only secondary data. It was reported that few researchers have examined finance and ecology (Fu and Irfan, 2022). However, macroeconomics was the only area covered in this research, and the study relied on secondary sources. Therefore, future studies should use firm-level data and an alternative method to examine the effect of green finance on environmental degradation (Chin et al., 2022). Consequently, it would be of interest in a future study to investigate the influence of green finance on environmental deterioration using a different approach. Green funding could benefit from future research. Tracking banks' green lending is difficult without a central green finance database. Future research should clarify and analyze green finance's function in economically stable development in developed and developing nations (Rahman et al., 2022).

Sadiq et al. (2023) investigated the impact of green financing, eco-innovation, and creativity on the sustainable development goals of ASEAN countries. The study exclusively focuses on the examination of developing countries. Research carried out in underdeveloped nations may not be applicable to developed countries. Authors addressing the same topic should include developed economies.

This paper is driven by a strong commitment to investigate the relationship between sustainable development and green finance in the French financial industry. It aims to explore how financial institutions contribute to sustainability and address a research gap. The study seeks to provide insights into motivations, challenges, and prospects for green finance in France, contributing to both academic knowledge and practical advancements in sustainable financial practices.

1.2. Research questions

The awareness and compliance of French financial professionals with international green financing commitments and sustainable development policies will be explored.

The research aims to understand the perceived growth of green finance in France, emphasizing the role of legislative advantages.

The study seeks to investigate the contributions of green finance to sustainable development in the French context.

An examination will be conducted on the offerings of French banks and companies to determine the relationship with the promotion of environmentally and socially responsible (ESR) business opportunities, including green finance products across different sectors.

1.3. Research objectives

Explore awareness and compliance of French financial professionals with international green financing commitments and sustainable development policies.

Assess the perceived growth of green finance and its legislative advantages in the financial industry of France.

Investigate the contributions of green finance to sustainable development.

Examine the range of goods, services, and specific criteria offered by French banks and companies to promote ESR business opportunities, including green finance products across different sectors.

2. Review of literature

Green: The term “green” implies small, gradual improvements in social practices, modern technology, and human living environments. However, “sustainable” indicates a transformative shift in how we structure our personal and communal lives, as well as how we interact with the planet (Yanarella et al., 2009). Green Finance: Green finance refers to the investment of funds into a diverse array of projects and endeavors that promote environmental preservation, aid businesses in safeguarding the environment, and foster the growth of a more sustainable economy (Zheng et al., 2021). Sustainable Development: SD involves formulating a strategy to attain human development goals while simultaneously ensuring the resilience of natural systems to continue providing essential resources and ecosystem services required by the economy and society (Lélé, 1991). Fintech: Fintechs are financial institutions characterized by their innovative nature, enabled by the utilization of digital technologies (Giglio, 2021; Shahzad et al., 2022).

Green finance policy focuses on offering financial services to eco-friendly and clean firms, encouraging sustainability and innovation while minimizing environmental harm (Zhang et al., 2021). Green finance necessitates the financial sector to incorporate environmental factors into investment choices, advocate for sustainable practices, and allocate funds to environmentally beneficial initiatives (Nawaz et al., 2021). Green money is a novel financial instrument designed to save the environment by channeling funds into sustainable projects and initiatives, advocating for eco-friendly practices, and facilitating a shift towards a more environmentally friendly economy (Sun et al., 2022). Green finance provides a modern means for individuals, organizations, and governments to fund and participate in eco-friendly or low-carbon projects through investment options, business funding, government regulations, financial instruments, and market growth (Huang et al., 2019). Green finance combines sustainable investing, banking, and insurance services to mitigate environmental and climatic risks through supporting eco-friendly projects, providing green loans, creating insurance for climate-related incidents, and considering environmental risks in financial choices (Volz, 2018).

2.1. Green finance

Green finance prioritizes environmentally beneficial initiatives, mitigates climate change impacts, and optimizes natural resource usage without harm (Agirman and Osman, 2019). Urgent climate concerns require globally enforceable laws to limit global warming below 2 ℃. Constructing a green financial sector is crucial for a sustainable economy. Green bonds and loans have emerged as key instruments in financing sustainable projects, despite challenges in implementation (Gilchrist et al., 2021). Green funding supports sustainable development, although its effects vary among EU areas, according to the study. The EU should boost its green funding policies to meet regional differences and promote renewable energy, energy efficiency, and greenhouse gas reduction. Creating green bonds help fund renewable energy and green construction initiatives (Kwilinski et al., 2023).

The study examined how financial institutions prioritized different aspects of green finance, such as waste management, water conservation, renewable energy, green products, construction that is environmentally friendly, energy efficiency, carbon capture, and adaptation (Finance, 2016). Investing in green finance is an essential long-term climate change initiative. Green finance merges sustainable business practices with financial rewards (Li and Umair, 2023).

2.2. Green finance and financial institutions

To promote green practices among consumers and small and medium-sized enterprises (SMEs), Fintech companies are in a favorable position to spearhead the provision of green finance through the utilization of big data analytics and machine intelligence (Duchêne, 2020). An increasing number of Fintech companies are proactively developing and implementing solutions targeted at creating a "green financial system" as a means of addressing climate change and advancing sustainable resource management (Yu et al., 2020). Fintech platforms simplify the process of obtaining and distributing financing for environmental projects by using sophisticated digital technologies and creative financial strategies (Deng et al., 2019). Green bonds are sustainable investment tools that can help Fintech companies improve their financial performance by appealing to eco-conscious investors and broadening their investment portfolios (Flammer, 2021). Alternative banks and financial providers support the green economy by funding environmental infrastructure projects like renewable energy, clean water supply, waste management bio-gas, and bio-fertilizer (Chowdhury et al., 2013). Investments that benefit the environment are encouraged by commercial banks (Nguyen et al., 2023).

2.3. Green finance instruments and products

Green bonds fund green technology, shifting finances from fossil fuels to low-carbon alternatives, and combating climate change (Alola et al., 2022). Green bonds enable investments in green technology and sustainable energy, ensuring liquidity and attracting temporary investment opportunities through a secondary market (Camana et al., 2021). Equity financing serves as an alternative for funding green technologies and renewable energy initiatives, as investors show aversion to

investing in equities that harm the environment, and human health, or disregard societal well-being (Akadiri and Adebayo, 2022).

Equity markets finance green technologies and clean energy, offering secure investments due to disclosure laws. Diverse shareholders bring varied perspectives to project evaluation (Fu and Irfan, 2022). By channeling funds into environmentally friendly investments, projects, or activities, a conventional financial product, service, or instrument can be transformed into a green asset (Li et al., 2021). Green finance encompasses various forms such as low-interest loans for tree planting, syndicated loans for cross-border green initiatives, air quality auto loan products, solar energy finance, and green mortgage loans (Ozili, 2022). Various green finance instruments, including green bonds, structured green funds, carbon market instruments, and society green funds, raise funds for eco-friendly projects (Sachs et al., 2019). Grants mitigate expenses and give technical help for green bond issuance, encouraging investment in ecologically friendly initiatives (Youngho, 2019), Green venture funds and financing support eco-friendly projects and green economy innovation (Nassiry and Wheeler, 2011). An international environmental fund assists global environmental efforts (GFI, 2016). Several of these instruments are utilized worldwide under diverse names as shown in **Table 1**.

Table 1. Types of green financial products (Wang and Zhi, 2016).

Types	Description
Funds for the Environment and Biodiversity	It provides financial support for initiatives protecting biodiversity, including organic farming, ecotourism, forest preservation, and fisheries.
Debt-for-environment Swaps	It supports biodiversity protection in developing countries. Around 30 countries, including the US, Sweden, and Germany, engage in these initiatives, with notable projects like the US-Poland project valued at $370 million.
Forestry Securitizations	Forestry companies create securities, which are sold on the market to raise funds. Examples include the US's Mitigation Banking and Brazil's Tradable Native Vegetation Obligations.
Weather Derivatives	Weather derivatives protect against climate-related disasters by providing financial compensation if a specified threshold is exceeded. Traded for billions of dollars since the mid-1990s, these instruments originated in the energy sector.
Nature-linked Securities	Nature-linked risks are securitized and sold to global investors through special-purpose vehicles, issuing disaster debt instruments for compensating natural disasters.
Green investment funds	Green finance principles drive fund managers to adopt eco-friendly investing strategies, avoiding assets of polluting firms that do not meet environmental, social, and sustainable standards.

2.4. Sustainable development

SD is a defining concept of modern civilization, driving connectivity and expansion across sectors, borders, and generations SD involves meeting present demands without endangering the ability of future generations to fulfill their own needs (IISD-Sustainable Development, 2020). SD aims for long-term economic and environmental stability by considering economic, ecological, and social factors in decision-making (Agirman and Osman, 2019). The Sustainable Development Goals (SDGs) are a universal plan for eradicating poverty, protecting the planet, and promoting prosperity by 2030. Adopted by all UN Member States, the 17 goals and 169 targets outline transformative actions that require global collaboration (Geoghegan, 2015).

2.5. Sustainable development and financial institutions

The Paris Agreement aims to limit global warming to under 2 ℃, and the Crédit Agricole Group is actively engaged in aligning financial flows with lower emissions and climate resilience (Agricole, 2020). Fintech supports SD by enabling green funding, reducing costs and information asymmetry, improving efficiency, valuing natural assets, and promoting realistic pathways for sustainable living. Fintech makes sustainable finance achievable (Cen and He, 2018).

The study aims to examine how green finance elements including green credit, renewable energy production, creativity, eco-innovation, and economic growth impact sustainable development goals. Research indicates that renewable energy production effectively controls atmospheric CO2 and supports sustainable development goals (Sadiq et al., 2023).

2.6. Green finance and sustainable development

Green finance encompasses a framework for the finance industry and broader initiatives aimed at promoting environmental sustainability (Nations, 2021). Green financing pertains to institutions that provide financial assistance for ecologically responsible projects. In the past, there was a prevailing belief that the operations of financial institutions had no environmental impact, as financial products were intangible and did not generate environmental waste (Saleena, 2014). However, it is now recognized that the banking industry serves as the primary source of finance for commercial endeavors and significantly contributes to economic growth. As a result, it plays a crucial role in supporting investments in sustainable environmental development and social responsibility (Pham, 2018). Financial institutions play an active role in offering green credits for eco-friendly projects and prioritizing green industries (Garg and Sharma, 2017).

Green bonds are increasingly used by businesses to finance sustainable initiatives, supporting SD. They enable responsible financial management and promote sustainable business development (Alseiari and Nobanee, 2021). Green finance and sustainability are interconnected and essential for global sustainability. The financial sector promotes green finance, ensuring sustainability. Without SD, green finance loses its effectiveness (Agirman and Osman, 2019; Khan et al., 2022).

BRICS policies prioritize environmental sustainability due to fossil fuel pollution concerns. Due to fossil fuel energy production and imports, greenhouse gas emissions have kept rising. The BRICS nations have renewable energy potential that is environmentally friendly. From 2000 to 2018, green finance and fintech might help the BRICS become carbon neutral. We consider energy innovation, economic growth, and resource rent. The results support the Environmental Kuznets Curve and suggest that green finance, fintech, and energy innovation improve sustainability. However, resource rent and economic growth affect the biosphere. The relationship between CO_2 emissions, green finance, fintech, and natural resources rent is bidirectional, while GDP and energy innovation are unidirectional. These findings suggest that the BRICS countries should prioritize green financial product development and bank and financial institution capacity to offer green loans. Green

financial solutions and risk management research should be funded more (Udeagha and Ngepah, 2023).

Green finance and renewable energy improve both the global economy and the environment. Underdeveloped regions benefit more in enhancing environmental performance through green finance due to the lack of established credit and capital markets. Green financing promotes environmentally friendly innovation and provides support to areas without access to environmental funding. It impedes the advancement of eco-friendly items in industrialized nations with strong green innovation or sustainability laws (Ma et al., 2023). This study examines the impact of green finance and environmental degradation on the sustainability of emerging countries. Environmental degradation hinders sustainable progress whereas green investments support it (Hunjra et al., 2023).

3. Materials and methods

The research's theoretical foundation is rooted in Sustainable Finance Theory, a framework that underscores the integration of environmental, social, and governance (ESG) factors in financial decision-making. This theory serves as a guiding principle to explore the objectives of the study. It informs the examination of awareness and compliance among French financial professionals with international green financing commitments, emphasizing the importance of aligning financial practices with sustainability principles. Sustainable Finance Theory is instrumental in assessing the perceived growth and legislative advantages of green finance in the French financial industry. Moreover, it shapes the investigation into the contributions of green finance to sustainable development, highlighting the role of financial activities in achieving broader sustainability goals. The theory also guides the examination of the range of goods, services, and specific criteria offered by French banks and companies, emphasizing the promotion of environmentally and socially responsible business opportunities, including green finance products across different sectors. This singular focus on Sustainable Finance Theory provides a cohesive and comprehensive theoretical framework for the study, offering insights into how financial institutions in France navigate and contribute to sustainable development through green finance.

The assumptions of this study are:

Financial professionals in French institutions are expected to be aware of and comply with international green financing commitments, reflecting a commitment to sustainable development.

Green finance in France is assumed to perceive legislative advantages, and the study aims to assess its perceived growth within the financial industry.

French banks and companies are assumed to offer goods, services, and specific criteria that promote environmentally and socially responsible business opportunities, showcasing a dedication to sustainability.

Banks and companies in France are presumed to be compliant with green finance regulations, indicating a commitment to sustainability and industry standards.

The recognition of the growth potential of green finance is assumed, along with the intent to contribute to sustainable practices.

This study utilized a qualitative research approach because of the exploratory nature of the research problem, which focuses on the convergence between green finance and sustainable development (SD). Obtaining information on green finance and sustainable development from French financial institutions was difficult because of the changing regulations in this area. Regulatory frameworks are evolving, complete databases are still being established, and public access to this data is restricted. Semi-structured interviews were undertaken with key stakeholders at the managerial level in banks and Fintech enterprises in France to address this restriction. The interviews were conducted to get detailed insights and firsthand opinions on the execution of green financing initiatives and their influence on sustainable development initiatives. Qualitative interviews allowed participants to offer detailed information and important insights that enhance comprehension of the intricate dynamics related to green finance and its impact on promoting sustainable development goals in the French financial industry. This study utilized semi-structured interviews to investigate the complexities of the topic. The semi-structured interviews facilitated an exploratory investigation into several facets of green finance and sustainable development. The study utilized this method to investigate green finance projects and their impact on sustainable development. Participants, including directors, CEOs, managers, and financial engineers, were identified through platforms such as LinkedIn and institutional websites. They were contacted and provided with an interview guide to facilitate the discussions. The sample size for this study consisted of twelve participants, selected using purposive sampling techniques based on their expertise and involvement in green finance initiatives. The selection aimed to ensure a diverse range of perspectives and experiences related to green finance and SD within financial institutions in France. The decision to use a sample size of 12 individuals was supported by the study's exploratory nature and its goal of collecting extensive data. Detailed planning and analysis were necessary for conducting and organizing comprehensive interviews. Rearranging and synthesizing the vast data collected presented hurdles, and time constraints also impacted the decision-making process. Emphasizing depth above breadth in the study, despite the limited sample size, enabled a comprehensive investigation of the research topic within the study's limitations.

Several past studies utilized a sample size of 12, determined by the level of saturation reached. Researchers were interested in the types of saturation used in qualitative research articles. Code saturation occurs after researchers have identified all potential theme issues, whereas meaning saturation indicates the depth of comprehension required to fully understand the topic. Hennink et al. (2017) examined 25 in-depth interviews and found that code saturation was reached after nine interviews, whereas meaning saturation was achieved between 16 and 24 interviews.

The minimum sample size required to achieve saturation was 5 interviews in a study with a homogeneous study population. The study aimed to validate survey findings and achieve saturation in broad categories. The combination of these study parameters may account for attaining saturation after 5 interviews (Constantinou et al., 2017) Theoretical saturation can serve as a valuable tool in designing qualitative

research. Empirical evidence suggests that samples of 12 may reach data saturation within a relatively homogeneous population (Boddy, 2016). Qualitative studies are typically advised to have a minimum sample size of 12 in order to achieve data saturation (Clarke and Braun, 2013; Fugard and Potts, 2015).

To accommodate the preferences and logistical constraints of the participants, interviews were conducted using a combination of online platforms like Microsoft Teams and face-to-face interactions. Prior consent was obtained from all participants for the recording of the interviews, and assurances were given regarding the confidentiality of their personal information and affiliations with their respective companies. This study adopts an inductive approach, which involves conducting a thorough analysis of the collected data to generate concepts, identify recurring themes, and develop models (Saunders et al., 2009). The recorded interviews were transcribed verbatim, capturing the rich data obtained from the participants. The transcriptions were carefully organized and prepared for further analysis. The transcribed data was analyzed using NVIVO version 12 software, which facilitated the management and exploration of qualitative data. Thematic analysis was employed to identify recurring themes, patterns, and relationships in the data. This approach allowed for a systematic and in-depth examination of the participants' perspectives on green finance and SD practices within financial institutions in France. Cluster analysis was performed using cluster mapping techniques to identify clusters of similar data points based on common characteristics. Additionally, a scatter plot was generated, showcasing multiple data points with varying correlation coefficients (r).

In this exploratory study on sustainable development through green finance in the financial industry of France, the research methodology prioritizes the reliability and validity of the data collected. The interview questions are strategically designed to comprehensively cover aspects related to awareness, compliance, perceived growth, and legislative advantages concerning international green financing commitments. This careful planning ensures that the responses garnered provide a well-rounded understanding of the subject matter. Consistency in the interview protocols contributes to the reliability of the findings, minimizing potential biases. The iterative and participant-engaged approach fosters validity, and a reflexive stance is maintained throughout to acknowledge and mitigate potential researcher biases. These methodological considerations collectively uphold the credibility and trustworthiness of the study's insights into the relatively unexplored landscape of green finance within the French financial industry.

Before participating in the interviews, all participants were provided with clear information about the research objectives, procedures, and their rights as participants. Informed consent was obtained from each participant, ensuring their voluntary participation in the study. Participants were assured that their personal information and affiliations with their respective companies/banks would remain confidential. Collected data was kept confidential and securely stored with limited access to the research team. By upholding participant confidentiality, the research study respected and protected the privacy of the individuals involved, further enhancing the ethical conduct of the study.

4. Results

4.1. Demographic information

The 3D Stacked Column Chart shown in **Figure 1** was created with the help of NVivo. It is an appealing visual representation. It illustrates the connection between the participants' various levels of professional experience and their ranks in the organization. This made it much easy to recognize each of the participants, which in turn improved the overall visual presentation. Each participant was assigned their own unique color-coding. Respondents were ranked at various positions, including director, manager, fund manager, financial engineer, private client director, CEO, and so on. Their experiences range from six to twenty-seven years, and they have diverse backgrounds.

The themes made in NVivo were: commitments and regulations, SD, special criteria, legislative framework, green finance products, green finance future, environmentally and socially responsible (ESR) opportunities. The hierarchy chart (Appendix **Figure A1**) demonstrates themes in terms of coding references and items coded. The commitments and regulations have more coding references because it covers three interview questions. Legislative framework has 13 direct and aggregated coding references which are least in the chart.

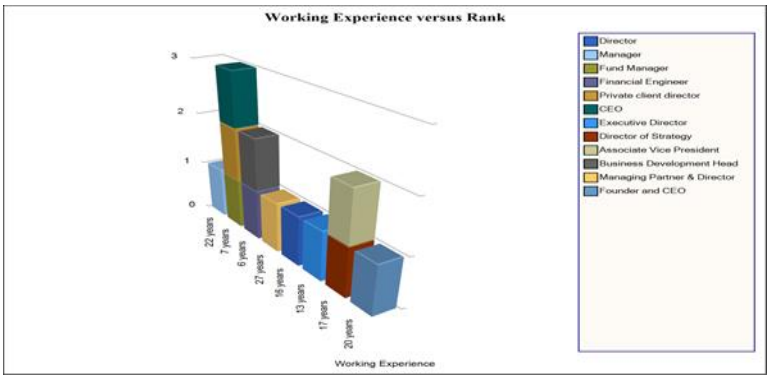

Figure 1. 3D Stacked column chart (NVivo).

4.2. Commitments and regulations

Table 2. Commitments and regulations.

Commitments and Regulations	
United Nations Environment Programme Finance Initiative (UNEP FI)	Aluminum Climate-Aligned Finance Working Group
EU Taxonomy	Net Zero Banking Alliance
Non-Financial Reporting Directive (NFRD)	Positive Impact Initiative
Principles for Responsible Investment (PRI)	Equator Principles
Climate Bonds Initiative (CBI)	Corporate Sustainability Reporting Directive (CSRD)
Social Responsible Investing (SRI)	Sustainable Finance Disclosure Regulation (SFDR)
International Financing Review ESG (IFR ESG)	Climate-related Financial Disclosures (TCFD)
International Finance Corporation (IFC) Green Bond Program	Nature-related Financial Disclosures (TNFD)
Aviation Climate-Aligned Finance Working Group	Carbon Accounting
UNSDGs	B-Corporation certified

Questions were asked from the respondents regarding commitments and regulations of green finance and SD. **Table 2** displays participants' awareness of green finance regulations and their companies' and banks' compliance. All participants confirmed compliance with these regulations.

One participant said that they adopt responsible investment practices, and ESG considerations, and comply with developing green finance regulations. Another respondent reported that they hold the Greentech Innovation Label, acknowledging their positive environmental impact. "In 2021, we committed $1 trillion, including $750 billion for low-carbon initiatives, to support the UNSDGs. To reach our 2030 goal, we aim to raise $700 billion for low-carbon solutions, requiring increased funding for clean-tech, renewable energy, and green bonds." Mr. H.

One response was that they align with the French government's low-carbon strategies and SDGs, influencing their sustainability goals, investments, and finance operations. Another participant reported compliance with French law's article 29, requiring specific ESG reporting on climate, biodiversity, and ESG risks. Mr. G reported: "We aim to be a "net zero bank" by 2050, driving the shift to a low-carbon economy. Our green financing standards and £100 billion budget support eligible funding from 2018 to 2030."

EU's green finance regulations are being enforced, but respondents stated the absence of clear measurement standards. Mr. F added: "The EU lacks an ecological strategy, relying on voluntary company involvement in regulations. The aim is to fractionalize carbon credits among consumers, with plans to require emission offsets for all products sold in Europe by 2026."

One participant mentioned that they have developed a stricter selection approach compared to existing ecological regulations, aligning with Article 9 to promote sustainable investments contributing to ESG goals.

4.3. Green finance future

The next question asked from the participants was regarding green finance growth and their companies' or banks' plans for increasing investments in this field. Participants view green finance as a rising industry and plan to enhance their green financing efforts. Responsible finance is the fastest-growing asset management segment. They aim to expand by developing new offerings, forging partnerships, and supporting clients' sustainability goals. One participant commented that they prioritize green financing in their CSR strategy due to the undeniable scientific consensus on global warming. They aim to support the energy transition and integrate green financing into their growth plans. Mr. L commented: "Every card transaction's estimated carbon emissions are calculated by us so that customers can better understand how their actions individually affect the environment. Our company has developed a financial model that incorporates transaction fees that will be donated to Unitlife and Ecotree."

One respondent added that the government is spending heavily on green finance. Incentives from governments provide funds or tax reductions to mitigate climate change. Thanks to laws Inflation Reduction Act (IRA) in Europe. "We lead in green finance with residential mortgage securitization and green bond issuance, committed

to the energy transition. Our 2024 plan includes financing new green and social assets, broader issuance policies, and ESG solutions for clients." Ms. I.

One participant stated that green financing revitalizes the French economy, offering opportunities like Regenerative finance. Third-party verification is crucial for venture capital investment in decarbonized projects. Carbon credits serve as the key business model for facilitating the environmental shift.

A representation of the green finance concepts that are supported by businesses and financial institutions that were identified by the respondents is shown in **Figure 2**. In an effort to attain net zero emissions, conserve biodiversity, and demonstrate support for ecological programs, businesses are developing methods to reduce the amount of carbon emissions they produce. The establishment of beehives and the development of plant initiatives are both receiving financial support from businesses through offering financial assistance. The internal ESG framework that they developed is the primary focus of their attention.

Figure 2. Green financing plans.

4.4. Legislative framework

The question of whether a legal framework and policies on green financing would help to encourage green investment was put to the respondents. Participants agreed that a legal framework and policy on green financing is essential in promoting green investment by offering precise rules, incentives, and risk-reduction strategies, thereby encouraging financial institutions to allocate money to environmentally friendly projects. There must be regulations for green finance to avoid greenwashing. "The current challenge is in defining green finance due to a lack of information. Businesses don't have all the data to demonstrate whether it's green or not. We require rules to encourage investment in green projects and to specify the restrictions. However, getting there will be challenging unless more resources and information are put in place." Mr. B.

One response was that the EU is at the forefront of those policies. It is getting there in the United States. Many climate, senior advocates, and professionals are starting to get involved. "The market is still in its early stages at the moment. Different processes need to be standardized between nations and commercial sectors. In terms of finance and how we currently view the environment, we are in the middle of a real transition." Mr. F.

Another respondent stated that a strong legal framework guides Fintechs in green financing, enabling them to create impactful products and services. It should

be adaptable and flexible, facilitating Fintech participation and supporting the success of green investments. One participant responded that they have established widely adopted criteria for green finance. When it comes to debt instruments, adherence to the EU Green Bond standards, along with the principles set by the International Capital Market Association (ICMA) and Loan Market Association (LMA), is crucial to ensure their quality and guarantee.

4.5. Green finance products

The participants were inquired about the green finance products and services offered by their respective companies or banks. They highlighted a range of offerings, including green bonds, sustainability-linked bonds, green loans, etc. as shown in **Table 3.** These green finance products and services are not limited to a specific segment but are designed to cater to a wide range of stakeholders. This includes individual consumers looking to invest their money in environmentally conscious projects, SMEs seeking funding for sustainable business initiatives, large corporations aiming to integrate sustainable practices into their operations, and even investment banking clients seeking opportunities in green finance projects. It is noteworthy that the provision of green finance extends across all economic sectors. This means that financing options are available for various industries, including but not limited to energy, agriculture, manufacturing, transportation, and construction. This comprehensive approach demonstrates a concerted effort to align financial resources with SDGs and promote a transition towards a greener and more environmentally responsible economy. The thematic Diagram of Green Finance and SD is shown in Appendix **Figure A2**.

Table 3 shows that green finance products and services refer to a suite of financial instruments designed to support environmentally and socially responsible initiatives. Examples include green bonds that fund eco-friendly projects, sustainable loans for socially beneficial endeavors, climate-linked offerings that tie financial incentives to sustainability goals, etc. These financial tools operate across sectors such as sustainable infrastructure, real estate, agriculture, clean energy, etc. They cater to different segments, including consumers, small and medium-sized enterprises (SMEs), large corporations, and investment banking entities. The overarching aim is to integrate financial activities with sustainability objectives, fostering responsible practices in diverse industries and meeting the financial needs of various stakeholders committed to environmental and social responsibility. Word Cloud of green finance products and services is shown in Appendix (**Figure A3**) which contains words like green bonds, green loans, sustainable finances, carbon credits, renewable energy bonds, green hydrogen projects, and more. These are several financial tools and projects designed to support environmental sustainability and adhere to sustainable development objectives.

Table 3. Green finance products.

Green Finance Products/Services	Sectors
Green, Social, and Sustainable Bonds	Sustainable Infrastructure
Green Notes	Sustainable Real Estate
Life Insurance	Sustainable Agriculture and Forestry
Blue Bonds	Environmental Conservation and Biodiversity
Sustainability-Linked Bonds	Responsible Consumer Goods and Production
Green and Sustainable Loans	Low carbon Transportation
Sustainable Funds	Energy Transition and Carbon Neutrality
Positive Impact Bonds	Sustainable Mining and Resources
Carbon Credits and Offsets	Water and Waste Management
Green Home Mortgage	Defense and Environmental Security
Green Building Bonds	Clean Energy
Sustainable Agriculture Bonds	
Renewable Energy Bonds	Segments
Green Private Equity Funds	
Investment Management	
Carbon Accounting	Consumers
Decarbonization Investment Vehicles	SMEs
Performance and Reporting Solutions	Large Corporates
Climate-Biodiversity Data Integration	Investment Banking
Green Hydrogen Projects	

4.6. Sustainable development

Respondents were inquired about the significance of green financing in promoting SD. All the participants agreed that the integration of green financing catalyzes SD. One participant commented that green financing supports SD by funding eco-friendly initiatives and promoting sustainable practices with ESG integration. Green finance drives renewable energy, clean tech adoption, and sustainable infrastructure, lowering emissions, protecting resources, and supporting a sustainable future. One respondent added that banks' green funding drives SD by directing capital towards eco-friendly industries, fostering innovation, and promoting sustainable practices in line with global sustainability goals. "I believe green finance has a crucial role to play in the ecological transition and in achieving the goal of the Paris Agreement." Mr. D.

One participant said that meticulous reporting is vital in green finance due to unique environmental rules. It ensures transparent and accurate reporting, supporting effective SD. Another reported that as sustainability integrates into corporate planning, green finance plays a crucial role in implementing environmental and social goals across a company's operations. Green financing fosters social impact through investments in fields like affordable housing, green buildings, water quality, and healthcare, improving quality of life, and boosting community resilience while driving economic expansion and addressing environmental and social issues.

4.7. ESR opportunities

It was inquired during the interviews whether the respondents' bank/company provides goods and services that promote the pursuit of ESR business opportunities. Respondents shared that by providing green financing choices, environmentally friendly investment products, and advisory services that support and promote sustainable practices, they encourage the exploration of business prospects that are both socially and environmentally responsible. One participant answered that they

offer investment strategies, portfolios, and wealth advisory services that take ESG considerations into account. Clients can now invest in and support companies that promote SDGs. Another respondent commented that they prioritize sustainability and offer customized financial products and services to businesses with sustainability goals, including green financing, sustainable investment advisory, ESG research and ratings, and social impact financing. Their impact products drive the transition to a more sustainable economy and address pressing global issues. "We provide vital financing to revitalize economies and drive the transition to a sustainable economic paradigm, supporting sustainable energy and low-carbon infrastructure projects. Our strategy fosters global social and SD through green finance, assisting clients in their energy transition efforts." Mr. G.

4.8. Special criteria

Respondents were queried about whether their bank or company implements specific criteria for green finance. They use ESG criteria to assess green finance, considering emissions, energy, water, waste, and land. This promotes a sustainable economy and aligns with EU taxonomy and UNSDGs. One participant stated that they adhere to best practice standards like the Equator Principles and Green Bonds Principles. The CSR sector policies outline their detailed social and environmental standards. Two respondents said that their green finance initiatives support the UNSDGs and have measurable impacts through the use of Impact Reporting and Investment Standards (IRIS) metrics. "We offer environmentally committed investments based on two green finance criteria. We exclude fossil fuels, tobacco, and non-global compact companies. We also align with the Paris Agreement's goal of limiting global warming to 2 ℃." Mr. D.

One participant shared that for companies they finance if 95% of their income is generated from eligible green business activities, it qualifies as 100% green finance. In cases where qualified green activities contribute 89% of the company's income, they apply the pro-rata approach to determine the extent of green finance. One response was that they excluded loans for environmentally harmful farming activities like alcohol production, sugarcane processing, and tobacco growing to promote sustainable agriculture. Another participant added that Green finance impact varies by customer type: private equity has a strong ESG focus, while asset management's role may be limited. "We use CIA methodology for carbon impact assessment and CRIS for climate risk screening. BIA-GBS measures biodiversity impact, aligning with global targets for climate and biodiversity challenges". Ms. K.

Financial institutions with green finance criteria prioritize sustainability, responsible practices, and transparency. They consider impact measurement, reporting, compliance with standards, and benchmarks. This promotes resource allocation to sustainable initiatives.

4.9. Cluster analysis

To generate a graphical representation that groups together codes with common attributes, a cluster analysis was used. This method grouped data points with similar properties together by analyzing patterns and trends within the collection. It provided

useful insights into the underlying links and associations within the dataset. **Figure 3** shows the resultant cluster map, which offers a visual representation of these clusters and helps to comprehend the data's organization and structure better.

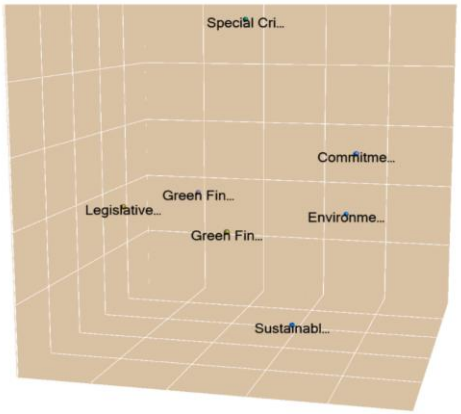

Figure 3. Cluster map (Items clustered by word similarity).

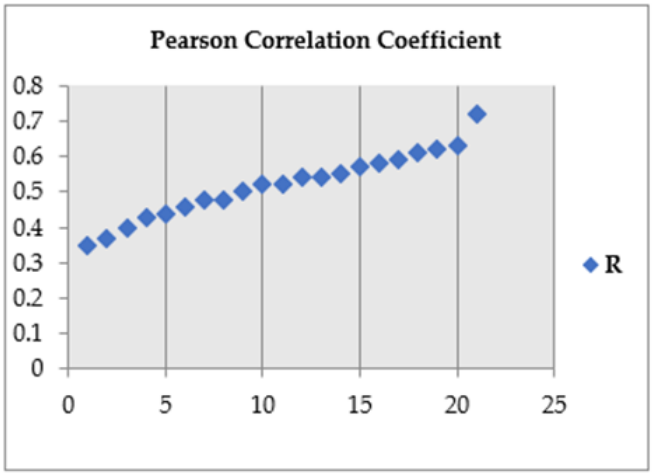

Figure 4. Scatter plot showing values of R.

Note: R = +1: A perfect positive correlation, which signifies that an increase in one variable corresponds to a proportional increase in the other variable.
R = −1: A perfect negative correlation, signifying that an increase in one variable is accompanied by a proportional decrease in the other.
R = 0: It shows the absence of correlation, signifying the absence of a linear association between the variables.

The Pearson correlation coefficient (R) ranges from 0.35 to 0.72, as indicated in **Table A1** located in Appendix **Table A1**. The table displays correlation coefficients (R values) between variables. The correlation coefficient is 0.35 between SD and specific criteria, and 0.72 between legislative framework and green finance future. The scatter plot analysis revealed various correlation coefficients (R) to show the strength and direction of the relationship between the variables employed in the research. **Figure 4** demonstrates a positive association among the variables in this research. The graph displays a positive linear relationship.

5. Discussion

The model shown in **Table 4** provides a structured approach to understanding

and evaluating the role of green finance in the French financial sector. It highlights key aspects, from professionals' awareness to the impact on sustainable development, and emphasizes the promotion of environmentally and socially responsible opportunities.

Table 4. Green finance impact framework.

Awareness and Compliance	Explore how well French financial professionals understand and adhere to international green financing commitments.
Green Finance Growth	Assess the initiation and success of green finance programs within the French financial industry, indicating overall growth and development.
Contributions to Sustainable Development	Measure the impact of green finance on sustainable development, focusing on its contributions to renewable energy, emissions reduction, and other sustainable practices.
Green Finance Products and Criteria	Analyze the variety and prevalence of green finance instruments (products) and specific criteria within French banks and companies.
ESR Opportunities	Explore how financial institutions encourage socially and environmentally responsible initiatives through green financing products, fostering environmentally sustainable business opportunities.

Findings revealed a high level of familiarity and compliance with international green financing commitments among banks and companies, showcasing a strong dedication to sustainable practices and alignment with global sustainability goals. Awareness of initiatives and frameworks such as UNEP FI, EU Taxonomy, PRI, CBI, etc. was evident, demonstrating active engagement in adhering to green growth and SD policies. Although clearer standards and stricter ecological criteria are needed, these insights contribute to the discourse on achieving responsible and sustainable financial practices. The compliance of banks and companies with green finance regulations demonstrates their commitment to sustainability and industry standards. This reflects their contribution to environmental goals and SD, highlighting the importance of green financing for a sustainable future. The growth potential of green finance is recognized, with plans to develop new products, forge partnerships with sustainable projects, and assist clients in achieving sustainability goals. These efforts demonstrate a commitment to integrating green finance, meeting market demands, and contributing to environmental and social objectives.

Clear guidelines, incentives, and comprehensive legal frameworks are essential for promoting environmentally friendly investments through green financing. The EU's leadership in green financing policies is acknowledged. These frameworks drive green investment and uphold the integrity of green financial instruments. Green finance options, including green bonds, sustainability-linked bonds, and green loans, etc. cater to a wide range of stakeholders, including individual consumers, SMEs, large corporations, and investment banking clients. These options span across all economic sectors, reflecting a comprehensive approach to aligning financial resources with the SDGs and driving the transition towards a greener and more sustainable economy. In particular, green bonds attract investors and offer long-term capital for investments in green technologies and renewable energy (Camana et al., 2021). Green financing plays a crucial role in promoting SD by directing capital to eco-friendly industries, supporting global sustainability goals, and facilitating the transition to renewable energy and sustainable infrastructure. It considers ESG factors, reduces carbon emissions, preserves resources, and improves quality of life.

Additionally, it has a positive social impact, including investments in affordable housing, green buildings, and healthcare. Green financing is an essential tool for achieving the objectives of the Paris Agreement and driving the transition to a sustainable future. Green finance plays a crucial role in achieving sustainability by meeting current needs while ensuring the well-being of future generations (Agirman and Osman, 2019).

Banks and companies provide green financing, sustainable investment products, and consulting services to support ESR business opportunities. They prioritize investments in companies aligned with SDGs, provide customized financial solutions for sustainable businesses, and advocate for ESR practices in the business community. Despite the COVID-19 pandemic, global sustainable investments in ESR stocks have exceeded USD 35.3 trillion, showcasing a 15% increase in two years and demonstrating the resilience of ESG stocks during market downturns (Akadiri and Adebayo, 2022). Financial institutions have established specific criteria for green finance, considering factors like emissions, energy efficiency, water usage, waste management, and land conservation. These criteria align with ESG principles, EU taxonomy, UNSDGs, and other sustainability measures. Compliance with best practice standards such as Equator Principles and Green Bonds Principles is prioritized, alongside integrating social and environmental standards from CSR policies. Methodologies like carbon impact assessment, climate risk screening, and biodiversity impact measurement are used to measure the impact and align with international targets. This commitment to sustainability enables effective support for sustainable initiatives.

The research underscores the significance of banks and companies maintaining their dedication to sustainability through actions like innovating new green financial products, collaborating with sustainable ventures, and offering personalized solutions to clients. It also emphasizes the necessity of well-defined legal structures to encourage green investments. Theoretical implications center on reinforcing the compatibility of green finance practices with sustainability theories and advocating for standardized methods to measure impacts. Moreover, the study recognizes the resilience of ESG investments in turbulent markets, indicating a need for deeper investigation. Collectively, this research offers valuable practical and theoretical insights that can steer the progress of ethical and sustainable financial practices.

The study, grounded in Institutional Theory, elucidates how banks and Fintech firms contribute to sustainable development through green finance by examining the influence of external regulations. It reveals the dynamics between regulatory frameworks, organizational practices, and the provision of green financial services. Additionally, incorporating Stakeholder Theory provides insights into effective engagement strategies with various stakeholders, guiding financial institutions in aligning their operations with sustainable development goals.

Practically, the research advises financial institutions to comply with external regulations, including Sustainable Development Goals, and tailor strategies to meet stakeholder expectations. By navigating regulatory landscapes adeptly and innovating in green finance, institutions can effectively contribute to sustainable development. Awareness of stakeholder dynamics allows for the creation of robust engagement strategies, fostering collaboration that promotes sustainable

development through green finance initiatives. Overall, the study offers practical guidance for financial institutions to align with sustainability objectives and meet the expectations of diverse stakeholders in the green finance landscape.

To help policymakers, government agencies, and enterprises incorporate green finance ideas into their strategies, policies, and practices, our research offers practical insights. This study can help policymakers create incentives for environmentally friendly investments and encourage more sustainable banking practices. In the same manner, companies may promote green finance practices by introducing sustainable operations and green investment products. Stakeholders can improve competitiveness, reduce risk, and help build a more resilient economy by adopting sustainability.

The limitations of this study include the constraints associated with a relatively small sample size of 12 participants, which may impact the generalizability of findings and limit the statistical power to detect significant correlations. Additionally, relying solely on qualitative research and utilizing NVivo for analysis may potentially overlook quantitative dimensions and constrain the depth of analysis. Although future research has the potential to address these limitations by increasing the sample size and incorporating more diverse perspectives from banks and fintech firms, the current study's findings should be approached with prudence when applied to broader contexts. Furthermore, the absence of p-values in the analysis raises considerations about the statistical significance of the observed Pearson correlation coefficients (ranging from 0.35 to 0.72). This emphasizes the need for future studies to use quantitative approaches and larger samples to examine the effects of green finance practices more thoroughly and credibly, allowing for more generalizable findings. Therefore, it is imperative to do further investigation in order to acquire statistical insights.

6. Conclusions

The survey indicates that businesses and financial institutions are highly dedicated to environmentally responsible practices and green finance. The study was done to examine this dedication. Their familiarity with a diverse array of projects and frameworks, coupled with their adherence to international standards, demonstrates their commitment to aligning with global sustainability objectives. It is crucial to have transparent standards and strict ecological requirements to ensure responsible and sustainable policies and practices in the financial sector. Engaging in planned activities like product creation and collaboration with sustainable projects to achieve sustainable aims indicates the potential for growth in the green finance sector. These actions aim to further sustainable project objectives. Supporting environmentally friendly investments involves establishing clear criteria, offering incentives, and implementing thorough regulatory frameworks. It is emphasized to include green finance into strategies and utilize green finance products like green bonds, sustainable bonds, and other tools in various industries. The significance of integrating green money into planning is highlighted. The importance of green finance in supporting the shift towards a sustainable future and in meeting environmental and social goals has been highlighted due to these findings.

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Appendix

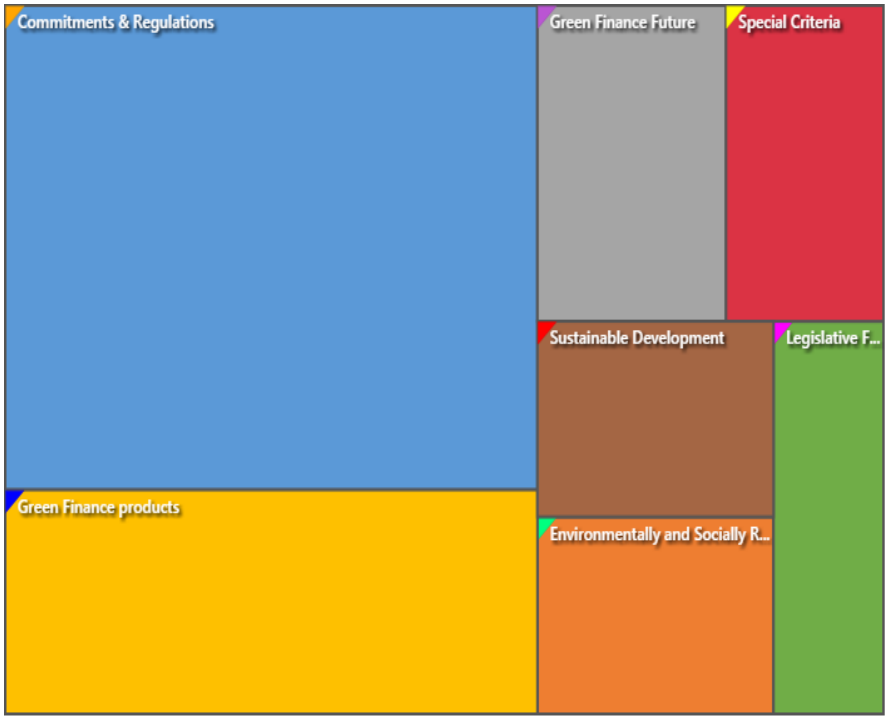

Figure A1. Hierarchy Chart compared by number of items coded.

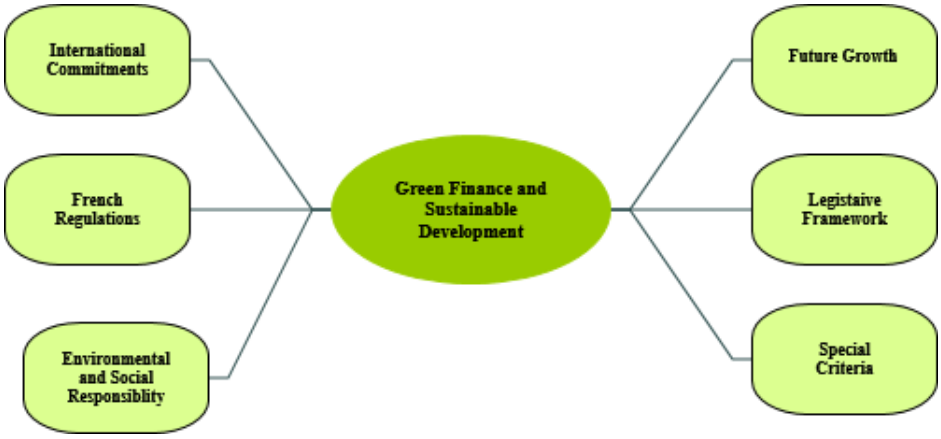

Figure A2. Thematic Diagram showing Green Finance and SD.

Figure A3. Word cloud of green finance products and services.

Table A1. Pearson correlation coefficient.

SD	Special Criteria	(r = 0.35)
Special Criteria	Legislative Framework	(r = 0.37)
Special Criteria	ESR Opportunities	(r = 0.4)
Special Criteria	Green Finance Future	(r = 0.43)
Legislative Framework	ESR Opportunities	(r = 0.44)
Special Criteria	Commitments & Regulations	(r = 0.46)
Green Finance Future	ESR Opportunities	(r = 0.48)
Special Criteria	Green Finance products	(r = 0.48)
Green Finance products	Commitments & Regulations	(r = 0.5)
SD	Legislative Framework	(r = 0.52)
SD	Green Finance products	(r = 0.52)
ESR Opportunities	Commitments & Regulations	(r = 0.54)
SD	Commitments & Regulations	(r = 0.54)
Legislative Framework	Green Finance products	(r = 0.55)
Green Finance products	Green Finance Future	(r = 0.57)
SD	Green Finance Future	(r = 0.58)
Legislative Framework	Commitments & Regulations	(r = 0.59)
Green Finance Future	Commitments & Regulations	(r = 0.61)
SD	ESR Opportunities	(r = 0.62)
Green Finance products	ESR Opportunities	(r = 0.63)
Legislative Framework	Green Finance Future	(r = 0.72)