

Socially Responsible Investments: A Retrospective Review and Future Research Agenda

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Abstract:

Socially Responsible Investments (SRI) have occupied the centre stage of discussion in the finance and social discourses. This study aims to unravel the intellectual structure of the research on SRI. At present, SRI is under-theorized, and the extant literature is divided into multiple fragments. Existing review studies on SRI suffer from limitations related to definitions and methods. We organize the theoretical lines of extant research and tie them up with empirical studies in the field by using systematic literature review and bibliometric techniques on a corpus of as large as 976 research articles. Our study describes the current dynamics of the SRI field, clusters the fragments of research into meaningful themes, highlights the impediments to current research and also proposes an agenda for future research. Although research on SRI occurs globally, the lack of academic collaboration amongst scholars along with under-theorization are two major challenges of the field. Future research could examine ESG-based asset pricing models, sustainable factor investing and measures to tackle greenwashing.

Keywords: Socially Responsible Investments, Sustainable Development, ESG, bibliometric analysis, systematic literature review, research agenda

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1. Introduction

Socially Responsible Investments (SRI) have long interested academicians, practitioners and the popular press. The field has become increasingly important due to formal responses and global policies to mitigate climate change as well as an upsurge in its investment inflows during the COVID-19 pandemic (Goodell, 2020). Bloomberg reported a 53% rise in the Assets under Management (AUM) of global SRI mutual funds in 2021 to touch \$2.7 trillion, with net inflows of \$596 billion; thereby, Environmental, Social and Governance (ESG) assets now account for one in every three dollars managed globally (Kishan, 2022).⁴ A Google search reveals 30.40 million web pages for SRI, including 5,34,000 web pages in Google Scholar.⁵ Traditional research on SRI has progressed on quantitative and qualitative aspects in four major strands: (i) the relationship between ESG performance and corporate financial performance (e.g., Clark, 2021; Landi & Sciarelli, 2019), (ii) the relationship between ESG performance and investment performance (e.g., Gianfrante et al., 2021; Naffa & Fain, 2021; Pizzutilo, 2017; Auer & Schuhmacher, 2016 and Lean et al., 2015), (iii) rating methodologies of research agencies (e.g., Escrig-Olmedo et al., 2019; Parguel et al., 2011; Yu et al., 2020) and (iv) motivation of investors and asset managers to use ESG information (see Friede et al., 2015; Revelli & Viviani, 2015, for a review). The literature is fragmented into different pockets of empirical themes with little focus on theory formation (Cunha et al., 2021; Fabregat-Aibar et al., 2019). At present, limited studies detail the science mapping of SRI and unravel its progression (Widyawati, 2020). While existing review studies have attempted to review the field, they have used limited definitions of SRI, with varying focus on ESG (e.g., Losse & Geissdoerfer, 2021), ethical and faith-based value systems (e.g., Widyawati, 2020), investment screening and sustainability (e.g., Kumar et al., 2021) which may lead to specious interpretations. Their scope and findings are limited due to the usage of a limited corpus of articles (e.g., Widyawati, 2020), manual review techniques (e.g., Barroso & Araújo, 2020; Daugaard, 2020), inadequate usage of bibliometric tools (e.g., Kumar et al., 2021), thematic focus (e.g., Chițimiea et al., 2021; Paltrinieri et al., 2020; Rahman et al., 2020) and limited theoretical discussion. It is, therefore, time to organize the theoretical lines of extant research and tie them up with empirical studies in the field. This study combines bibliometric analysis and systematic literature review to provide an updated overview of the literature and cluster its fragments into meaningful themes. We have defined SRI more inclusively by considering

⁴ Bloomberg article accessed on 23-May-2022 at <https://www.bloomberg.com/news/articles/2022-02-03/esg-by-the-numbers-sustainable-investing-set-records-in-2021>

⁵ Data as on 18-May-2022.

sustainability, impact investing, and ethical investing dimensions in addition to the previous contributions. This study takes a more comprehensive and rigorous approach to review the extant literature to close the gaps in the previous contributions. We attempt to identify the dominant theories used in the SRI field [e.g., stakeholder value maximization (Freeman, 1984), good management theory (Waddock & Graves, 1997) and Economic theories of social norms (Elster, 1989)] while suggesting areas for future research and theory formation. This study answers eight research questions usually addressed in a comprehensive bibliometric review (Donthu et al., 2021; Kent Baker et al., 2020; Kumar et al., 2021; Pattnaik et al., 2020). In particular, this study seeks answers to the following broad research question: What constitutes the intellectual structure of the research in the field of SRI?

The findings of this study are helpful for researchers and policymakers in multiple ways. First, the synthesis of theories used in the literature can help researchers to concentrate efforts on theory formation in SRI, particularly furthering the international theory of SRI propounded by Scholtens & Sievänen (2013). Second, the performance analysis of the literature can help researchers get acquainted with the publication trend and research interest amongst major journals, authors and institutions. Third, researchers can identify the influential studies, influential authors, and the association between authors from various institutions for possible research collaborations in the future. Policymakers and industry practitioners can also identify experts for applied research or advisory. Fourth, prospective researchers can understand the major research themes and the future research areas within the SRI field to differentiate their work from existing literature and make an original contribution to the field. Finally, the challenges to existing research can be helpful to researchers in planning their research while they design possible methods to tackle those challenges. This study is relevant since SRI is a significant channel for tackling problems like climate change and social inequalities.

2. Literature Review

The impact of socially responsible behaviour of firms on their investment performance and financial performance is central to the existing research on SRI. Recent research has examined topics like greenwashing of sustainability disclosures and sustainable factor investing. We conduct a comprehensive review of the extant literature in six parts as below.

2.1 Corporate Social Performance and Corporate Financial Performance:

The link between Corporate Social Performance (CSP) and Corporate Financial Performance (CFP) of firms has seen a lot of empirical debate in the existing literature. Supporters of the shareholder theory propounded by Friedman (1970) argue for a negative impact of the social behaviour of firms on their profitability. A few studies have established a positive link between the two phenomena, thereby supporting the stakeholder welfare maximisation theory proposed by Freeman (1984). Margolis & Walsh (2003) and Orlitzky et al. (2003) argue about a positive relationship between financial performance and Corporate Social Responsibility (CSR). These results are motivated by the “good management hypothesis”, which prioritizes social performance and posits that a firm which is perceived as having a good reputation will enjoy superior financial performance. In the context of emerging markets, Chelawat & Trivedi (2016) and Bodhanwala & Bodhanwala (2018) empirically examined the impact of ESG performance of Indian firms on their CFP and concluded that good ESG performance enhances CFP. Renneboog et al. (2008a), in their critical review of SRI literature, found that good corporate governance, sound environmental standards and care of stakeholder relations are associated with higher shareholder value. Given the current research structure, it is difficult to provide a bird’s eye view of the field and draw high-level conclusions about the relationship between CSP and CFP (Brooks & Oikonomou, 2018).

2.2 The investment performance of Socially Responsible stocks and portfolios

Studies on the investment performance of socially responsible stocks and portfolios have examined the impact of ESG performance on financial performance and risk characteristics globally (Brammer et al., 2006; Humphrey et al., 2012; Statman & Glushkov, 2009). A few studies have compared the investment performance of companies that score good and bad on the ESG front (Belghitar et al., 2014; Mollet & Ziegler, 2014), while other studies have compared the performance of SR indices with conventional indices (Erragragui & Lagoarde-Segot, 2016; Schröder, 2007; Tripathi & Bhandari, 2015; Tripathi & Kaur, 2020). A few empirical studies that compare the performance of SR funds with conventional funds support the "doing good while doing well" hypothesis that indicates a positive relationship between corporate social and financial performance and suggests that investors can benefit (lose) from choosing high (low) ESG rated stocks (Auer & Schuhmacher, 2016; Derwall et al., 2011; Renneboog et al., 2008a). In their experimental study, Hauff & Nilsson (2022) report that

the choice of the ESG strategy impacts the perceived mutual fund quality. ESG screening can reduce the high costs that emerge when corporate social crises, lawsuits, or environmental disasters take place. The "doing good but not well" hypothesis suggests that companies that use their resources for socially responsible activities jeopardise the welfare of their shareholders and maybe at a relative disadvantage compared to firms that are less socially active (Auer & Schuhmacher, 2016). The third view is neutral and opines that SRI neither adds nor destroys portfolio value because the socially responsible activities of the firm are not priced (Brammer et al., 2006; Humphrey et al., 2012).

Derwall et al. (2011) distinguished between two hypotheses, viz., the "shunned stock hypothesis" and the "errors-in-expectations" hypothesis. The former hypothesis states that socially controversial stocks outperform the broad market because values-driven investors avoid investing in such stocks, pushing their prices below those of responsible stocks. When socially responsible investors care about the non-pecuniary aspects of their investments, they shift their demand from irresponsible assets to responsible assets. In contrast, the "error-in-expectations" hypothesis states that socially responsible stocks have higher risk-adjusted returns because the market is slow to recognise the positive impact of CSR practices on companies' expected future cash flows. The study found that errors in investors' expectations are temporary, while investors' concerns for values and societal norms are unlikely to disappear. Thus, the empirical evidence on the investment performance of socially responsible stocks is mixed and is contextual to specific geographies, data sources and time periods. Pacelli et al. (2022) analysed the link between the performance and the ESG score of different sectoral portfolios and concluded that sustainable investment performance is still heterogeneous worldwide. Meira et al. (2022) assessed ESG strategies worldwide. They reported significant differentiation of the governance factor in every region, while the environmental and social portfolios showed similar risk-return profiles and high levels of correlation. Renneboog et al. (2008a) suggest that existing studies on SRI hint but do not unequivocally demonstrate that SRI investors are willing to accept suboptimal financial performance to pursue social or ethical objectives. Mervelskemper & Streit (2017) concluded that firms that publish an ESG report are valued positively and more strongly. Also, firms that adopt integrated reporting for ESG and financial matters experience superior outcomes compared to firms adopting stand-alone reporting. The results of the study by Zhou et al. (2022) show that an improvement in the ESG performance of listed companies leads to an

improvement in the market value of the company, and the financial performance of the company presents a mediating effect.

2.3 The investment performance of SRI portfolios during crises periods

Empirical studies have established the downside protection function of SRI portfolios during crisis periods, thereby supporting the “good management hypothesis”. Nofsinger & Varma (2014) noted that SRI mutual funds in the USA outperformed during market crises compared to conventional mutual funds. Atif & Ali (2021) also found an inverse relationship between ESG disclosure and default risk due to increased profitability, reduced performance variability and cost of debt. However, this downside protection comes at the cost of underperformance during non-crisis periods. W. Ding et al. (2020) and Engle et al. (2020) also explained this as the insurance function of high ESG stocks. Such an asymmetric return pattern is aligned well with Prospect Theory which states that investors are more negatively impacted by losses than a gain of similar magnitude positively impacts them. Thus such investors are likely to choose a portfolio with asymmetric performance because the gain in utility for doing better in falling markets is larger than the loss in utility for underperforming in rising markets (Cox et al., 2004). Broadstock et al. (2020) found that higher ESG firms exhibited lower price volatility during the COVID-19 period. The study's results provide empirical evidence consistent with the flight to security hypothesis and the signalling role that ESG performance might offer investors in terms of potential resilience against downside risk. Beloskar & Rao (2022) also confirmed the downside protection of ESG stocks during the COVID-19 crisis in the Indian context and established an investment case for ESG stocks in emerging markets in India by providing support to the good management hypothesis. Cardillo et al. (2022) found that high rated ESG firms perform better than low rated ESG firms when European public authorities announced their national number of confirmed cases and deaths due to the COVID-19.

2.4 Greenwashing and Brownwashing of sustainability disclosures

Recent studies have addressed the crucial issue of “greenwashing”, where firms improve social performance for purely presentational reasons and not to improve underlying

sustainability or deliberately advertise superior performance on some ESG aspects while burying the bad performance on others (Owen et al., 2001; Schaltegger & Burritt, 2010; Yu et al., 2020). Yu et al. (2020) identified three types of greenwashing behaviour: manipulating disclosure to boost valuations, selective disclosure to mislead investors, and product-level greenwashing. The study suggested a few factors related to independent scrutiny that may prevent greenwashing behaviour. Arvidsson & Dumay (2022) highlighted the need for improved ESG performance and improved ESG reporting quantity and quality to tackle real problems like climate change and COVID-19. Li et al. (2022) noted that stakeholders could hardly identify greenwashing in an emerging economy with high-level information asymmetry. They concluded that local environmental regulation and negative media coverage could reduce this information asymmetry, making greenwashing easier to be identified. Welford (2004) has explained 20 elements of CSR that businesses can adopt based on international conventions, codes of conduct and industry best practices. The study highlights the commitment of firms to report on CSR and sustainable development in line with the Global Reporting Initiative (GRI).

2.5 Investor survey regarding SRI

Amir & Serafeim (2018) surveyed senior investment professionals at asset-owning and asset-managing institutions worldwide and observed that financial motives rather than ethical motives drive investors to consider ESG information. Another survey by Eccles et al. (2017) highlighted that the most significant barrier to ESG integration is the lack of high-quality data about the performance of companies on their material ESG factors. Przychodzen et al. (2016) found that the willingness of fund managers to incorporate ESG factors into the investment decision-making process is strongly motivated by "subjective" behavioural factors compared to objective factors. Zeidan (2022) performed sentiment analysis of 13,000 messages exchanged by finance professionals between 2017 and 2020 and concluded that asset managers hold a negative view of ESG investing, primarily due to limited diversification, transaction costs and data quality. The study calls for regulators' and investors' actions to improve the quality of ESG information disclosure and persuade asset managers to incorporate non-financial criteria in their investment decision-making process.

2.6 ESG and factor investing

Factor investing strategies like value and momentum have historically delivered excess returns over the market during periods of slow economic growth, high inflation and volatile markets (Hua Fan & Michalski, 2020). The most widely used employed factors include the original Fama & French (1992) factors – value and size in addition to momentum, quality, low volatility and high dividend yield. Recent studies have attempted to analyse the combined effect of ESG and factor investing on investment performance, particularly in developed markets (Bender et al., 2017; Hua Fan & Michalski, 2020; Yasmine & Kooli, 2022).

Despite the advancements in the research literature on SRI, the theoretical foundations of the link between social responsibility and financial performance remain weak. The relationship between ESG performance and investment performance is also unclear and cluttered with studies using different screening techniques, time periods and geographies. The extant literature provides different and conflicting definitions of SRI, ESG investing, Impact investing and Faith-based investing. One school of thought considers ESG information an essential tool to operationalize SRI (Auer & Schuhmacher, 2016; Capelle-Blancard & Monjon, 2012; Renneboog et al., 2008a). In contrast, other researchers opine that SRI results in screening out certain companies (negative screening of companies engaging in activities that the investor finds undesirable). At the same time, ESG investing gives guidance on what companies to include within an overall portfolio approach (Hill, 2020). The majority of the studies are empirical, and they heavily draw from the existing theories in finance and other domains, mainly stakeholder value maximization and modern portfolio theories. Empirical studies have not only attempted to refine and adapt existing theories but also contextualised these theories in various geographies, with a heavy focus on developed nations. We identified 83 theory-based studies on various phenomena in the SRI field. We further mapped these theories to the different players in the SRI field (companies, investors, regulators and government) and noted their characteristics and impact. An overview of this structure is detailed in Appendix A in the supporting information. Since the literature on SRI is dominated by empirical studies investigating multiple phenomena, we attempted to list the important recent studies in the field. The results are detailed in Appendix B in the supporting information. Scholtens & Sievänen (2013) laid the foundations of an international theory of SRI, which attempts to find the determinants of SRI at the country level. Their study seeks to find why countries differ in the

relative size and composition of their SRI. There is a need for further research on the lines of the international theory of SRI. This study shows that the extant literature on SRI is over-focused on empirical work that supports theories based on the behaviour of firms and investors. The roles of regulators, government and financial institutions are under-explored in the literature.

This study aims to identify the main research areas and current dynamics in the field of SRI. Using bibliometric analysis, the present study aims to identify the important themes and intellectual structure in this area. We also endeavour to identify impediments that hinder the growth of research in this field and provide directions for future research. To the best of our knowledge, this study is a novel attempt to combine two methods, bibliometric analysis and systematic literature review, to review the literature on SRI. Previous researchers in the field of SRI have used either bibliometric techniques (Kumar et al., 2021; Losse & Geissdoerfer, 2021; Widyawati, 2020) or systematic literature review (Barroso & Araújo, 2020; Daugaard, 2020) to review the literature. Our review differs from the previous studies in multiple ways. First, our study combines bibliometric analysis and a systematic literature review to evaluate the research progress in SRI. Second, most studies have used databases extracted from either Web of Science or Scopus. We combine these databases and employ a broader keyword search to extract research articles, thus considering a larger number of articles than previous studies. Third, unlike earlier studies that employ bibliometric techniques, this study goes beyond citation analysis to analyse the literature. Fourth, we highlight various impediments to research in the field and the areas for future research. A comparison of the earlier literature reviews with our study on various dimensions is presented in Appendix C in supporting information.

3. Research questions and research methodology

Bibliometric analysis of the extant literature involves research on large sets of aggregated bibliographic data, such as published journal articles and their citations. It includes objective and quantitative methods, e.g., performance analysis of publication trend, citation analysis, keyword co-occurrence analysis and co-citation analysis to map the scientific structure of the field. Conducting a 'science mapping' using bibliometric methods requires several distinct steps, including identifying

the research question and choosing research methods, compiling and filtering the data, cleaning and analyzing the data, visualizing the results and interpreting the results (Zupic, 2015).

This study answers eight research questions usually addressed in a comprehensive bibliometric review (Donthu et al., 2021; Kent Baker et al., 2020; Kumar et al., 2021; Pattnaik et al., 2020). We conduct a performance analysis of the current publication trend to understand the progression of the field. The most influential articles on SRI are identified using citation, centrality, and PageRank analyses. We also identify the most popular themes in the field using keyword and keyword co-occurrence analyses in VOSViewer software. The state of co-authorship is also mapped using a co-authorship collaboration network. We attempt to understand the intellectual structure of the current research in SRI by analysing the co-citation clusters. Finally, the present study highlights the impediments to current research and provides suggestions for future research for the intellectual growth of the field. Table 1 summarizes the research questions and the proposed research methodology.

Insert **Table 1** here

4. Data

We collect bibliometric data on SRI research by adopting the Scientific Procedures and Rationales for Systematic Literature Reviews (SPAR-4-SLR) protocol developed by Paul et al. (2021). This protocol consists of three stages and six sub-stages, as mentioned below.

- i. **Assembling** – (a) identification and (b) acquisition of literature that has not been synthesized
- ii. **Arranging** – a) organization and (b) purification of literature that is in the process of being synthesized
- iii. **Assessing** – (a) evaluation and (b) reporting of literature that has been synthesized

4.1 Assembling

We identified a list of search keywords related to SRI research from the review of literature, as explained in section 2 of this paper. This led to a combination of the 21 most comprehensive keywords compared to the recent bibliometric studies on SRI described in section 2. The Web of Science Core Collection (WOSCC) provided by Clarivate Analytics is the frequently used

source of bibliometric data in the SRI literature (Barroso & Araújo, 2020; Daugaard, 2020; Widyawati, 2020). This database provides data and cited references on documents published in the social sciences and other domains. All journals indexed in WOSCC are assigned one or more subject categories (e.g., Economics, Psychology) that can be used for selecting relevant publications. However, this data source has a few limitations - the scope of journals covered by the WOSCC is limited to those with an official impact factor. It takes some time for newer journals to be included in the database, so it does not contain data from publications that have been “just accepted” for publication (Zupic, 2015). The WOSCC indexes fewer journals than the other popular journal quality list, Scopus, due to its highly stringent indexing criteria (Paul et al., 2021). WOSCC is generally used to curate a manageable collection of articles for the review in subject areas of established and rich review domains. In contrast, Scopus can be used to curate a larger pool of articles in emerging research domains. We eliminate the bias for any particular database and ensure the collection of a robust set of articles by combining the articles retrieved from both databases. Following Kent Baker et al. (2020), we extracted the list of articles from the WOSCC database by conducting a topic search (combination of title, abstract, author keyword, and keywords plus fields in WOSCC) in September 2021. We also conducted a title-abstract-keyword search in the Scopus database during the same period. Losse & Geissdoerfer (2021) used such a combination of databases in their recent bibliometric study. 1,828 and 5,668 articles were returned from WOSCC and Scopus databases, respectively.

4.2 Arranging

We arranged the corpus of 7,496 articles returned from the assembling step by applying relevant filters for document type, language and categories. Next, the database was filtered to include articles limited to “article”, “English”, and “Business, Business Finance, Economics, Management, Ethics, Management and Accounting and Econometrics and Finance” categories in those filters, respectively. Unlike previous studies, we chose not to limit the keyword search to a specific number of years. Book chapters, conference proceedings, dissertations or theses and non-academic sources like news articles, market reports and white or working papers were excluded since they may not undergo a rigorous peer-review process. Existing review studies on the field were excluded to avoid double-barreled insights. Articles in languages other than English were excluded due to our lack of proficiency in other languages. Articles on SRI are

generally found in business, finance, management, ethics and related categories. After removing duplicate entries from articles retrieved from both databases, the reduced list contained 2,070 articles.

Each article was screened based on a content analysis of titles, abstracts and keywords to ensure that the central idea of these articles was related to SRI and to ensure the robustness of the data set. Following Kumar et al. (2021), we eliminated 1,084 articles whose themes were remotely related to sustainability but were not central to SRI. A list of themes included in and excluded from the study is provided in Appendix D in the supporting information. Ten articles “in press” were excluded since their final versions were unavailable. We thus arrived at a final corpus of 976 articles on SRI for our study. We cross-checked the articles randomly using websites of prominent journals in the field of SRI to avoid unintended exclusion of any study. The data retrieval process is detailed in the table and figure presented in Appendix E in the supporting information.

4.3 Assessing

The present study adopts a bibliometric analysis approach to assess and review the relatively large corpus of 976 articles. Bibliometric reviews use quantitative techniques to map the structure and development of a research field (Zupic, 2015). It relies on bibliographic modelling (e.g., co-authorship analysis, co-citation analysis, and social network analysis) and topic modelling (e.g., bibliographic coupling, cluster analysis, and keyword co-occurrence analysis) (Paul et al., 2021). The number of articles in our study is large enough (more than 500) to warrant a bibliometric analysis of the SRI field (Donthu et al., 2021). Bibliometric studies of literature can eliminate possible biases that can sneak into manual and qualitative reviews, especially when the corpus of articles is large.

We use VOSViewer, Gephi and Biblioshiny package of R to conduct these analyses and understand the major themes, state of author collaboration and the intellectual structure of SRI research. Our understanding of the literature has also helped us highlight the challenges to advancing research on SRI. This study also presents a detailed agenda for future research along with specific research questions on the major themes identified by us.

5. Analysis and findings

The research activity in a particular field can be used to map its intellectual structure (Ronda-Pupo, 2017). The present study uses an approach combining bibliometric analysis and systematic literature review to find the structure of research on SRI. We also use social network analysis tools to illustrate the structure and central themes of SRI.

We answer the first research question (What is the current publication trend in the field of SRI?) by conducting a performance analysis of the publication trend of articles on SRI by year, country, journal, contributing author and organization.

5.1 Publications by year

Fig 1 presents the number of research articles on SRI published annually from 1986 to 2021. The increase in the number of articles published from 2008 onwards can be attributed to the increasing research on the investment performance of SRI. Nofsinger & Varma (2014) noted that ESG funds focusing on positive screening offered downside protection to investors during crisis periods. Another spike in the number of articles is observed during the financial crisis caused due to the outbreak of the COVID-19 pandemic in 2020. Over the years following the global financial crisis of 2008, the number of signatories to the United Nations Principles of Responsible Investment (UN PRI) has steadily increased.

Insert **Fig 1** here

5.2 Publication activity by country

Research on SRI has seen considerable interest from researchers from 50 countries. The top publishing countries are listed in Table 2. USA, UK and Spain lead the world in research on SRI. This can be attributed to the availability of better ESG data and disclosures in developed countries and the beginning of the modern SRI investment movement in the USA. The USA also leads the world in terms of AUM of SRI funds (Tam, 2020). Top publishing countries in the APAC region include Australia, China and India.

Insert **Table 2** here

5.3 Publication activity by journal

The 976 articles on SRI were published in 324 journals. The journals with the most articles on SRI are listed in Table 3. Journal of Business Ethics has published the highest number of articles on SRI. A considerable number of studies have emerged on the investment management aspect of SRI, which is evident from the articles published in journals like the Journal of Sustainable Finance and Investment and the Journal of Portfolio Management. Most of these journals are included in the Association of Business Schools (ABS) journal quality list; a few have a rating of 3 and above. This indicates that the SRI research has received increasing attention from leading journals in finance and other management areas.

Insert **Table 3** here

5.4 Publication activity by author and organisation

Our dataset revealed that 802 authors from 792 institutions have contributed to the research on SRI. Tables 4 and 5 list the top contributing authors and institutions. Haigh M., Viviers S. and Dorfleitner G. are the top contributing authors, with six publications each. Tilburg University and Jaume I University were the most active institutions in SRI research, with 28 publications each. They were followed by Griffith University, which has 23 published articles. Most of the top publishing authors and institutions belong to the USA, Europe and Australia.

Insert **Table 4** here

Insert **Table 5** here

5.5 Citation network analysis

We answer the second research question (Which are the most influential articles in the field of SRI?) by analysing the citation network of 976 research articles. Citation network analysis helps to identify the most influential publications in a research field and understand its intellectual dynamics (Donthu et al., 2021). The impact of a publication is determined by its citation count, which is considered the most objective and straightforward measure of research impact (Pieters & Baumgartner, 2002; Stremersch et al., 2018). VOSViewer and Biblioshiny package of R are used to conduct citation analysis.

Appendix F in the supporting information reports the topmost research publications by both global and local citations. Global citations indicate the number of times other works cite an article in the database, including works from other areas. Local citations are received by an article from other articles in the SRI field only. Local citations indicate an article's popularity within the network of 976 articles. Local citations are a measure of contextual citations from the same field and indicate the extent of an article's influence over the body of the literature. Comparing global and local citations can enrich the understanding of research impact and influence as they reveal the actual or true state of affairs (Donthu et al., 2021). According to global citations, Renneboog et al. (2008a) and Chatterji et al. (2009) were the most cited articles, with 604 and 555 citations, respectively. Within the field of SRI, the most cited articles were Bauer et al. (2005) and Renneboog et al. (2008a), with 182 and 145 local citations, respectively. Fig 2 shows the prominent nodes in the citation network with a high number of total citations. The size of the node is determined by the total citations received by the article. The lines connecting two articles approximately indicate the relatedness of the articles in terms of co-citation links. The closer the two articles are, the stronger is their relatedness.

Insert **Fig 2** here

5.6 Centrality analysis of citation networks

A centrality analysis of the articles in the citation network is also conducted. Network metrics like degree of centrality, weighted degree of centrality, closeness centrality, betweenness centrality, eigen-centrality and PageRank help to understand the relative importance of the research constituents (e.g., articles, authors, institutions, countries), which may not necessarily

be reflected through publications or citations (Donthu et al., 2021). Appendix G in the supporting information presents the centrality measures of the most connected articles within the network.

The degree of centrality measures the influence of an article within the citation network. It is the number of connections an article has with other articles in the citation network. A highly cited article has a higher degree of centrality, which signifies its contribution to the overall literature on SRI. Weighted degree of centrality measures an article's relative popularity within the citation network. This measure is computed by adding each connection after multiplying it by its weight. Since no weights were assigned to the nodes, this measure was equal to the degree of centrality. Closeness centrality measures a node's proximity to all other nodes in the citation network. It is the average length of the shortest path from the node to every other node in the network. Betweenness centrality indicates the amount of influence a node has over the flow of information in a citation network. Revelli & Viviani (2015) and Friede et al. (2015) score the highest on this measure, indicating that these studies are important for the flow of knowledge in the citation network. Eigenvector centrality (or Eigen-centrality) also measures the influence of a node in a citation network. It is a more sophisticated view of centrality: an article with few connections could have a very high eigenvector centrality if those few connections were to very well-connected other articles. Eigenvector centrality allows connections to have a variable value, so connecting to some nodes has more benefits than connecting to others (Hansen et al., 2020). For the calculation of this measure, relative scores are assigned to the nodes in the citation network based on the concept that connections to high-scoring nodes contribute more to the node in question than equal connections to low-scoring nodes. Despite having a lower degree of centrality, Revelli & Viviani (2015) and Friede et al. (2015) have a higher influence on the SRI literature. Revelli & Viviani (2015) and Friede et al. (2015) were among the first studies to present a meta-analysis of the relationship between SRI and financial performance.

5.7 PageRank analysis

PageRank is an alternative measure of an article's impact and prestige (Ding et al., 2009). It was introduced by Brin & Page (1998). PageRank indicates the prestige of publications that influence the research field by influencing highly-cited publications despite not being highly cited (Donthu et al., 2021). An article with a high PageRank is deemed "high quality" and thus

a “must cite” among highly-cited publications. It was initially designed to prioritize web pages in a keyword search. PageRank is calculated as follows:

$$PR(A) = \frac{(1-d)}{N} + d \left(\frac{PR(T_1)}{C(T_1)} + \dots + \frac{PR(T_n)}{C(T_n)} \right)$$

where A is the article cited by highly cited publications $T_1, T_2, T_3, \dots, T_n$, $P(T_i)$ is the publication’s PageRank, $C(T_i)$ is the number of citations received by the publication, d is the dampening factor, and N is the size of the network. The dampening factor is taken as 0.85 based on the original Google algorithm (Kent Baker et al., 2020).

The 90 articles identified in the citation analysis have a PageRank between 0.005525 and 0.091351. This is the probability range of citing any of these articles by cross-referencing the articles in the citation network. Appendix H in the supporting information presents the results of the PageRank analysis.

5.8 Keyword and co-occurrence analysis

The keywords of an article sufficiently represent its content and the relationships that the study establishes among the investigated problems (Comerio & Strozzi, 2018). Co-occurrences of the same keywords or pair of keywords suggest the presence of a trend or pattern in the literature which may correspond to a research theme. We address the third research question (Which themes involving SRI are the most popular among research scholars?) by conducting a keyword and co-occurrence analysis in VOSViewer and Gephi software.

Fig 3 shows that corporate social responsibility, sustainability, investment and ESG are the prominent nodes after socially responsible investment and its lexical variants in the keyword co-occurrence network. Table 6 shows that socially responsible investment is the most frequently used keyword in SRI literature. This is followed by corporate social responsibility. This finding is logical as the CSR activities of the firm are of prime interest to socially responsible investors. Among the top 10 keywords, six refer to investments. Mutual funds is also one of the frequently occurring keywords since many empirical studies on SRI from developed countries focus on the performance of socially responsible mutual funds (Bauer et al., 2005, 2006; Capelle-Blancard & Monjon, 2014; Cortez et al., 2008; El Ghouli & Karoui, 2017; Henke, 2016; Nofsinger & Varma, 2014; Riedl & Smeets, 2017; Statman, 2019; Wimmer, 2012).

Insert **Fig 3** here

Insert **Table 6** here

Appendix I in the supporting information shows that corporate social responsibility and socially responsible investment co-occur the most. Out of the top ten co-occurring pairs of keywords, nine pairs contain the term “investment”. This shows an overwhelming focus on the investment management of SRI. A few studies have focused on the individual pillars of ESG, viz., Environment, Social and Governance (Broadstock et al., 2020; Delmas & Blass, 2010; Harjoto & Jo, 2011; Henke, 2016). Environmental economics, Corporate Social Responsibility and Corporate Governance also appear in the top keyword co-occurrences. Research on ESG investing and portfolio theory has received less attention from researchers.

5.9 Co-authorship analysis

We answer the fourth and fifth research questions (Who are the most influential authors in the field of SRI? and What is the state of collaboration amongst authors in the field of SRI?) by analysing the co-authorship network. Co-authoring research publications is presumed to be a measure of scientific collaboration (Zupic, 2015). Co-authorship analysis examines the social networks that researchers create by collaborating on research articles (Acedo et al., 2006). It also examines the level of interaction amongst the authors in a research field (Donthu et al., 2021). It can help to identify the most influential authors within the network as well as within the particular cluster. Contributions from different scholars can lead to richer insights and greater clarity in the research field. Collaboration networks can provide researchers with valuable information to reach out and collaborate with influential authors in their research field.

Fig 4 presents the co-authorship network on SRI. This figure clearly shows the complete absence of academic collaboration in the field of SRI. The research in this field is presently conducted in silos, which may hamper the flow of new knowledge, increase the cost of research,

and reduce researchers' efficiency. There is a need for cross-country research collaboration to create globally accepted frameworks and theoretical models for SRI.

Insert **Fig 4** here

5.10 *Co-citation analysis*

Co-citation is defined as the frequency of two articles being cited together (Small, 1973). Co-citation analysis uses co-citation counts to construct measures of similarity between articles. It assumes that the more two items are cited together, the more likely their content is related. Co-citation analysis reflects the state of the field during the period under study and is the most used and validated bibliometric method (Zupic, 2015). Since citation measures influence, this analysis offers a method to filter the most important works in the field of SRI. Co-citation analysis helps reveal a field's intellectual structure, direction, and development (Liu et al., 2015; Rossetto et al., 2018).

We attempt to answer the sixth research question (What is the intellectual structure of current research in the field of SRI?) by using a co-citation and content analysis. In a co-citation network, two articles are connected to each other when they co-occur in any other research article. The initial analysis shows that 69 out of 976 articles are co-cited by other articles within the network. A threshold of a minimum of ten citations of a cited reference was used.

Clustering (also termed modularity) is frequently used as a tool to create identical groups of research works (Kent Baker et al., 2020; Radicchi et al., 2004; Xu et al., 2018). In a co-citation network, a cluster is a group of well-connected publications in a research area with limited connection to publications in other clusters or research areas (Xu et al., 2018). Co-citation clustering helps to study the intellectual foundations of the research (Zupic, 2015). Clustering also allows for topological analysis of a co-citation network, identifying topics, interrelations and collaboration patterns (Xu et al., 2018). We perform co-citation clustering by forming clusters of cited documents. The default tool for co-citation clustering in Gephi is based on the Louvain algorithm, which is an iterative model that optimizes the number of partitions to maximize the modularity index (Blondel et al., 2008). A modularity

index measures the density of links inside the cluster versus the links between the clusters. The modularity index, Q is calculated as

$$Q = \frac{1}{2m} \sum \left[A_{ij} - \frac{k_i k_j}{2m} \right] \delta(c_i, c_j)$$

where A_{ij} is the weight of the edge between i and j ; k_i is the sum of the weights of the nodes attached to i ; c_i is i 's community; $\delta(c_i, c_j)$ is 1 if $c_i = c_j$ and otherwise 0; and m is the sum of the weight of all the edges. We applied this algorithm to filter out the 69 node co-citation network. This resulted in four research clusters, with 26 articles in cluster 1, 3 articles in cluster 2, and 20 articles each in clusters 3 and 4. Appendix J in the supporting information shows the top ten articles in each cluster by PageRank.

In order to identify the common theme within each cluster, we studied and analysed the content of the top 10 articles by PageRank within each cluster obtained from the co-citation analysis, which is a prevalent practice in bibliometric studies (Kent Baker et al., 2020; Xu et al., 2018).

5.10.1 Cluster 1: Evolution of SRI across the world

Cluster 1 is the largest cluster, with 26 articles that provides an overview of the concept, themes and growth of SRI. The cluster highlights the investment commitment of investors to SRI. The most prestigious article in this cluster, namely Webley et al. (2001), concluded that ethical investors retain investments in socially responsible companies even if they perform badly or are ethically ineffective. Rivoli (2003) discussed the accomplishment of SRI for investors and society and concluded that given the well-documented imperfections of the equity markets, SRI makes a positive difference to society. Sparkes (2001) lays down a conceptual framework for examining ethical investment as a process and highlights key themes in the field. Researchers have also identified the terminological and thematic heterogeneity in the field of SRI (Michelson et al., 2004; Sandberg et al., 2008). However, the definition of SRI continues to be refined by current research to include recent developments in the field (Cunha et al., 2021). Overall, we find that the common factors in the articles of this cluster are the characteristics of socially responsible investors and the factors that support the growth of the SRI regime.

5.10.2 Cluster 2: Relationship between CSP and CFP

Cluster 2, with only three articles, is the smallest of the four clusters. The central idea of this cluster is the empirical linkage between CSP and CFP. Traditional finance theories have narrowly focused on the concept of shareholder value maximization. In contrast, the stakeholder value maximization concept propounded by Freeman (1984) argues for consideration of the interests of all stakeholders who substantially affect (or are affected by) the welfare of the firm. While existing research provides mixed evidence on the impact of CSP on CFP, it is replete with problems of endogeneity, reverse causality and flawed empirical analysis (McWilliams & Siegel, 2000). Waddock & Graves (1997) provided empirical support to the slack resource theory suggesting that CSP is positively associated with prior financial performance. They also found that CSP is positively associated with future financial performance. A meta-analysis by Friede et al. (2015) found that roughly 90% of the empirical studies report a non-negative relationship between ESG and CFP, thus establishing a business case for ESG investing. A large majority of studies reported positive findings, which appeared to be stable over time.

5.10.3 Cluster 3: Investment performance of SR mutual funds and indices

Cluster 3, with 20 articles, focuses on a very prominent theme in the SRI literature, the evaluation of investment performance of SR mutual funds and indices from developed countries. Research from this theme provides mixed evidence on the performance of SR mutual funds and indices versus the conventional mutual funds and indices. The most prestigious article in this cluster, namely Statman (2000), found that the Domini Social Index, an index of socially responsible stocks, performed better than the S&P 500 index. Schröder (2004) found no significant underperformance of SR mutual funds from the USA, Germany and Switzerland when their performance was evaluated against conventional mutual funds. On the other hand, many SRI indices were found to have higher risk relative to their conventional benchmarks (Schröder, 2007). Nofsinger & Varma (2014) observed an asymmetric return pattern in the performance of SR mutual funds during crisis and non-crisis periods. Overall, this cluster is replete with empirical studies that are fundamental for explaining the benefit of including non-financial parameters like social responsibility in investment portfolios.

5.10.4 Cluster 4: Investment performance of synthetic SRI portfolios

This cluster consists of 20 articles that focus on recent research evaluating the investment performance of synthetic portfolios of SR stocks based on historical prices and ESG data. The most prestigious article in this cluster, namely Statman & Glushkov (2009), concluded that tilting portfolios towards high ESG stocks (positive screening) and shunning stocks of controversial businesses (negative screening) gave an advantage over conventional investments. However, the advantage of positive screening is offset by negative screening. Recent research has focused on a best-in-class screening approach that allows the construction of synthetic portfolios by selecting high rated SRI stocks from each industry. This approach overcomes problems of sector biases and loss of diversification. Kempf & Osthoff (2007a) and Statman & Glushkov (2018) found that the best-in-class screening approach delivers maximum abnormal returns. The findings from this cluster are pivotal in understanding the portfolio construction approaches under social considerations.

6. Key Findings and Areas for Future Research

This section summarises the key findings of our bibliometric study and suggests areas for future research in the SRI field (RQ 7: What are the areas in the field of SRI that need further study?). We also attempt to answer research question 8 (What are the impediments to current research in the field of SRI?) by identifying challenges to the research in this field.

The descriptive analysis throws light on the current trend of research on SRI (RQ 1). Most research articles have been published from 2008 onwards, partly due to the growing research on the asymmetric return pattern of SRI during crisis and non-crisis times and the increasing number of signatories to UN PRI. Most research articles are published in the USA and UK, thereby highlighting the dominance of developed countries in the field. Authors and organisations globally have contributed to the research on SRI.

The citation analysis results (RQ 2) reveal that a limited number of articles have influenced the field of SRI research. Renneboog et al. (2008b) is the most prominent node in the citation network with the highest degree of centrality, followed by Bauer et al. (2005) and Statman (2000). PageRank analysis reveals that despite low citations, Friede et al. (2015) and Revelli & Viviani (2015) are the most prestigious articles because other popular articles have frequently used their content. The keyword and co-occurrence analysis (RQ 3) shows that most of the research work is

dominated by empirical work on investment performance. These findings seem logical because investors are willing to pursue their social or ethical objectives in their investing practices, but they may not accept suboptimal financial performance (Renneboog et al., 2008a).

A co-authorship analysis (RQ 4 and 5) highlighted the complete lack of academic collaboration in the SRI field. There is a need for cross-country collaboration, especially with authors from emerging countries where SRI is still at a nascent stage of development. Co-citation clustering analysis (RQ 6) classified the literature into four parts. Cluster 1 explains the evolution of SRI across the world. Cluster 2 addresses how CSP affects CFP. Cluster 3 consists of studies that evaluate the investment performance of SR mutual funds and indices. Cluster 4 is a relatively new cluster that considers the investment performance of synthetic SRI portfolios.

6.1 Areas for Future Research

As a significant contribution of this study, we provide a structure to the fragmented literature in this field by cataloguing it into relevant themes. Research in the field of SRI is concentrated on the CSP - CFP link and CSP - investment performance link. Despite much research in the field of SRI, several areas merit attention from researchers. We highlight eight areas that warrant further attention from researchers.

6.1.1 Theory development

The field of SRI is replete with empirical studies and has limited theoretical frameworks. Clusters 2, 3 and 4 from the results of the co-citation analysis are exclusively focused on empirical work. The field has seen a wide application of existing theories like the shareholder, stakeholder, agency and resource-based view. Integration of theories across disciplines can lead to the further enrichment of the field. The main aim of theory development is to provide an explanation of key phenomena that collectively define the field of SRI. Comprehensive studies that unravel the theoretical background behind the impact of SRI on investment performance, risk exposure and fund subscription and redemption behaviour of investors are needed. A few research questions that can be addressed in this regard are as under.

- Is there a need to precisely define SRI?

- What is the relationship between SRI and other related terms like ethical investing, green investing, sustainable finance, ESG investing and impact investing?
- What is the underlying core theory of SRI?

6.1.2 *Incorporation of ESG information in asset pricing models*

Research on the incorporation of ESG information in asset pricing models is sparse. Pedersen et al. (2020) have provided a solution to the investor's portfolio problem by illustrating an ESG-efficient frontier that shows the highest attainable Sharpe ratio for each ESG level. Naffa & Fain (2021) did not find sufficient evidence for the inclusion of the ESG factors constructed in line with Triguero et al. (2016) as additional factors in the Fama-French 5-factor model. However, further work in this regard that would consider the inclusion of ESG information in asset pricing models remains to be done. Important research questions that can be addressed in this area are:

- How can ESG information be included in asset pricing models?
- What is the relationship between the factors in the asset pricing models and ESG information?

6.1.3 *Research in developing nations*

Most of the empirical studies in this field are focused on developed countries (Widyawati, 2020). Empirical studies have attempted to study the investment performance of SRI funds and indices, the relationship between corporate social performance and corporate financial performance and investor behaviour from developed countries. The results from such studies may not be contextual to developing countries due to reasons like the difference in the development of the financial system, socio-economic differences amongst investors and low level of awareness about SRI. A few research questions that need attention in the context of developing countries are as under.

- What is the level of development of SRI in developing nations?
- What is the extent of preparedness of developing nations in implementing SRI?
- What are the environmental and social challenges faced by firms and investors in implementing sustainability in their business and investment decisions?

6.1.4 Industry-specific studies

The existing literature on performance evaluation of ESG portfolios focuses on all the ESG-rated stocks in a specific country. The impact of ESG integration at the portfolio level may be different for stocks from different industries. Thus, there is a need for industry-level studies in the area of performance analysis of ESG portfolios. For example, firms in the financial industry are different from other firms in terms of their market valuation, regulatory regimes and accounting rules (Mollet & Ziegler, 2014). It is important to understand whether industry differences play a role in the risk-return performance of SRI portfolios constructed using ESG scores.

6.1.5 Greenwashing and Brownwashing of ESG information

Recent studies have highlighted the phenomenon of greenwashing and brownwashing by firms. Greenwashing and brownwashing behaviours prove to be a significant barrier to the integration of ESG information in investment decisions. Considerable research is needed to quantify greenwashing behaviour and suggest measures to the financial market regulators to prevent such harmful behaviour. A few research questions that need attention are as under.

- What factors determine the extent of greenwashing and brownwashing by firms?
- How can greenwashing and brownwashing of sustainability information by firms be discouraged?
- What are the industry-specific or country-specific factors that affect the greenwashing and brownwashing behaviour of firms?

6.1.6 Sustainable factor investing

Integration of smart beta factors such as low volatility, value, high beta and others might provide potential avenues for alpha generation and risk mitigation to asset managers. Hua Fan & Michalski (2020) have analyzed the combined effect of ESG and factor investing on investment performance in Australia. Important research questions that can be addressed in this area are as under.

- What are the advantages, costs, opportunities, and threats of sustainable factor investing across markets?
- Which smart beta factors are closely related to ESG factors across geographies?
- How can the advantages, costs, opportunities and threats of sustainable factor investing be conceptualized through a framework for all kinds of stakeholders (investors, institutions, government, regulators)?

6.1.7 *Framework for assessment of sustainability practices of firms*

At present, the ESG evaluation of firms conducted by research firms like Bloomberg, MSCI, Sustainalytics, etc., are the primary source of data for investors to evaluate the sustainability practices by firms in the environmental, social and governance areas. With ESG investing becoming mainstream in certain parts of the world, especially post the COVID-19 pandemic, the demand for ESG data has increased manifold. Research highlights that different agencies produce different ESG ratings/ rankings due to differences in ESG constructs (theorization problem) and differences in methodologies (commensurability problem) (Abhayawansa & Tyagi, 2021). Escrig-Olmedo et al. (2019) highlighted that ESG rating agencies do not fully integrate sustainability principles into the corporate sustainability assessment process. Since ESG information is material to the construction of SRI portfolios, the following questions warrant further research in terms of a common framework for the assessment of the sustainability practices of firms.

- Is there a need for a common framework for reporting sustainability information across geographies?
- Is there a need for common definitions and methodologies for the assessment of sustainability practices of firms by research agencies?
- What role can regulators play in bringing uniformity in the sustainability reporting and assessment activities?

6.1.8 *Sustainability practices by MSMEs – motivations and challenges*

The empirical studies that form clusters 2, 3 and 4 of the co-citation network focus on the sustainability practices at large firms. Studies on the relationship between CSP, on the one hand, and CFP and investment performance, on the other hand, have primarily focused on large-cap firms across the world due to limited data availability. Sustainability practices by Micro, Small and Medium Enterprises (MSMEs) have received little attention from researchers (Tsvetkova et al., 2020; Yadav et al., 2018). In this regard, the following research questions may be explored by researchers.

- What are the motivations for MSMEs for the implementation of sustainability practices?
- What are the challenges faced by MSMEs in the implementation of sustainability practices?
- Do the slack resource theory and good management theories hold in the case of sustainability practices by MSMEs also?

6.2 Impediments to current research

With a little over three decades of academic research, SRI is relatively a new field of research that encompasses multiple areas. While research in the field has gained momentum in the last few years, researchers face a few challenges. Using a systematic review and content analysis of the literature, we explain the challenges to research in the field of SRI.

6.2.1 Lack of conceptual studies

A lot of empirical studies have been published in the field of SRI. However, work on theoretical lines remains to be done. While empirical work on SRI uses existing theories from finance and other areas, a robust theoretical framework is needed to guide future research (Kumar et al., 2021).

6.2.2 Lack of data availability

Disclosure of sustainability data is neither compulsory nor standardized across geographies. Also, due to limited disclosures, research agencies refrain from producing sustainability rankings/ ratings of most mid-and small-cap firms worldwide. This makes it difficult to form investment portfolios based on sustainability data, especially in developing nations where disclosure regulations are still evolving (Amir & Serafeim, 2018; Eccles et al., 2017). There is a need for a global mandate to disclose and measure sustainability information holistically. The UN PRI is such a step in the right direction.

6.2.3 *Absence of academic collaboration*

The co-authorship analysis reveals a complete absence of academic collaboration in the field of SRI. Greater collaboration across nations and organisations is needed to boost research and create global theoretical frameworks for SRI.

7. Conclusion

This study follows a systematic review approach using bibliometric analysis to unravel the performance and science of the SRI field. New empirical topics like performance analysis of synthetically constructed ESG portfolios, greenwashing and sustainable factor investing have recently received attention in the SRI literature, indicating its evolution. Empirical studies support theories majorly based on the behaviour of firms and investors. The role of regulators, financial institutions, and government needs further attention in the literature. The results of our study suggest that while authors from different parts of the world have contributed to the literature, their relational ties are absent. We also identify the most influential and prestigious articles that have shaped the literature in this field. The keyword co-occurrence analysis shows that CSR and investment remain the top themes in the literature. The clusters identified in the co-citation analysis shed light on four main themes in the literature that explain the evolution and growth of the SRI concept and empirical studies on SRI funds and synthetic portfolios.

The present study makes several contributions to the literature on SRI. First, this study lists the prominent theories from finance and other areas used in empirical research on SRI, thereby highlighting the need for theory formation. Second, the performance analysis of the publication trend to help researchers identify prominent journals, authors and institutions. Third, by identifying the most influential articles and authors using citation and co-authorship analysis, the present study highlights the need for collaboration amongst authors to develop the field further. Fourth, we aim to help researchers identify the most prominent research themes in this field by using co-occurrence analysis and co-citation analysis. Lastly, we identify barriers to the growth of research and provide suggestions for future research in this field.

This study also has a few limitations. Detailed reviews of specific research articles are needed to evaluate the individual theme of work in an area. The selection of keywords is based on our literature review and understanding of the field of SRI. Other sets of keywords may emerge in the

future. Secondly, other types of analysis, such as bibliographic coupling, can be explored in the future.

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Tables:

Table 1: List of research questions and research methodology of the study

| Sr. No. | Research questions | Research methodology |
|---------|---|---|
| 1. | What is the current publication trend in the field of Socially Responsible Investments (SRI)? | Performance analysis of the publication trend in the field of SRI using total publications by year, country, journal, contributing author and organization |
| 2. | Which are the most influential articles in the field of SRI? | <ul style="list-style-type: none"> • Citation analysis using VOSViewer and Biblioshiny package of R – identify the top research publications by global and local citations, creation of a citation network • Centrality analysis and PageRank analysis to analyse the citation network of the 976 research articles. |
| 3. | Which themes involving SRI are the most popular among research scholars? | <ul style="list-style-type: none"> • Keyword and keyword co-occurrence analyses using VOSViewer to explore prevalent themes within the field of SRI |
| 4. | Who are the most influential authors in the field of SRI? | <ul style="list-style-type: none"> • Co-authorship collaboration network |
| 5. | What is the state of collaboration amongst authors in the field of SRI? | |
| 6. | What is the intellectual structure of current research in the field of SRI? | <ul style="list-style-type: none"> • Co-citation analysis to analyze the relationships among cited publications to understand the structure of the current research in the field of SRI. • Literature classification using data clustering in Gephi • Content analysis of top 10 articles within each cluster to identify common theme within each cluster |

FINAL ACCEPTED VERSION

| Sr. No. | Research questions | Research methodology |
|----------------|---|------------------------------|
| 7. | What are the areas in the field of SRI that need further study? | Systematic Literature Review |
| 8. | What are the impediments to current research in the field of SRI? | |

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Table 2: Top publishing countries on SRI

| Country | Number of articles |
|----------------|---------------------------|
| USA | 119 |
| United Kingdom | 69 |
| Spain | 53 |
| Australia | 52 |
| Germany | 47 |
| Canada | 46 |
| Netherlands | 37 |
| Italy | 33 |
| China | 31 |
| France | 31 |
| South Africa | 24 |
| India | 20 |
| Sweden | 19 |
| Malaysia | 16 |
| Belgium | 13 |

Table 3: Top publishing journals on SRI

| Name of the journal | Number of articles | Name of the publisher | 2021 ABS rating |
|---|--------------------|-------------------------------|-----------------|
| Journal of Business Ethics | 92 | Springer Nature | 3 |
| Journal of Sustainable Finance and Investment | 87 | Taylor and Francis Ltd. | 1 |
| Journal of Portfolio Management | 27 | Portfolio Management Research | 3 |
| Journal of Cleaner Production | 24 | Elsevier Ltd | 2 |
| Business Strategy and the Environment | 21 | Wiley-Blackwell | 3 |
| Critical Studies on Corporate Responsibility, Governance and Sustainability | 19 | Emerald Group Publishing Ltd. | NR |
| Journal of Banking and Finance | 19 | Elsevier Ltd | 3 |
| Finance Research Letters | 18 | Elsevier Ltd | 2 |
| Corporate Social Responsibility and Environmental Management | 17 | Wiley-Blackwell | 1 |
| Research in International Business and Finance | 16 | Elsevier Ltd | 2 |
| Social Responsibility Journal | 13 | Emerald Group Publishing Ltd. | 1 |
| Business and Society | 12 | SAGE Publications Ltd | 3 |
| European Journal of Operational Research | 9 | Elsevier Science BV | 4 |
| Journal of Asset Management | 9 | Springer Nature | 2 |
| Journal of Behavioral and Experimental Finance | 9 | Elsevier Ltd | 1 |

The ABS journal quality rating is provided by the Chartered Association of Business Schools (CABS). 4*=journals recognized worldwide as examples of excellence; 3=journals publishing the most original and well-executed research; 2=journals publishing original research with acceptable standards; 1=journals publishing original research with modest standards, NR: Not rated

Table 4: Publication activity by author

| Authors | TP | Citation structure | | IIAP | | | | |
|----------------|----|--------------------|-----|------|---|------|-----|------|
| | | TC | TLC | h | g | m | NAY | PAY |
| Haigh M | 6 | 80 | 61 | 5 | 6 | 0.31 | 16 | 0.38 |
| Viviers S | 6 | 66 | 41 | 5 | 5 | 0.36 | 14 | 0.43 |
| Dorfleitner G | 6 | 55 | 1 | 3 | 4 | 0.30 | 10 | 0.60 |
| Bauer R | 5 | 845 | 20 | 4 | 5 | 0.24 | 17 | 0.29 |
| Giamporcaro S | 5 | 58 | 22 | 4 | 5 | 0.36 | 11 | 0.45 |
| Ortas E | 5 | 126 | 17 | 5 | 5 | 0.46 | 11 | 0.45 |
| Richardson Bj | 5 | 181 | 25 | 4 | 4 | 0.31 | 13 | 0.38 |
| Sievanen R | 5 | 87 | 13 | 4 | 5 | 0.44 | 9 | 0.56 |
| Bilbao-Terol A | 5 | 53 | 6 | 3 | 3 | 0.33 | 9 | 0.56 |
| Apostolakis G | 4 | 37 | 7 | 4 | 4 | 0.67 | 6 | 0.67 |
| Humphrey Je | 4 | 129 | 52 | 3 | 3 | 0.27 | 11 | 0.36 |
| Lewis A | 4 | 253 | 85 | 4 | 4 | 0.18 | 22 | 0.18 |
| Nilsson J | 4 | 254 | 30 | 4 | 4 | 0.29 | 14 | 0.29 |
| Revelli C | 4 | 193 | 0 | 3 | 3 | 0.43 | 7 | 0.57 |
| Sandberg J | 4 | 218 | 23 | 4 | 4 | 0.31 | 13 | 0.31 |

This table represents the top contributing authors in the SRI research. TP = total publications, TC = total citations, TLC = total local citations, IIAP = influence, impact, activity and productivity, h = h-index, g = g-index, m = m-index, NAY = number of active years, PAY = productivity per active year

Table 5: Publication activity by institution

| Institution | TP |
|---------------------------|-----------|
| Tilburg University | 28 |
| Jaume I University | 28 |
| Griffith University | 23 |
| University Of Regensburg | 22 |
| University Of Zaragoza | 22 |
| University Of Oviedo | 20 |
| University Of Kassel | 17 |
| Maastricht University | 17 |
| Universiti Teknologi Mara | 17 |
| University Of Groningen | 16 |
| University Of Minho | 15 |
| University Of Waterloo | 15 |
| University Of Helsinki | 14 |
| University Of Sydney | 14 |
| University Of Queensland | 12 |

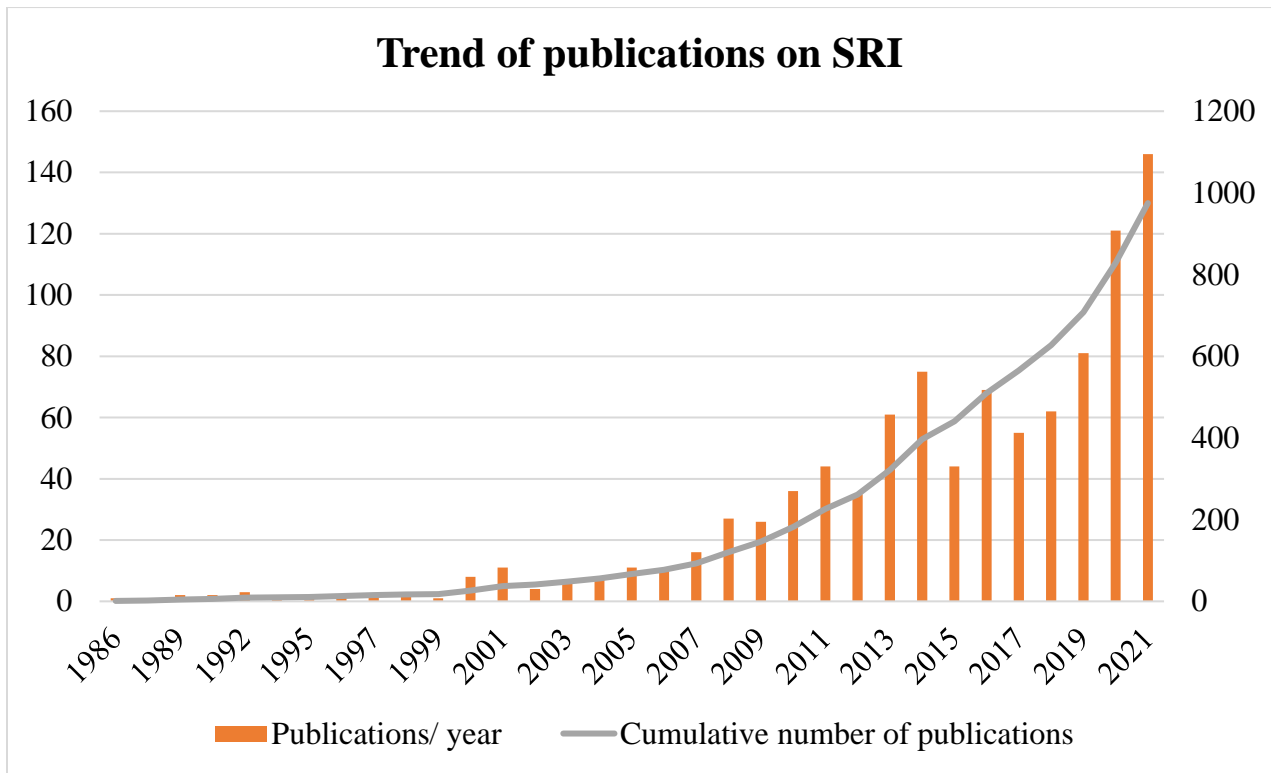
This table represents the top contributing organisations in SRI research. TP = total publications

Table 6: Top keywords by frequency of their occurrence

| Keyword | Count |
|----------------------------------|--------------|
| Socially Responsible Investment | 137 |
| Corporate Social Responsibility | 110 |
| Socially Responsible Investing | 101 |
| Investing | 65 |
| Sustainability | 65 |
| Sustainable Development | 60 |
| ESG | 52 |
| Ethical investments | 51 |
| Investments | 50 |
| Mutual Funds | 49 |
| SRI | 45 |
| Socially Responsible Investments | 43 |
| Responsible Investment | 42 |
| Financial Performance | 36 |
| Impact Investing | 36 |
| Sustainable Finance | 36 |
| ESG investing | 35 |
| Finance | 32 |
| Performance | 30 |
| Corporate Governance | 28 |

Figures:

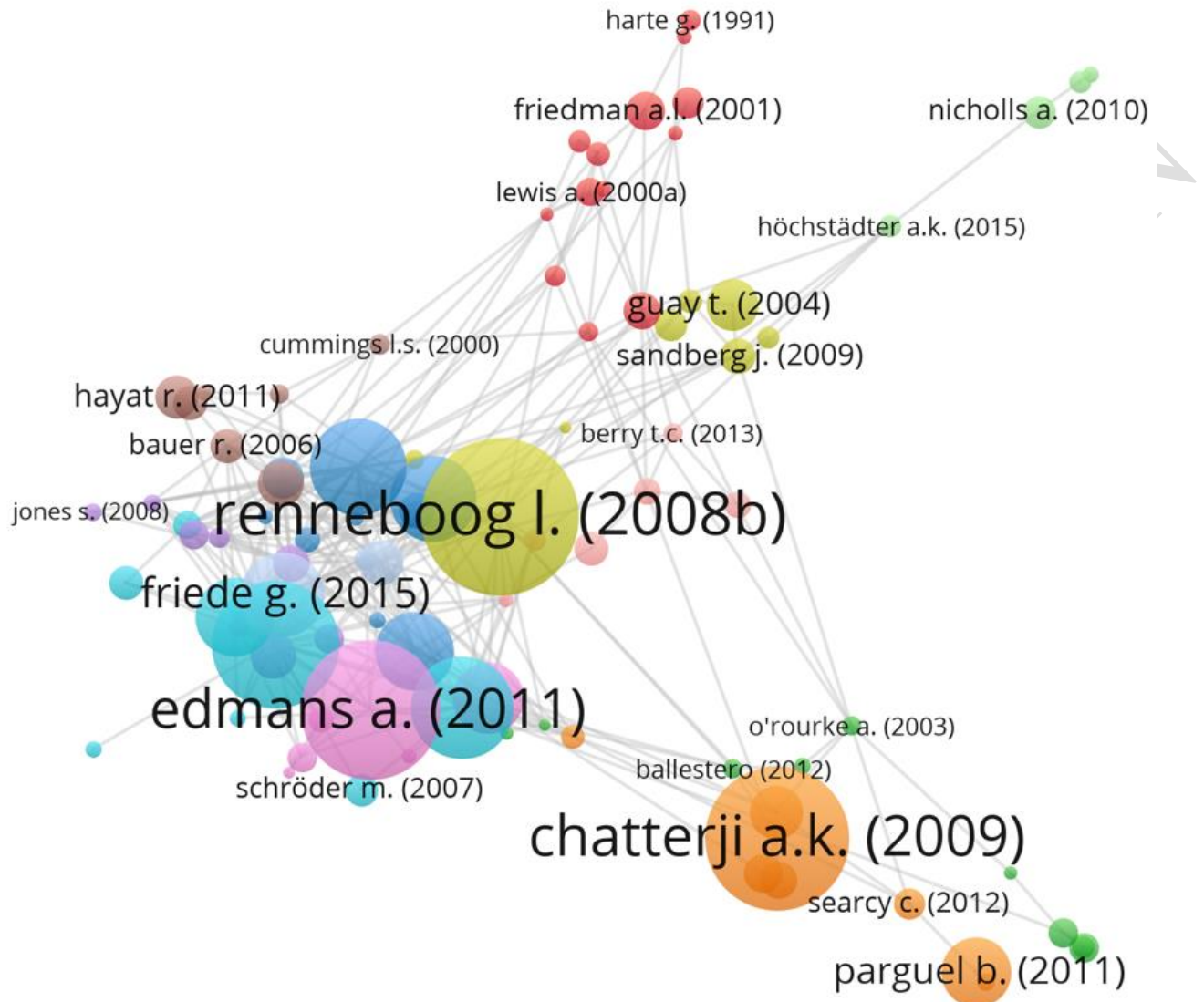
Fig 1: Annual distribution of research articles on SRI retrieved from WOSCC and Scopus databases.



This figure represents the number of articles published on SRI annually and cumulatively from 1986 to 2021.

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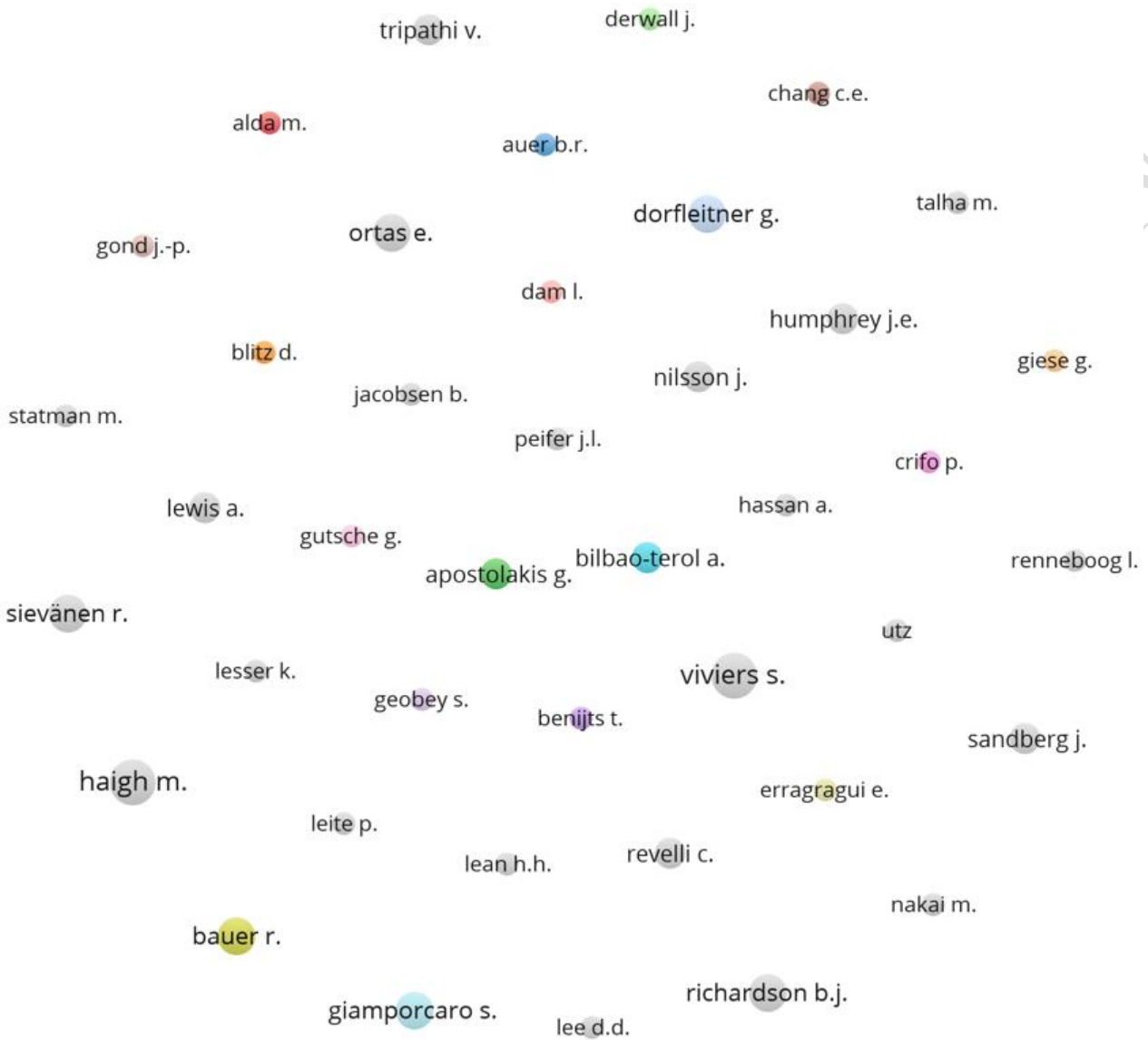
Fig 2: Citation network of research articles on SRI



This figure shows the citation network of articles on SRI. This figure has been generated from VOSViewer based on the number of citations with a threshold of at least 50 citations. 90 articles are represented on this network.

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Fig 4: Co-authorship network on SRI



This figure shows the co-authorship network on SRI using VOSViewer software with a threshold of at least three articles.

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