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GREEN FINANCE: PAST, PRESENT AND FUTURE STUDIES

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The research consists of a systematic literature review (SLR) emphasizing scholars' views on the topic of green finance. Seeking to provide a deep understanding of the state of the art, the paper aims to draft implications and insights to address future research. Studies on green finance are investigated using the Scopus database as a source to get access to the dataset. The methodological approach is inspired by Kraus *et al.* (2020) in order "*to identify, choose and critically appraise relevant pieces of research, and to generate collective insights of knowledge from past research*" (Loureiro *et al.* 2019).

Keywords: Green finance; SLR; CSR.

1. Introduction

Traditional finance had as its goal the maximization of profit for its shareholders, without considering externalities that could harm the environment and society (Tao *et al.* 2022). However, beginning in the 1970s, the first ideas about the importance of corporate social responsibility settled in. The growing interest of savers and financial investors around sustainability issues and the significant role of

sustainable investments justifies the evolution of traditional finance to green finance, from shareholder-facing value creation to what we find in the triple bottom line, i.e. value creation for the benefit of society as a whole (Friedman 2007).

The development of the concept of a sustainable financial system consists of a set of elements, approaches and decision-making mechanisms (Schoenmaker 2017) that starts from maximizing shareholder value and profits over a short-term horizon and arrives at a stakeholder-facing model capable of creating not only financial value but also social and environmental values and contextually considering the returns associated with them. The financial system would prove capable of facilitating decision-making on the trade-offs between economic, social and environmental goals of sustainable development (Dimmelmeier *et al.* 2021).

Green finance can be understood broadly as "financing as well as related institutional and market arrangements that contribute to the achievement of strong, sustainable, balanced, and inclusive growth through direct and indirect support of the Sustainable Development Goals (SDGs) framework. In addition, green finance is concerned with the stability of the financial market and its overall efficiency." (Sustainable Finance Study Group 2018). It emerges how the concept of finance has gradually evolved to the point of incorporating ESG issues among investment objectives and in investment strategies. To meet the investment needs required to reconvert the production system, there is a need to mobilize private savings by directing them, through institutional investors (such as pension funds, insurance companies, investment companies, but also banks), toward the investments needed to reorient the economy toward sustainability goals.

To this end, in 2018, the Action Plan on Sustainable Finance was published by the European Commission. The Action Plan on Sustainable Finance provides for a series of actions — 10 to be exact — that aim, on the one hand, to encourage the allocation of private capital in sustainable investments, and on the other hand, to help financial market participants identify sustainability risks that may negatively impact their portfolios, as sustainability risk, and climate change risk in particular, has become a systematic and systemic risk. Clearly, financial products that do not take sustainability factors into account will encounter distribution difficulties in the future, where, as a result of the MiFID II amendment (another of the actions in the European Commission's Plan), clients express preferences for ESG investments.

The evolution of society cannot be achieved without the support of finance and appropriate tools for its development (Elheddad *et al.* 2021).

Regulation of the financial industry is adapting to the very rapid growth it has achieved, with the preparation of numerous initiatives to counter greenwashing and refine sustainability ratings, so as to produce greater transparency and reliable data, and manage risks of creating a bubble that could burst producing losses and financial instability (Zhang 2022).

The main initiative put in place in this regard is the Sustainable Finance Disclosure Regulation (SFDR) adopted in November 2019 (Regulation 2019/2088 — SFDR) and the EU taxonomy adopted in June 2020 (EU Regulation 2020/852).

The goal of the Regulation is to expand and standardize the information provided to investors on ESG financial products, i.e. those investment products that consider environmental, social, and governance aspects. With this information, it should be easier for investors to compare different investment products and understand their level of sustainability.

The EU Taxonomy is the main starting point of the concrete implementation of the EU Sustainable Finance Action Plan to help investors identify opportunities offered by the energy transition and achieve sustainable investment goal and will form the basis of forthcoming regulations to be introduced.

Several studies address the topic of green finance (Zheng *et al.* 2019, Dervi *et al.* 2022, Frimpong *et al.* 2022, Wang *et al.* 2021a), however, our contribution has a different implementation and offers a more accurate analysis. The study considers a time frame that includes the entry into force of two important legislative instruments for the development of the green finance: the SFDR and the EU taxonomy. In fact, we believe that this introduction will be instrumental in achieving a new model of inclusive and sustainable finance.

Given the increasing importance of the sustainability paradigm, we believe that its influence on the financial sector should be studied through a systematic approach. Therefore, the purpose of this paper is to critically review the literature on green finance. Thus, we applied the systematic literature review (SLR) (Kraus *et al.* 2020, Tranfield *et al.* 2003) using the Scopus database "to identify, choose and critically appraise relevant pieces of research, and to generate collective insights of knowledge from past research" (Loureiro *et al.* 2019).

Therefore, we combined the keywords analysis and the content analysis to achieve adequate results and answer the following research questions (Massaro *et al.* 2016):

- RQ 1 How is the literature on green finance developing also given the new regulatory measures?
- RQ 2 What is the literature's focus in the green finance field?
- RQ 3 What are the academic implications in terms of research gaps and future research avenues?

Ensuring a transparent and high-quality process, our research team created a review protocol and searched the terms "Green Finance" or "green loan(s)" or "climate transition risk" and "financial(s)" or "climate change risk" and "financial(s)" when they appeared either in the title, abstract or keywords of the studies. The search has been undertaken on the Scopus (Elsevier) database. The research team has included only research papers as documents to search, published in an international peer-reviewed journal, written in English, and published between 2012 and 2023.

The analysis starts from 2012 as the Sustainable and Responsible Investment has been booming for a number of years around the world and between 2012 and 2018, the value of assets managed by European "responsible" mutual funds doubled from 250 billion to 500 billion euros (Climate Bond Initiative 2019)

Proceeding papers, book chapters, book reviews, meeting abstracts, theses, interviews, and any kind of studies not written in English, have been excluded from the examination. We limited the investigation to the areas of Business, Management and Accounting and Economics, Econometrics and Finance. The result was based on 89 research papers connected to the aim of this SLR.

We develop a longitudinal study analysis on ten years (2012–2023) as the relevant period of analysis. Our systematic review of the literature emphasizes scholars' views on the role of green finance, green loans, and climate change/transition risk. Our key findings outline significant streams of study of green finance: the importance of fostering green investments, the role of financial institutions, the proposition of models and the impact of carbon taxes on order financing.

Another important evidence is the even lower presence of empirical work when considering finance journals in the current "state of the art" of the topic.

This paper is organized as follows. Section 2 proposes our methodology. Section 3 outlines the results. Section 4 outlines the implications of the SLR. Lastly, Sec. 5 presents the conclusions and future research aims.

2. Methodology

Intending to build an integrated and up-to-date definition of green finance, the research consists of a SLR based on Tranfield *et al.* (2003) and Kraus *et al.* (2020) approaches. The choice to perform an SLR, instead of a "traditional literature review" (Kraus *et al.* 2020, p. 3), is driven by the willingness to provide a standalone view on the topic, avoiding biases by the research team's members (Okoli 2015). Indeed, we did not aim to build a narrative methodology to support any pre-defined hypothesis. We believe that the SLR approach is the best standalone way to create evidence on the topic; in fact, "*SLR offers the possibility of combining existing literature and create solid definitions and foundations for future research*" (Kraus *et al.* 2020, p. 2).

Within an SLR, the research team deals with existing publications by following a systematic methodology implemented to synthesize knowledge coming from published contributions (Tranfield *et al.* 2003). Such methodology needs a pre-defined process to analyze literature in a reproducible manner. As Kraus *et al.* (2020, p. 10) point out, scholars provided several process models, varying in the number of stages and steps (Tranfield *et al.* 2003, Frank & Hatak 2014, Okoli 2015, Pittaway *et al.* 2014, Secundo *et al.* 2020). Nevertheless, each model claims the same main steps:

(1) Planning the review;
(2) Identifying and evaluating studies;
(3) Extracting and synthesizing data;
(4) Disseminate the review results.

Such protocol ensures the exact execution of the established method. In the following sections, the four stages of the SLR are resumed.

2.1. *Stage* **1:** *Planning the review*

2.1.1. *Identify the need*

The decision to conduct a SLR focused on the topic of green finance is supported by several reasons. First, according to the research conducted by the research team, there are limited studies that conduct a bibliometric analysis on the topic of green finance (Zheng *et al.* 2019; Dervi *et al.* 2022; Frimpong *et al.* 2022; Wang *et al.* 2021a); however, our contribution has a different implementation and offers a more accurate analysis. Indeed, the study considers a time frame that includes the entry into force of two important legislative instruments for sustainable investment development: the SFDR and the EU taxonomy.

Both normative interventions are the result of intensive "regulatory" aimed at directing financial operators toward integrating sustainability risks within their processes investment and advisory processes while also strengthening information transparency to end clients.

Second, given the growing importance of the sustainability paradigm, we believe that its influence on the financial sector should be studied through a systematic approach. Third, such analysis could be useful in addressing future studies.

2.1.2. *Review protocol*

Ensuring a transparent and high-quality process, our research team created a review protocol and searched the terms "Green Finance" or "green loan(s)" or "climate transition risk" and "financial(s)" or "climate change risk", and "financial(s)" when they appeared either in the title, abstract or keywords of the studies. The search has been undertaken on the Scopus (Elsevier) database that is considered reliable for a comprehensive study; moreover, Scopus is also a Journal indexing database and is more common for searches of citations and references and appears to be more accepted than other databases. The research team has included only research papers as documents to search, published in an international peer-reviewed journal, written in English, and published in between 2012 and 2023. We have chosen such a time-frame because according to Scopus, 2012 is the first year of expansion of published contributions on green finance. Proceeding papers, book chapters, book reviews, meeting abstracts, theses, interviews, and any kind of studies not written in English, have been excluded from the examination. We limited the investigation to the areas of *Business, Management and Accounting* and *Economics, Econometrics and Finance.* The result was based on 203 research papers connected to the aim of this SLR.

2.2. *Stage* **2:** *Identification and evaluation of studies*

From the database of 203 research papers, we screened titles, keywords, and abstracts of retrieved results, to understand the best connection with our research aims. This step of the research has been developed through a database implemented

on an excel file spreadsheet. The appraisal consisted of five phases to obtain a valid, reliable, and applicable database:

(I) Analysis of the title, keywords, and abstract of each contribution;
(II) sift of abstracts and exclusion of papers that mention the terms included in the search bar without any relation with the area of research;
(III) inclusion of selected publications in the database;
(IV) sift of the full text of publications; and
(V) exclusion of publications that do not provide or refer to a proper definition of climate transition/climate change risk/green loans.

To achieve the maximum level of reliability, such a phase has been separately conducted by each member of the research team. The review is restricted to peer-reviewed papers, regarded as validated knowledge, and most likely to have the highest impact in the field of knowledge. The review process does not base the selection on journal rankings as we do not wish to exclude new and relevant studies published in less established journals (Loureiro *et al.* 2019, p. 3).

After a comparison of the results of each member, the team approved the final database. Thus, we assumed 89 research papers as adjusted sources for the SLR, defining this research stream as an immature field (in full expansion). Kraus *et al.* (2020, pp. 15–16) argued the advantages from an immature field: "*In a less mature field, the number of available papers is limited and more scattered as a lot of research questions remain unanswered. At this point, an SLR can help to establish a new theory based on existing papers (Frank & Hatak 2014). Another reason to conduct an SLR in an immature field is to point out missing data and call for empirical research at the right point of time (Petticrew & Roberts 2006)*".

2.3. *Stage 3: Extracting and synthesizing data*

2.3.1. *Data extraction*

To perform the data extraction, we built a research list in the Scopus database including the 89 research papers (Table 1) arising from the previous stage. Then, we extracted the comma-separated values (CSV) file in excel format as a basis to

Table 1. Search and database composition.

Phase of the research	Result
TITLE-ABS-KEY ("green finance") OR TITLE-ABS-KEY ("green loan*") OR TITLE-ABS-KEY ("climate transition risk") AND TITLE-ABS-KEY ("financial*") OR TITLE-ABS-KEY ("climate change risk") AND TITLE-ABS-KEY ("financial*")	618
AND PUBYEAR > / = 2012	614
LIMIT-TO (DOCTYPE, "ar")	504
LIMIT-TO (LANGUAGE, "English")	488
LIMIT-TO (SUBJAREA, "ECON") OR LIMIT-TO (SUBJAREA, "BUSI")	203
EVALUATION	89

perform the next step of the stage. The CSV excel file provides — for each research paper — the following information:

- Citations information: *Author (s), Document title, EID, Source title, volume, issue, pages, Citation count, Source & document type, Publication Stage, DOI*;
- Bibliographical information: *Affiliations, Serial identifiers (e.g. ISSN), PubMed ID, Publisher, Editor (s), Language of the original document, Correspondence address, Abbreviated source title*; and
- Abstract & keywords: *Abstract, Author keywords, Index keywords*;
- Other information: *include references*.

2.3.2. *Data synthesis*

We present the synthesis of data by providing several descriptive bibliometric analyses (Secundo *et al.* 2020) and adopting VOSviewer software (Van Eck and Waltman 2014) to provide keywords and content analysis. Our bibliometric analysis by VOSviewer is mainly based on cluster analysis using the co-occurrence of keywords, citations of documents, and bibliographic coupling.

## 2.4. *Stage 4: Dissemination of results*

Our SLR provides an accurate background on green finance, providing the state of the art and valuable insights (Kraus *et al.* 2020) to advance studies in the business, management, and financial fields (Lombardi *et al.* 2020b). While Secs. 4 and 5 disseminate the results of our analysis by answering our RQ, Sec. 6 provides a discussion of results and concluding remarks.

3. Results

3.1. *Performance analysis*

In this section, we propose our results answering RQ 1 and RQ 2 and providing a descriptive and bibliometric analysis of the papers. Our descriptive analysis started with the distribution of the 203 research papers referred to the areas of Business, Management and Accounting and Economics, Econometrics and Finance during the time and among countries, providing a deep understanding of literature trends. Papers have a consistently increasing trend from 2017 — from 1 paper in 2016 to 100 papers in 2022 — that points out the nature of an immature field (in full expansion). The growing trend over the two-year period 2021–2022 (Fig. 1) coincides with the time frame in which the European Commission has adopted a set of measures to encourage capital flows to sustainable activities throughout the European Union in order to direct investor interest toward more sustainable technologies and businesses (SFRD and EU Taxonomy).

The research papers distribution, assuming the author's affiliation countries (Fig. 2), is mainly concentrated on advanced countries. China is located at the top of

Documents by year
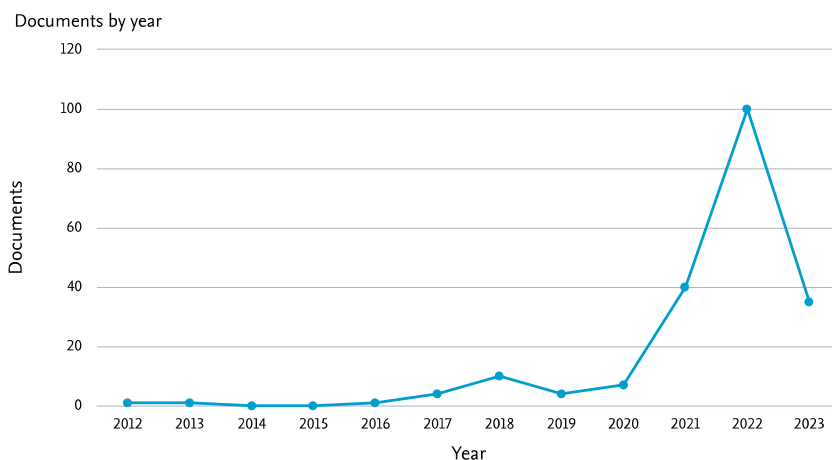
Fonte: Scopus.

Fig. 1. Documents per year.

the list (105 research papers). Pakistan (17 research papers), Malaysia (16 research papers) and France (14 research papers) follow.

Table 2 shows the number of citations per journal, Table 3 offers for each of the twenty papers the number of citations per author/document and citations per year (CPY).

Thus, the most interesting research papers and influential authors are Taghiza-deh-Hesary & Yoshino (2019), Zhang *et al.* (2015), Dafermos *et al.* (2017), Falcone *et al.* (2018) and Ng (2018). The trend of citations and CPY is aligned to this author list following a decreasing trend in numbers. All the five research papers are by authors coming from diverse countries and are published in journals of several fields (interdisciplinary, finance, technological and environmental issues). Particularly, Taghizadeh-Hesary & Yoshino (2019), aiming to induce private participation in
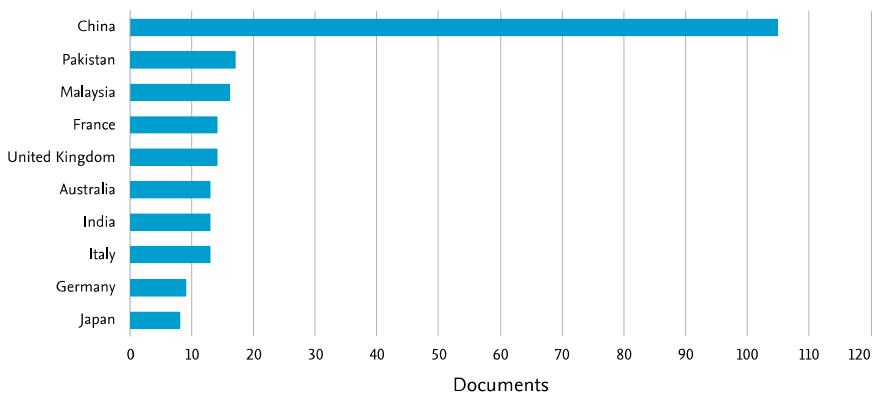

Fig. 2. Documents by country or territory.

Table 2. Citations per journal.

Cogent Business and Management	95
Journal of Cleaner Production	88
Ecological Economics	47
Technological Forecasting and Social Change	47
Journal of Economic Behavior and Organization	28
Singapore Economic Review	21
Journal of Sustainable Finance and Investment	20
International Journal of Green Economics	19
Business Strategy and the Environment	14
International Journal of Finance and Economics	3

Table 3. Citations per authors/document and CPY.

Authors	Title	Source title	Citations	CPY
Taghizadeh-Hesary & Yoshino (2019)	The way to induce private participation in green finance and investment	Finance Research Letters	83	27,66667
Zhang *et al.* (2015)	A bibliometric analysis on green finance: Current status, development, and future directions	Finance Research Letters	59	8,428571
Dafermos *et al.* (2017)	A stock-flow-fund ecological macroeconomic model	Ecological Economics	47	9,4
Falcone *et al.* (2018)	Greening of the financial system and fuelling a sustainability transition: A discursive approach to assess landscape pressures on the Italian financial system	Technological Forecasting and Social Change	47	11,75
Ng (2018)	From sustainability accounting to a green financing system: Institutional legitimacy and market heterogeneity in a global financial center	Journal of Cleaner Production	40	10
Yoshino *et al.* (2019)	Modeling the social funding and spill-over tax for addressing the green energy financing gap	Economic Modeling	38	12,66667
D'Orazio & Popoyan (2019)	Fostering green investments and tackling climate-related financial risks: Which role for macroprudential policies?.	Ecological Economics	35	11,6667
Jin & Han (2018)	Assessment of Chinese green funds: Performance and industry allocation	Journal of Cleaner Production	24	6,0
Soundarrajan & Vivek (2016)	Green finance for sustainable green economic growth in India	Agricultural Economics	21	3,5
Xiong & Qi (2018)	Financial development and carbon emissions in Chinese provinces: A spatial panel data analysis	The Singapore Economic Review	21	5,25

Table 3. (*Continued*)

Authors	Title	Source title	Citations	CPY
Falcone (2020)	Environmental regulation and green investments: The role of green finance	International Journal of Green Economics	19	9,5
Raberto *et al.* (2019)	From financial instability to green finance: The role of banking and credit market regulation in the Eurace model	Journal of Evolutionary Economics	16	5,3333
Barua & Chiesa (2019)	Sustainable financing practices through green bonds: What affects the funding size?	Business Strategy and the Environment	12	4,0
Yuan & Gallagher (2018)	Greening development lending in the Americas: trends and determinants	Ecological Economics	12	3,0
D'Orazio & Valente (2019)	The role of finance in environmental innovation diffusion: An evolutionary modeling approach	Journal of Economic Behavior & Organization	12	4,0
He & Liu (2018)	Stand by or follow? Responsibility diffusion effects and green credit	Emerging Markets Finance and Trade	10	2,5
Ren *et al.* (2020)	Nexus between green finance, non-fossil energy use, and carbon intensity: Empirical evidence from China based on a vector error correction model	Journal of Cleaner Production	10	5,0
Zhang & Vigne (2021)	How does innovation efficiency contribute to green productivity? A financial constraint perspective	Journal of Cleaner Production	8	8
Guild (2020)	The political and institutional constraints on green finance in Indonesia	Journal of Sustainable Finance & Investment	8	4
Durrani *et al.* (2020)	The role of central banks in scaling up sustainable finance — what do monetary authorities in the Asia-Pacific region think?	Journal of Sustainable Finance & Investment	8	4

green finance and investment, propose two applied frameworks, backed by theoretical models on green finance and investment based on project size. Moreover, the paper explores the idea of making use of technological features of Distributed Ledger Technologies (DLTs), such as blockchain technology to reduce risks associated with green investments. DLTs enable an expansion of the investor pool to community-based green trust funds, especially for small green energy projects (e.g. solar and wind).

Zhang *et al.* (2015), focusing on the large attention that green finance received in the literature and on the absence of consensus on the definition among researchers, propose a brief review of the recent advances in green finance research. The paper consists of a bibliometric analysis approach to summarize the status quo and

development trends of green finance to assist in establishing a solid conceptual base and guidance to future research directions. Dafermos *et al.* (2017), develop a stock-flow-fund ecological macroeconomic model that combines the stock-flow consistent approach of Godley & Lavoie (2007) with the flow-fund model of Georgescu-Roegen (1976). Simulations are conducted to investigate the trajectories of key environmental, macroeconomic, and financial variables under (i) different assumptions about the sensitivity of economic activity to the leverage ratio of firms and (ii) different types of green finance policies.

Falcone *et al.* (2018) examine the use of language and depict the emerging storylines surrounding green finance to identify actors pushing the Italian financial sector to become increasingly greener. The paper scrutinizes the narratives used by landscape actors to assess the channels through which such pressure is exerted, as well as its effectiveness. The findings reveal a high/unbalanced narrative pressure coming from global actors by means of both institutional and informal channels, and from national actors mainly by means of informal channels. The study aims to support decision-makers in developing specific strategies to unlock the huge potential of GF in the transition process towards a greener economy by: (i) supporting a deeper strategic collaboration among informal and institutional actors operating at the national level; (ii) acting as catalysts of green-oriented financial initiatives and related dissemination, and (iii) re-addressing the national-institutional actors towards a more proactive role in fostering finance for green innovation. Ng (2018) explores the phenomenon of the adoption of sustainability accounting, sustainable financing and relevant regulatory measures for the development of a green financing system in an emerging global financial center under the influence of sustainable global development. Adopting a multiple-case study approach, the paper reveals three cases of sizable, listed enterprises notable for their heterogeneous approaches to embracing risk governance, sustainable accounting and financing in their issuance of green bonds. Finally, a theoretical framework is proposed over the mutually reinforcing effects of legitimate policy and market-based finance that engender the convergence of a green financing system.

3.2. *Science mapping*

We performed the occurrence analysis by identifying the most relevant keywords in the 89 research papers analyzed. Table 4 presents these keywords, each of which has a minimum of five occurrences: sustainable development, finance, climate change and green bonds are the prominent keywords that frequently emerge when investigating and answering our RQs.

We investigated all keyword clusters by examining the co-occurrence of all keywords, choosing five as the minimal number of keyword occurrences; 11 keywords met this threshold. We adopted the full counting method without weighing the authors. Figure 3 shows the results. The VOSviewer co-occurrence analysis generates links between key terms. As shown in Fig. 3, lines connect the different terms, and

Table 4. Groups of keywords occurrence.

	Keywords	Occurrences
Cluster 1 (5 items — red)	Climate change	7
	Green economy	5
	Investment	6
	Sustainability	6
	Sustainable development	10
Cluster 2 (3 items — green)	Finance	10
	Financial development	5
	Investments	7
Cluster 3 (3 items — blue)	Green bonds	7
	Green finance	39
	Renewable energy	5

the strength of the links indicates the number of publications in which two terms occur together; thicker lines indicate a stronger link (Kirby 2023).

Table 4 shows the group of keywords occurrence identifying three clusters. We identify cluster 1 with five items adopting the red color and cluster 2 with three items adopting the green color. Interestingly, results emphasize two main research streams following the main pillars of the topic of green finance: on the one hand, climate change, green economy, investment, and sustainability and on the other hand the connection with finance and investments. Therefore, cluster 1 seems to assume the
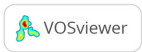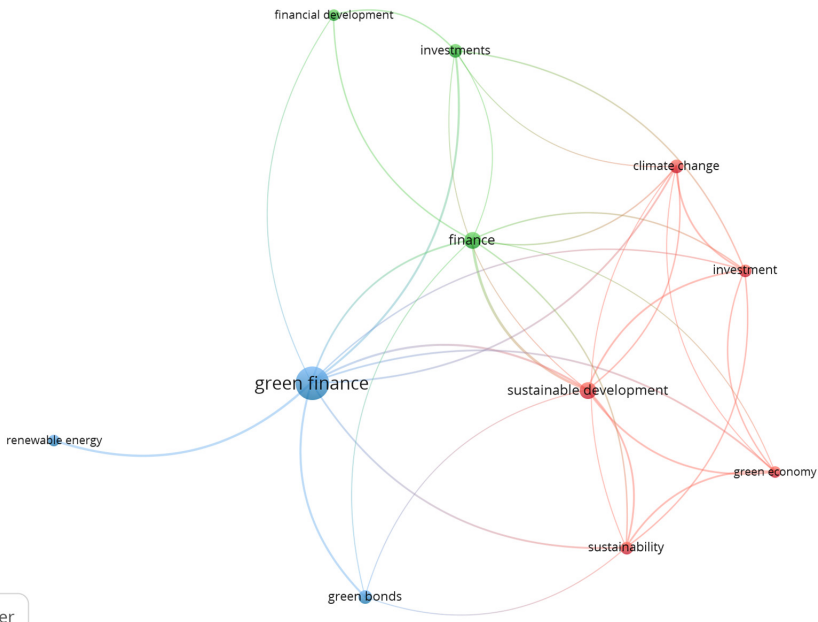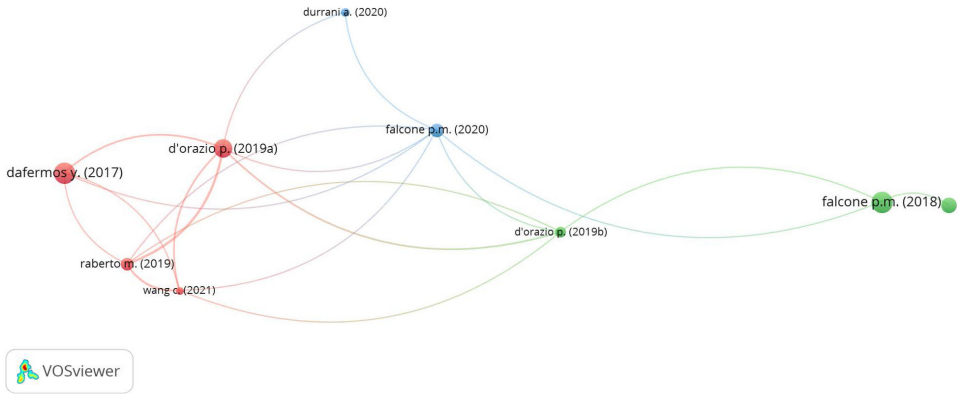

Fig. 3. All keywords occurrence.

Fig. 4. Cluster grouping items (per document).

prominent role of green finance for climate change and environmental issues while cluster 2 emphasizes the financial soul of the topic. Cluster 3 seems strictly connected with cluster 2. Our cluster analysis is mainly developed by determining the bibliographic coupling clusters assuming both (i) more than five items (citations) and (ii) the full counting method to achieve results. We emphasize the presence of two main clusters (Fig. 4): cluster 1 (red color) and cluster 2 (green color).

Table 5 presents information pertaining to clusters 1, 2, and 3.

The research papers in cluster 1 mainly focus on the importance of fostering green investments and on the role of financial institutions in the diffusion of green finance instruments; more in deep:

(1) D'Orazio & Popoyan (2019) focus on the role of macroprudential policies in fostering green investments and tackling climate-related financial risks;
(2) Dafermos *et al.* (2017) propose a stock-flow-fund ecological macroeconomic model;
(3) Raberto *et al.* (2019) focus on the role of the banking and credit market in regulation to moderate the financial instability towards green finance;
(4) Wang *et al.* (2021b) focus on the effects of order financing by considering carbon taxes.

In the second cluster, there is still a relevant focus on the importance of fostering green investments and on the role of financial institutions for the diffusion of green finance instruments; more in deep:

(1) D'Orazio & Valente (2019) focus on the role of finance in environmental innovation diffusion by proposing an evolutionary modeling approach;
(2) Falcone *et al.* (2018) focus on the role of green finance to foster the sustainability transition by performing discursive approach research on the Italian financial system;

Table 5. Bibliographic coupling clusters.

	Authors	Titles	Citations
Cluster 1 (4 items — red)	D'Orazio & Popoyan (2019)	Fostering green investments and tackling climate-related financial risks: Which role for macroprudential policies?	35
Green investments and financial Institutions	Dafermos *et al.* (2017)	A stock-flow-fund ecological macroeconomic model.	47
	Raberto *et al.* (2019)	From financial instability to green finance: The role of banking and credit market regulation in the Eurace model.	16
	Wang *et al.* (2021a)	Order financing for promoting green transition.	6
Cluster 2 (3 items — green)	D'Orazio & Valente (2019)	The role of finance in environmental innovation diffusion: An evolutionary modeling approach.	12
Environmental innovation and the diffusion of green finance instruments	Falcone *et al.* (2018)	Greening of the financial system and fuelling a sustainability transition: A discursive approach to assess landscape pressures on the Italian financial system.	47
	Jin & Han (2018)	Assessment of Chinese green funds: Performance and industry allocation.	24
Cluster 3 (2 items — blue)	Durrani *et al.* (2020)	The role of central banks in scaling up sustainable finance — what do monetary authorities in the Asia-Pacific region think?	8
The role of institutions for the diffusion of green investments	Falcone (2020)	Environmental regulation and green investments: The role of green finance.	19

(3) Jin & Han (2018) focus on an interesting empirical analysis to evaluate the performances of Chinese green funds.

4. Implications of the SLR

This section answers RQ3 by providing implications and insights of the SLR. The publication trend and the number of published papers define such a stream as an immature field (in full expansion) (Kraus *et al.* 2020, pp. 1037–1038); consequently, many research questions remain unanswered. However, the SLR also reveals a scarce presence of papers providing empirical evidence, a fact that is probably associated with the lack of public data on the financial instruments related to green finance policies; anyway, the stream would benefit from empirical research

(Petticrew & Roberts 2006). As the SLR is approaching an immature field (Kraus *et al.* 2020, p. 1038) it can suggest research questions and try to speculate research hypotheses.

The cluster analysis reveals that scholars mainly focused on the importance of fostering green investments and on the role of financial institutions (Falcone *et al.* 2018, D'Orazio & Popoyan 2019, Raberto *et al.* 2019, D'Orazio & Valente 2019) as well as on the proposition of models (Dafermos *et al.* 2017) and on the impact of carbon taxes on order financing (Wang *et al.* 2021b).

The SLR revealed that green finance has been largely investigated through a conceptual or qualitative explorative approach; indeed, we have found a limited presence of empirical works (Jin & Han 2018). This means that even if green finance must be considered an immature field (in full expansion) (Kraus *et al.* 2020, pp. 1037–1038) scholars did not aim to provide statistical generalizations, but they considered it more important to offer theoretical explanations to be applied to similar cases (Yin 2014, p. 48). At the current state of the art, the research stream seems only formed by contributions implemented according to a normative view.

Both normative interventions are the result of intensive "regulatory" aimed at directing financial operators toward integrating sustainability risks within their processes investment and advisory processes while also strengthening information transparency to end clients. The EU Taxonomy is the main starting point of the concrete implementation of the EU Sustainable Finance Action Plan to help investors identify opportunities offered by the energy transition and achieve sustainable investment goal and will form the basis of forthcoming regulations to be introduced.

Hence, future contributions should point out issues and disadvantages of green finance policies and practices.

5. Conclusions and Future Agenda

This paper critically reviews the literature on the topic of green finance. We applied the SLR (Kraus *et al.* 2020, Tranfield *et al.* 2003) using the Scopus database "*to identify, choose and critically appraise relevant pieces of research, and to generate collective insights of knowledge from past research*" (Loureiro *et al.* 2019). We combined the keywords analysis and content analysis to achieve adequate results. Proposing a longitudinal study analysis, our review of the literature emphasizes scholars' view on the topic of green finance by extending the literature (Lombardi *et al.* 2019, Palmaccio *et al.* 2021). Several implications and insights are drafted, contributing to an immature field (Kraus *et al.* 2020, pp. 1037–1038).

Several studies address the topic of green finance (Zheng *et al.* 2019, Dervi *et al.* 2022, Frimpong *et al.* 2022, Wang *et al.* 2021b), however, our contribution has a different implementation and offers a more accurate analysis. The study considers a time frame that includes the entry into force of two important legislative instruments for the development of the green finance: the SFDR and the EU taxonomy. In fact,

we believe that this introduction will be instrumental in achieving a new model of inclusive and sustainable finance.

Beyond the need for empirical research to be done, we believe that there are three main avenues for future research arising from our SLR. Firstly, future studies should outline which industries have been more involved in the introduction of green finance instruments to understand which environment and operations conditions favor the green transition. Second, even if the modern managerial approach is focused on the equal consideration of stakeholders, investors appear as relevant actors in the green transition; therefore, a focus should be placed on how the green perspective is changing the interaction (practices) between companies and investors. Thirdly, having green finance the goal of increasing sustainability performances, empirical research should verify if such performances are increased by green finance instruments and practices.

Thus, we propose a research agenda inviting scholars to deeply investigate these topics under the following research questions:

- How green finance is changing business processes and which are the main business fields affected?
- How the green perspective is changing the interaction between companies and investors?
- Is green finance a concrete opportunity to increase sustainability performances?

Concerning the limitations of this research, the SLR has been conducted keeping in mind the inquisitiveness and ethical principles of quality and accuracy. Nevertheless, this paper is not exempt from limitations, which could be considered for further developments. First, this paper adopts one leading and renowned database of scientific papers; however, by employing other databases, findings might be diverse from ours. Second, even if green finance is an immature field, the number of research papers on the topic is in plain expansion and our future agenda is directed to answer the previous questions as well as to undertake a similar SLR to understand the evolution of the research topic, also considering the ongoing modifications depended on the introduction of the EU Taxonomy.

Authors' Contribution

While the article is the result of a joint effort by the authors, the individual contributions are as follows: Matteo Plamccio wrote "Results", Graziana Galeone wrote "Introduction", Matilda Shini wrote "Methodology" and "Implication of the SLR" and Francesco Campobasso wrote "Conlusions and Future Agenda".

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