

# The Evolution of ESG Investing: Performance, Measurement, and Key Challenges- A Systematic Review

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**ABSTRACT-** Environmental, Social, and Governance (ESG) investing has grown rapidly in the global financial market. It began as an ethical approach to investment but is now being implemented by investors across the board to maximize financial returns as well as to support ethical business practices. However, the research findings on ESG performance are not always consistent. Many studies also are raising concerns about how ESG is measured and reported. This systematic review explores the development of ESG investing and how it is related to financial performance, and the major challenges of ESG measurement. The review is based on the PRISMA guidelines for a transparent and structured process. Relevant studies were collected from the major academic databases such as Scopus, Web of Science, Google Scholar and SSRN. Peer-reviewed articles published in the period 2010-2025 were screened, according to well-defined inclusion and exclusion criteria. The studies chosen were analyzed, following a thematic approach, in order to identify the key trends and debates in ESG literature. The results show that the use of ESG investing has gained popularity as a result of demand from investors, government regulations and corporate sustainability efforts. Many studies find positive impacts of ESG on firm performance and risk reduction, and others weak or mixed results. A major problem found is the inconsistency between ESG rating agencies. Different scoring methods provide different results in ESG which makes the result less reliable and there is a risk of greenwashing. The review points to key areas where ESG research is lacking, in particular the lack of agreed-upon measurement systems, evidence of long-term financial impact, and more research into emerging markets. Future research should design clearer ESG metrics, employ new technologies for data analysis, and test ESG performance over longer time periods.

**KEYWORDS-** ESG Investing; Sustainable Finance; Financial Performance; ESG Measurement; ESG Ratings; Responsible Investment; Corporate Sustainability; Systematic Review

## I. INTRODUCTION

In recent years, ESG investing has experienced rapid growth in global financial markets. Many investors are now taking into account environmental, social and governance factors when making investment decisions [1]. This growth is part of a broader trend towards sustainable and

responsible finance. More and more large asset managers, pension funds and financial institutions offer funds and strategies with an ESG orientation. Sustainability considerations are no longer confined to ethical investors but become part of mainstream financial decision-making [2]. ESG investing originated from socially responsible investing (SRI). Early investors mainly use ethical screening by avoiding companies involved in activities such as tobacco, weapons, or heavy pollution [3]. The primary function was to invest based on personal or social values instead of enhancing financial performance. Over time, this approach shifted because investors started seeing factors of sustainability as financially relevant information. Environmental risks, poor labor practices, and poor governance structures were associated with operational disruptions, legal costs, and reputational damage. ESG factors, therefore, began to be incorporated into financial analysis and no longer simply as moral preferences [4]. Today, ESG investing takes many different forms. Some investors are still depending on exclusion strategies, while others incorporate ESG data directly into valuation models and risk management frameworks. Best-in-class strategies choose firms that have better ESG results in the same industry. Thematic funds are directed towards specific areas of sustainability, such as renewable energy or clean technology ([5]. The goal of impact investing is to create quantifiable social or environmental impacts in addition to financial returns [6]. Although these strategies vary in their purpose and design, they all rely on ESG information to guide capital allocation. A number of forces have helped the expansion of ESG investing. Institutional investors play a key role since they are operators of long-term portfolios and are highly exposed to future risks with regard to sustainability [7]. Growing awareness among the public, regulatory reforms, and pressure exerted by stakeholders have raised awareness about corporate responsibility. Governments and financial authorities have put in place new reporting standards under which firms have to report information about emissions, governance practices, and social policies [8]. These changes have led to an improvement in ESG data availability and the use of ESG data in financial markets. This shift towards sustainability-focused investing is seen in the speed at which ESG assets under management are growing. Figure 1 shows the strong upward trend in investment flows of ESG-related investments over time. This figure 1 demonstrates how ESG investing has gone from a relatively small segment of the

market to being a large component of global finance. The steady increase in assets shows the growing investor confidence in sustainability-based strategies and reflects the

growing influence of ESG considerations in capital markets.

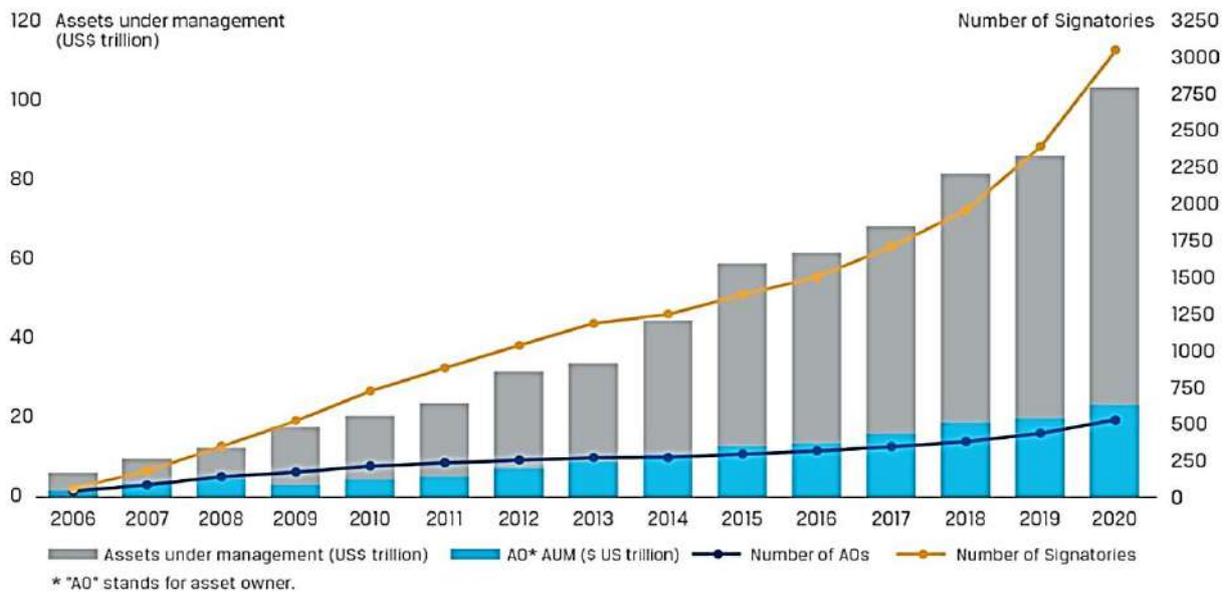


Figure 1: ESG Assets under Management Growth (2006–2020)

Climate risk is now a key driver for this development. Extreme weather events may cause damages to infrastructure and supply chains while climate regulations can impact energy costs and corporate profitability [9]. These environmental risks are now well known to be financial risks. Social factors such as safety of employees, diversity of workforce and community relations impact the productivity and brand reputation [10]. Governance quality influences managerial accountability, fraud prevention and shareholder protection. Together, these factors contribute to the growing belief that ESG performance is associated with the long-term value of firms. Despite this rapid growth, the financial impact of ESG investing is unclear. A great number of researches examine whether high ESG performance enhances financial results [11]. Some research finds positive relationships, which suggests that firms with high ESG scores experience better profitability, less risk and better stock performance. Other studies report weak and neutral, or mixed results. Outcomes often differ across industries, countries, time periods and by the type of financial indicator used. In some cases, the benefits of ESG are only seen in the long-run, while the short-term costs could make gains [12]. As a result, there is still no clear consensus regarding the economic value of ESG investing. Measurement difficulties only add to this debate. ESG performance cannot be seen directly but is estimated by using rating systems and indicator frameworks. Different ESG rating agencies use different methodologies with different data sources, which causes big differences in scores for the same firm [13]. A company can receive a high ESG rating from one provider and a low rating from one provider. This lack of consistency discourages comparability and undermines empirical conclusions. Much ESG data is also self-reported by firms, and this raises concerns about selective disclosure, incomplete information and greenwashing. In addition, ESG scores often combine environmental, social and governance into

one index. This aggregation may mask fundamental differences in dimensions. Some rating systems are concerned with the sustainability-related financial risk and others with corporate social impact. These concepts do not have the same meaning. A firm may do a good job of managing ESG risks, but the firm may do harm to the environment [14]. Such variation further adds to the confusion in ESG analysis. Although ESG research has grown exponentially, the research is fragmented. Studies use varying definitions of ESG, rating providers and financial performance measures. Research is done in various areas and sectors and the outcomes are inconsistent. Without systematic synthesis, it is hard to determine trends on the whole, any theoretical shortcomings and methodological weaknesses. For these reasons, a systematic literature review is required. A structured review allows existing research to be gathered, assessed and synthesized transparently. It helps explain how ESG investing has developed, what we know about its financial impact, and how issues of measurement affect the results to date. It also provides for the identification of future research needs. This study therefore conducts a systematic review of the ESG investing research which focuses on three core areas: the development of ESG investing in the financial markets, the relationship between the ESG investing with the financial performance, and the major challenges associated with the ESG measurement.

- The research questions that guide the review are as follows:
- How has ESG investing evolved in financial markets?
- What does the literature say about ESG and Financial Performance?
- What measurement challenges are prevalent in ESG research?

By answering these questions, this review is an attempt to create a clear and organized understanding of ESG

investing and to facilitate future research in the field of sustainable finance.

## II. CONCEPTUAL BACKGROUND

The concept behind ESG investing is that there is a correlation between the financial performance and the way companies manage their environmental, social and governance issues [15]. Over the years, this has evolved from ethical investing to become a long-term value and risk management strategy. This section provides an understanding of the basis of ESG investing, the logic behind the expected financial impact of ESG and the measurement systems behind ESG analysis.

### A. ESG Investing Foundations

ESG investing is an evolution of socially responsible investing/SRI. Early SRI strategies focused mainly on ethical issues. Investors avoid companies with unorthodox products or unethical behavior [16]. The point was not to invest to get a better return, but to match investments with the value of one's life. As the financial market became more and more complex, this began to change. Researchers and investors began to find out that environmental damage, abysmal labor practices and bad governance could result in real financial loss. This resulted in the development of ESG investing, where sustainability factors are taken into direct consideration as part of financial decision-making. Later on, impact investing was one more step in this evolution. While ESG investing has major aims to risk management and the improvement of performance over time, investing is aimed at the creation of quantifiable social and environmental benefits together with the generation of financial returns [17]. Together, SRI, ESG investing and impact investing are the sign of shift from ethical preferences to strategic sustainability in finance.

Stakeholder theory is an important theoretical structure for ESG investing. This theory argues that firms should take into consideration the interests of all stakeholders, including employees, customers, communities, suppliers, and the environment, rather than just shareholders [18]. When firms do a good job of managing stakeholder relationships, they reduce conflict, improve trust, and improve long-term performance.

The strong ESG practices are a signal that a company respects the interests of its stakeholders, which could result in higher employee loyalty, reputation and lower regulatory risks [4]. Risk management logic is also on the side of ESG investing. Many ESG issues provide a source of financial risk [19]. Environmental risks such as climate change, pollution fines and resource scarcity. Social risks include: labor disputes, safety failures and consumer boycotts. Governance risks are related to fraud, corruption, and poor management oversight [20].

By identifying and proactively managing these risks, firms can avoid significant losses. Investors, therefore, use ESG information as a tool to measure the future uncertainty and ensure the safety of the value of their portfolio. Another important foundation is the long-term value creation. ESG investing assumes that investment in sustainability by firms

is better placed for future growth [21]. Effective use of resources can be money-saving. For high-quality decision-making, good governance is required. Positive social relations raise the value of brands. Although investments in sustainability can entail short-term costs, these are expected to have long-term benefits in terms of stability, innovation, and resilience [22].

### B. ESG Performance Logic

Firms that have good ESG practices are also likely to be less exposed to legal penalties, as well as environmental accidents and reputational crises [23]. For example, proactive companies that reduce their carbon emissions might be less exposed to the costs of regulation in the future. Effective safety policies can help to prevent accidents in the workplace that disrupt operations. There is a lesser possibility of financial scandals in good governance [24]. Together, these factors give downside risk and low volatility.

Another channel that is important is reputation. Companies with a low ESG performance are often seen as untrustworthy and irresponsible [25]. This can help attract customers, employees, and investors. A positive reputation may result in increased sales, greater brand loyalty and ease of recruitment of skilled workers [26]. Over time, these advantages can improve profitability. Access to capital is also a factor. There is now a preference from many institutional investors for companies with robust performance on ESG. Some funds limit their investments in companies with poor ESG records. As a result, firms with higher ESG scores can potentially have lower borrowing costs and increased demand for stock. This is capable of heightening the valuation of the firm and lowering its financing costs [27].

To see how ESG performance has evolved over time, [Figure 2](#) shows trends in total ESG scores and their respective environmental, social and governance components. The figure indicates that the performance on the overall ESG scores has been steadily rising from the early 2000s to 2021. ESG scores were about 33 in 2003 and they moved up to about 52 in 2021. The environmental dimension has the largest growth. Environmental scores rose from around 20 in 2003, to around 43 in 2021, reflecting an increasing corporate concern about emissions, energy consumption and environmental policies. The social dimension also improved, from about 31 to about 51 during the same time period, reflecting greater concern for labor practices and community involvement.

In contrast, governance scores were fairly stable over time. Performance of governance began at around 47 in 2003 and slowly rose to around 56 in 2021. This implies that governance structures in many firms were already more developed, whereas environmental and social practices were more developed. This [Figure 2](#) also reflects a noticeable change starting around 2015, with the Paris Climate Agreement. After this period, there was a higher growth rate of environmental scores, implying that global climate policy induced firms to improve environmental performance.

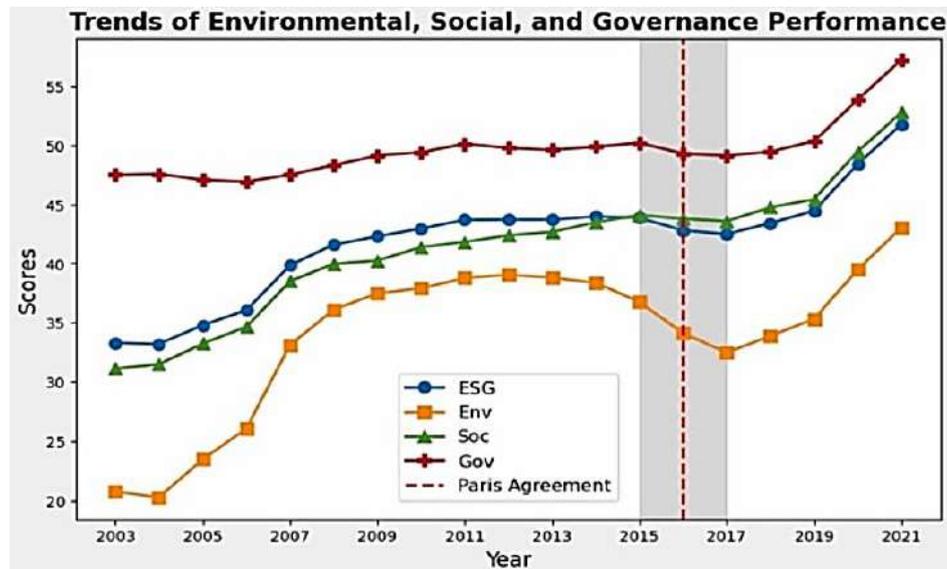


Figure 2: ESG Performance Trend (E, S, G over time + Paris Agreement)

### C. ESG Measurement Ecosystem

ESG performance is measured through information provided by specialized rating agencies and reporting frameworks. Major ESG data providers include companies such as MSCI, Refinitiv, Bloomberg, Sustainalytics and S&P Global. These organizations gather information from company reports, regulatory filings, news sources and surveys. They then translate this information into ESG scores or ratings which are used by investors and researchers.

In addition to rating agencies, there are a number of disclosure frameworks to guide on ESG reporting. Common frameworks include Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), Task Force on Climate-related Financial Disclosures (TCFD) and integrated reporting standards. These frameworks focus on enhancing transparency and consistency in reporting sustainability [28]. However, companies frequently have the option of the standards to comply with, so there is some variation of the data disclosed. A big problem with the ESG measurement ecosystem is diverging scores. Different rating agencies tend to have very different ESG scores for the same company [29]. This is due to providers have different indications, weighting methods and definitions of sustainability. Some are more risk exposure-oriented, and others are more corporate impact or policy commitments-oriented. As a result, ESG ratings are not readily comparable. This divergence is challenging for investors as well as researchers. Depending on the ESG provider used, [30] investment decisions may change.

Academic results could also be different because of the difference in the data sources used for the studies. In addition, many ESG indicators are based on self-reported company information, which may be incomplete or biased. Firms with superior reporting systems may present themselves as being more sustainable than if actual performance is similar to others. Together, these issues imply the complexity of ESG measurement and explain why findings on ESG and financial performance tend to differ empirically. Understanding the ecosystem of ESG

measurement is therefore critical to understanding the results and enhancing future research.

### III. PREVIOUS REVIEWS AND RESEARCH GAP

In the past few years, ESG investing has been the focus of growing academic interest. Several review papers have been written on various aspects of the ESG field. Some focus on the relation between ESG performance and financial returns [31] mostly. These studies tend to report positive or neutral effects of ESG on firm value, risk and profitability, although not consistently across countries and industries. Other reviews are focused on ESG disclosure and transparency and examine the impact of sustainability reporting on investors and corporate behavior. A different set of studies examine environmental risks, specifically exposure to climate change and carbon performance [32]. While such reviews do offer valuable insights, they do so from relatively narrow angles with regard to ESG. Many are not thinking holistically about the environmental problems or financial outcome, without linking performance outcomes with the measurement of ESG. For example, several reviews use ESG scores but fail to investigate the reason why different rating agencies present a completely different assessment of the same firm. Others are studying financial impacts without challenging the quality and consistency of ESG data.

This narrow focus has produced a patchwork of knowledge. ESG research is dispersed in finance, sustainability, management, and environmental journals and often uses various theories, indicators, and methods to study it. Some studies refer to the ESG as a single score, and some studies examine the dimensions of the environment, social, and governance aspects of a business separately. Financial performance is measured in many ways with respect to stock returns, accounting profits, firm value and risk levels [33]. Because of this diversity, results are hard to compare and seem often contradictory. The dramatic growth of research on ESG is clearly evidenced in Figure 3. This Figure 3 shows that the number of publications on the subject of ESG was very low before 2010, with less than 10

studies per year. After 2015, the research activity sharply increased. Annual publications have increased by 2016 to about 40 publications, by 2018 to over 80 and in 2020 to

over 250 studies. The cumulative number of publications also increased sharply and passed about 1000 studies by 2021.

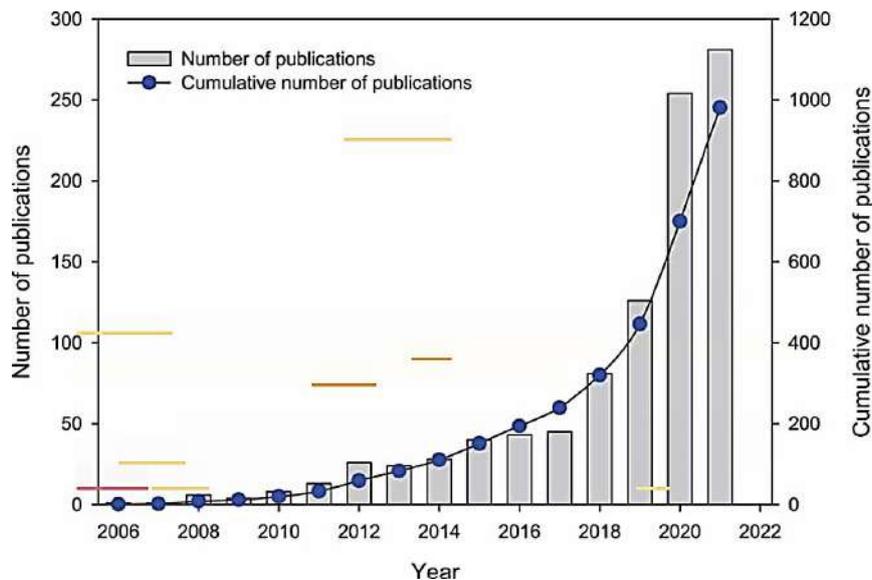


Figure 3: Growth of ESG-related academic publications over time (annual and cumulative)

This strong upward trend confirms that in a short time ESG investing has become a major area of research. However, speed of growth has not been seen to be matched by systematic integration of findings. Instead, studies have evolved in parallel streams and often in isolation from one another.

Another major weakness in the existing reviews is the lack of treatment of ESG measurement. While it is acknowledged in many papers that there is divergence in ESG ratings from different providers, few reviews systematically explore the implications this has on research results. Measurement problems like inconsistent indicators, self-reported data and ambiguous methods of weighting are often mentioned briefly but not deeply analyzed [34]. As a result, the relationship between ESG performance and financial outcomes is unclear.

Furthermore, most of the current reviews offer limited recommendations for future research. Common recommendations are to study emerging markets, improve the quality of data, or increase time horizons. However, few provide a structured research agenda, linking the evolution of ESG, performance impacts and measurement challenges in a single framework. Therefore, although there are currently a significant amount and a growing volume of ESG literature, there is still a lack of a comprehensive synthesis. There is a definite need for a systematic review integrating three critical aspects: the development of ESG investing in financial markets, the ESG relationship with financial performance, and measurement systems that produce ESG data.

This study addresses this gap by employing a systematic literature review methodology to extend the synthesis of evidence across disciplines. It relates performance results to underlying issues of measurement and creates a better agenda for future research. By doing this, it moves away from disconnected findings and helps give a cohesive picture of ESG investing in today's finance.

#### IV. RESEARCH DESIGN: SYSTEMATIC LITERATURE REVIEW (PRISMA APPROACH)

This study is guided by a methodology of Systematic Literature Review (SLR) based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. The SLR approach was chosen to guarantee a structured, transparent and replicable synthesis of the existing research on ESG investing. Given the speed of growth and the diversity of methods employed in the literature on ESG-related studies, there is a need for a systematic approach to minimize bias, organize scattered data, and offer an overview of the entire field [35]. Unlike narrative reviews that can be based on subjective selection of articles, the procedure of the chosen search strategy, screening and analysis of literature is predefined in the SLR method following the PRISMA guidelines (which improve reliability and academic rigor).

The review has been developed to reflect three inter-related dimensions of ESG investing: the development of ESG practices in the financial markets, the correlation between ESG performance and financial outcomes, and the measurement systems that produce ESG data. These themes informed construction of the search strategy, selection criteria and analytical framework.

##### A. Data Sources and Search Strategy

Ensures a wide coverage of the discipline and a high quality of research, the literature search was undertaken in a number of top academic databases. These were Web of Science, Scopus, Business Source Ultimate (EBSCOhost), and ScienceDirect. These databases have been selected because they contain publications of peer-reviewed journals that are known in the field of finance, sustainability, economics, and management research. The use of multiple databases minimized the risk of excluding the relevant studies and enabled a more comprehensive representation of the ESG investing literature [36].

A structured keyword strategy was created based on the common terminology used in previous studies on ESG research and existing review studies. Core search terms included "ESG investing," "Environmental Social Governance," "sustainable finance," and "responsible investment," combined with performance-related terms, such as "financial performance," "firm value," "risk" and "returns." To reflect the dimension of measurement, some more keywords like "ESG rating", "ESG score", "ESG disclosure" and "ESG measurement", were added. Boolean operators were used to link these terms in an effective manner and cover more searches. The search was carried out in the titles, abstracts and author keywords respectively to ensure relevance, while at the same time trying to keep it as broad as possible.

### ***B. Time Frame and scope of the Review***

The review focused on studies published between 2005 and 2024. This timeframe represents the emergence of ESG investing as a formal topic of study and its rapid incorporation into the mainstream finance arena following the emergence of the global sustainability movement in the early 2010s. Earlier research mostly involved corporate social responsibility, while the ones developed after 2005 moved towards the ESG-based frameworks compatible with the decision-making process of investors. Limiting the review to this period ensured relevance to modern financial markets, regulatory environments and the availability of data.

### ***C. Inclusion and Exclusion Criteria***

In order to ensure quality and consistency in the academic outcomes, explicit inclusion and exclusion criteria were formulated prior to screening. Only peer-reviewed journal articles were considered because it was felt that all selected studies were being considered which would be meeting recognized scholarly standards. Included studies were required to focus on the topic of ESG investing, ESG performance or ESG measurement in the context of a financial or corporate setting. Both empirical and conceptual research were welcome, as long as they addressed the understanding of ESG evolution, financial impacts or measurement systems.

Studies were excluded if they were conference proceedings, book chapters, policy reports, or non-academic publications. Articles that did not explicitly frame ESG but only focused on corporate social responsibility were also removed. In addition, studies that were not related to financial outcomes or financial investment decisions, even if they were in the general field of sustainability, were excluded. This process ensured that the end sample was well-aligned with the aims of the review.

### ***D. Screening and Selection Process***

The screening process involved several steps that were organized according to PRISMA guidelines. First, all the records found in the databases were taken together and duplicate records were deleted. Next, the titles and abstracts were read to exclude studies that obviously did not meet the inclusion criteria. This initial screening filtered out papers that did not deal with ESG investing, financial performance or measuring issues.

Following this step, the full text of the remaining studies was read in detail. This stage ensured that individual articles

addressed directly one or more of the key themes of the review. Studies that did not have methodological clarity, relevance or substantive ESG focus were excluded. The rest of the articles formed the final sample for analysis. A PRISMA flow diagram will be used later to represent the selection process graphically, showing the number of studies identified, screened, excluded and retained.

### ***E. Data Extraction and Analysis Method***

For each article included in the final sample, information was systematically extracted in depth. This included year of publication, geographical focus, data sources, ESG indicators used, financial performance measures applied and major findings. Extracting these variables allowed for a structured comparison between studies and allowed for both descriptive and thematic analysis.

Descriptive analysis was applied to examine trends in growth of publications, distribution regionally, approaches used in methodology, and providers of data. This permitted the identification of dominant patterns of research and emerging themes in the ESG investing literature. Thematic synthesis was then applied to group findings concerning ESG-performance relationships and issues around measurement challenges. Through this process common results, contradictions and research gaps were systematically identified.

### ***F. Final Sample & Methodological Rigor***

After passing all the screening and quality assessment steps, a refined portfolio of relevant studies represented the final review sample. This sample represents a variety of geographic regions, sectors, and research methods in order to provide a comprehensive understanding of ESG investing research. The systematicity of the review enables transparency and replicability so that future scholars can revise or extend the analysis as more studies become available.

Following the principles of PRISMA ensures this research has been improved in terms of methodological reliability possible with the least amount of selection bias. The explicit documentation of databases, keywords, timeframe and screening procedures ensures that findings are based on robust and transparent review process.

## **V. LITERATURE REVIEW OF ESG INVESTING DESCRIPTIVE ANALYSIS**

This section provides an organized summary of the included studies that were included in the systematic review. It focuses on the development of publication over time, regional emphasis, research methods and journal distribution. In addition, it incorporates real-world ESG investment trends as the sustainable fund market value graph. Together, these elements illustrate the scope, direction and current state of the research on ESG investing.

### ***A. ESG Investing Publication Growth***

The academic interest in ESG investing has grown rapidly during the past decade [37]. Early studies prior to the year 2010 were limited as there were only a few published each year. The subject matter of these early papers was largely dominated by topics on ethical investing and corporate social responsibility and less so by structured ESG frameworks.

After 2015 there was a steep rise in publication activity. This time is also a period of major global sustainability developments such as the Paris Climate Agreement, the growing movement of ESG reporting standards, and the increasing investor demand for sustainable assets [38]. By 2018 there were several times more annual ESG related publications compared to previous years and by 2020 there are over two hundred publications per year in some data sets.

This fast-growing evidence suggests that ESG investing has evolved into a mainstream area of study in the field of finance and management [39]. However, the rapid growth has also led to very diverse methodologies, source of data, and theories. While the volume of research is impressive, findings are often inconsistent and difficult to compare and reinforce the need for systematic synthesis.

### B. Regional Distribution of ESG Investment Activity

To supplement the academic trends, Figure 4 shows the market value of sustainable investment funds by region

from 2014 to 2024. This Figure 4 demonstrates clearly about the strong geographic concentration of ESG investment capital.

Europe has the largest share of sustainable fund assets over the entire period, closely followed by North America. Together, these two regions are the leaders in global ESG investment markets. As leaders, they reflect strong regulation frameworks, high disclosure standards, and the advanced adoption of sustainable finance policies.

Asia-Pacific demonstrates moderate growth, especially since 2018, but without a doubt represents a much smaller portion of global ESG fund value. Emerging markets in Latin America, Africa and parts of Asia are still marginal contributors. This investment concentration strongly reflects the patterns of academic research. Most ESG performance researches are based on European and US firm data, where ESG scores are more available and regulatory pressure is stronger. In comparison, emerging markets are not well studied.

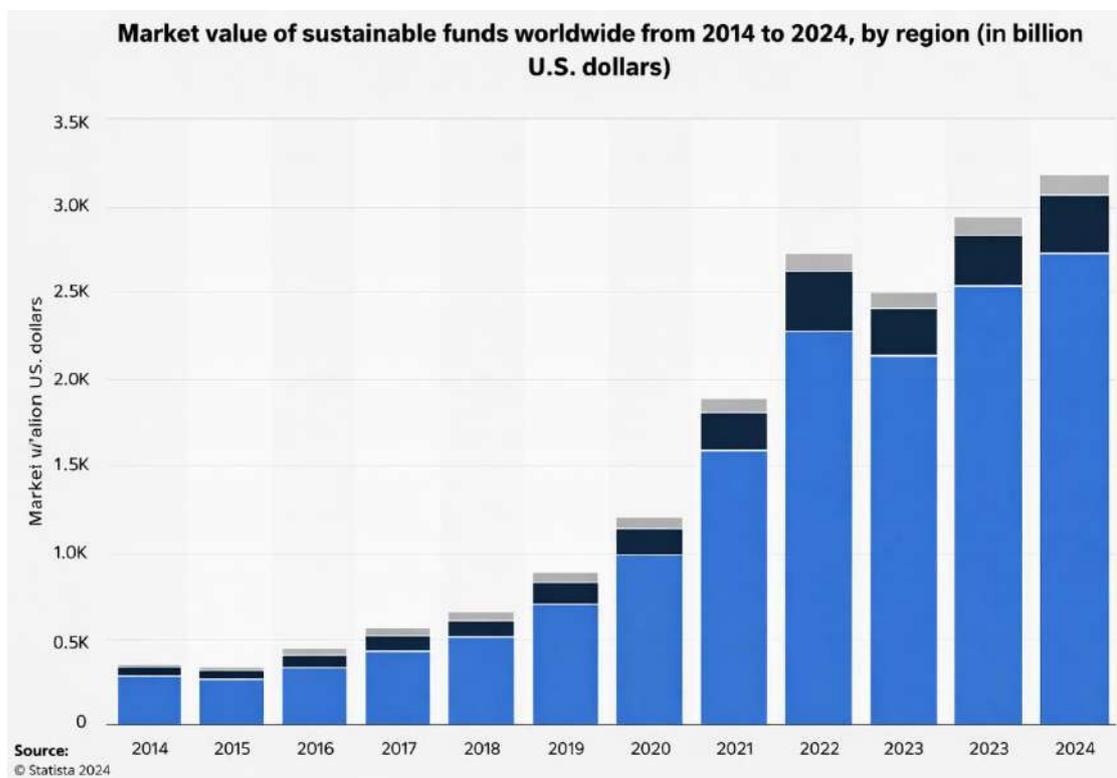


Figure 4: Sustainable Fund Market Value by Region (2014–2024)

The gap implies that existing ESG knowledge might not fully reflect the dynamics of sustainability in developing economies where institutional environments, disclosure quality and investor behaviour vary greatly. Expanding research into these regions is an important direction for the future.

### C. Methodological Approaches

Most ESG investing studies involve the use of quantitative empirical methods. Regression analysis and panel data models as well as testing of portfolio performance dominate the field. These methods seek to project the relationship between ESG scores and financial performance such as returns, volatility, and firm value. Some studies have taken an event-study approach to examine the ESG performance

in times of market shocks, such as the global financial crisis [41] or the pandemic caused by the coronavirus [41]. These analyses have frequently found that high-ESG firms suffer less losses and recover faster.

Qualitative research is still limited. A small number of studies examine the ESG disclosure practices, corporate strategies for sustainability and engagement with stakeholders through case studies and interviews. Mixed-method designs are not common either. The high priority on quantitative analysis is a result of the growing availability of ESG datasets, but it gives little attention to the deeper institutional and organizational dynamics that influence sustainability performance.

#### D. Journal Distribution

ESG investing research is published in a wide variety of journals. Major outlets include finance journals, sustainability journals, environmental management journals, and interdisciplinary business journals. It is common themes that connect responsible investment, corporate governance, climate risk, and financial performance. This interdisciplinary dispersion reflects the relevance of ESG across different disciplines. However, it is also a matter of fragmentation: Researchers tend to interact in various theories and methods according to disciplinary norms. Systematic reviews, therefore, have an important role to play in bridging these streams of research and developing coherent knowledge

#### E. Key Descriptive Insights

A number of important patterns emerge from the descriptive analysis:

First, ESG investing research has grown exponentially since 2015, as a reflection of a growing market relevance and regulatory pressure. Second, ESG investment activity and academic attention still lies in Europe and North America, with emerging markets being largely underrepresented. Third, quantitative financial analysis predominates in the literature, and there are few qualitative and mixed approaches. Fourth, ESG measurement practices differ to a large extent across studies and this contributes to inconsistent findings on performance.

## VI. THEMATIC CONTENT ANALYSIS

This section draws together the key patterns emerging from the ESG investing literature. It relates the development of ESG investing over time, sustainability performance to financial performance, and ongoing measurement problems encountered in research. Rather than presenting individual studies individually, the analysis synthesizes evidence to identify dominant trends and contradictions and unresolved issues.

#### A. Evolution of ESG Investing

ESG investing has undergone a structural change in the last 20 years [42]. In its early form, investment strategies were mostly driven by ethical screening. Investors excluded firms from activities detrimental to the environment or socially controversial ones, such as fossil fuels, weapons or bad labour practices [43]. The first and foremost goal was the moral alignment and not the financial performance. Sustainability considerations were considered external to value creation in the economy.

As sustainability risks were increasingly exposed, ESG factors slowly found their way into mainstream financial analysis [44]. Environmental regulations stepped up, social expectations grew stronger and corporate scandals made governance failures [45]. Investors began to realize that poor sustainability practices could result in long term financial losses. ESG indicators were thus adopted as tools which could be used to measure regulatory exposure, operational risk and management quality. This was a move away from ethical investing and instead focused on performance-based ESG integration.

In the latest stage, ESG investing has been entrenched in financial decision-making [46]. Institutional investors incorporate ESG metrics in portfolio construction, risk

management, and asset valuation. There is a demand from regulatory bodies for standardized sustainability disclosure and large asset managers actively engage with firms on ESG improvements [47]. Sustainability is no longer considered an optional preference, but a core part of long-term financial security [48].

The trend of ESG performance in ESG trend graph is in favour of this transformation. Overall ESG scores rose steadily as time went on, especially since 2015. Environmental performance had the greatest acceleration - it increased sharply after global climate policy efforts such as the Paris Agreement [49]. This represents increased corporate attention to emissions control, energy efficiency and climate risk mitigation. Social performance improved more gradually as firms enhanced labor practices and engagement with the community [50]. Governance performance was fairly stable showing that governance structures date back earlier than environmental and social initiatives.

A number of important drivers explain this evolution. Regulatory pressure has heightened the accountability of sustainability particularly in Europe and North America [51]. Risk management for ESG became more important because of the investor demand for risk-adjusted returns. Climate change led to direct financial exposure as it concerned both physical risks and transition costs [52]. At the same time, the development of the availability of ESG data made sustainability performance more measurable and investable [53]. Together, these drivers took ESG from a moral issue to a strategic financial tool.

#### B. ESG and Financial Performance

A key theme in the study of ESG is the relationship between sustainability performance and financial performance. The reviewed studies illustrate four dominating patterns, i.e. broadly positive effects, mixed and context dependent results, strong performance during the time of the crisis in the market place, and stronger benefits when the investments are over longer periods of time.

Many studies report a positive relationship between the ESG performance and firm value, stock returns and risk reducing [54]. Firms with high ESG score are frequently found to have higher efficiency of operations, higher quality of governance and better reputation among stakeholders [55]. Environmental initiatives result in saving on energy and waste costs. Social responsibility makes the employees more loyal and trustworthy to customers [56]. Governance enhances decision making and prevents the possibility of fraud. These benefits have the advantage that it attracts long-term investors and reduces financing costs that help to drive better financial performance.

At the same time, a substantial body of research has mixed or neutral effects. In some sectors, ESG investments are worth obvious benefits, while in others the financial impact is limited. Regional differences also appear to be important, as in the developed markets, ESG effects are larger than in emerging economies [57]. Measurement variation has a great effect on these results. So, different studies based off of different ESG providers tend to come up with different conclusions even when they are analyzing similar companies.

Another consistent pattern is that of the role of ESG in crisis resilience. For example, high-ESG firms are more likely to suffer less losses and have quicker recovery after financial

stocks such as the global financial crisis and the Covid-19 pandemic [58]. Strong stakeholder relationships safeguard reputation, good governance facilitates crisis response and environmental efficiency mitigates operational vulnerability [59]. These results indicate that ESG functions as a type of downside risk protection.

Time horizon also contributes to ESG outcomes. Short-term effects may be weak or neutral because there are initial costs associated with sustainability investments [60]. Over longer periods, however, ESG performance tends to enhance profitability and stability through innovation, readiness for regulations and competitive advantage. Long-term investors, therefore, receive the greatest benefits from ESG integration [61].

These patterns are systematically summarised in Table 1 which classifies studies based on positive, mixed and neutral financial relationships in different contexts.

### C. ESG Measurement Issues

While ESG investing has grown quickly, the literature has consistently identified measurement as its weakest foundation. ESG ratings vary greatly from provider to provider as agencies use different indicators, weighting systems and definitions of sustainability [62]. Some focus on risk exposure and others on corporate policies or what has been disclosed as commitments. As a result, the same firm may have very different ESG scores depending upon the source of the data.

This divergence has a great impact on the research outcomes. Studies with different ESG datasets tend to report conflicting financial effects, contributing to mixed empirical evidence [63]. Investors are also struggling to interpret sustainability information, which has led to a decrease in confidence regarding ESG-based decision making.

Disclosure gaps also compromise ESG measurement. Many of the ESG indicators are based on voluntary corporate reporting, which generally varies considerably in quality and completeness [64]. Firms having better reporting infrastructure tend to appear to be more sustainable no matter what the actual performance is. Smaller companies and companies in emerging markets are not well represented due to lack of disclosure.

Greenwashing is another problem. Some companies buy into the ESG jargon and establish formal sustainability programs without any real change in operations. Rating systems can be used to reward symbolic commitments if they emphasize disclosure, rather than real impact [65]. This causes ESG metrics to be less credible and may potentially mislead investors.

Finally, the absence of standard reporting requirements means that comparability between firms and regions is limited. While frameworks such as GRI, SASB and TCFD have helped raise the transparency bar, companies are still opting to use different indicators and report on them in different ways. Until more harmonization occurs, ESG measurement is likely to continue being fragmented.

### D. Integrated Thematic Understanding

Overall, the thematic analysis shows that ESG investing has emerged as a core financial strategy that has been driven by regulation, investor demand and risk management requirements. Most evidence is in the positive financial effects and resiliency in crisis over the longer run. However,

the inconsistent measurement is the biggest hurdle to unambiguous conclusions.

The mixed ESG-performance results observed between studies mostly lie in unreliable data systems and not weak sustainability impact. Strengthening ESG measurement standards, improving the quality of disclosure and bridging the gap in ratings is therefore important for advancing both the research and the investment practice.

## VII. ESG MEASUREMENT CHALLENGES

Although ESG investing has become exponentially, measuring sustainability performance is one of the most hotly debated and problematic areas of literature. Across the reviewed studies, researchers consistently report difficulties associated with inconsistent metrics, unclear causal relationships, regional bias, sectoral distortion and data reliability. These challenges have a strong impact on academic findings as well as on practical investment decisions.

A central concern is the lack of harmonization of the ESG rating systems. Different providers have different sets of indicators, weighting structures and conceptual definitions of Sustainability [66]. Some highlight corporate risk exposure; others focus on the volume of disclosure while some highlight policy commitments. As a result, ESG scores for the same firm may vary greatly from platform to platform.

In the below Figure 5 shows the ESG score divergence graph between Refinitiv and Bloomberg for both the United States and Europe shows this issue well. Over the period from 2010 to 2020, all score series are on an upward trajectory, indicating that attention to ESG performance is increasing. However, the levels vary considerably from provider to provider. Refinitiv regularly has higher ESG scores than Bloomberg in both regions. For instance, by 2020, Refinitiv EU scores are close to the low seventies and Bloomberg EU scores are still in the low fifties. A similar gap exists in the American data. This constant divergence implies that ESG performance is not equally measured. Instead, different aspects of sustainability are captured by each provider. Such variation causes contradictory research results which diminish the confidence in ESG-based investment strategies.

Another big hurdle is causality between performance in ESG and financial consequences. Many research studies indicate that there is a positive link between high ESG scores and firm performance. However, it is not yet known whether good ESG practice leads to better financial results or if financially successful firms have more resources to spend on sustainability initiatives at their disposal [67]. This reverse causality problem is found in literature quite often. While some researchers apply fancy econometric techniques to attempt to address it, there are still relative paucity of causal evidence. Without more concrete identification strategies, the true economic impact of ESG is to some extent up for debate.

Regional bias also has an impact on the outcome of ESG research [68]. Most empirical research relies on a large amount of data from Europe and North America, where reporting on sustainability is more developed and the regulatory frameworks are stronger. In contrast, developing markets are hardly represented because of inadequate availability and disclosure standards [69]. This imbalance is

a limiting factor with regard to the generalizability of ESG findings. Corporate governance structures, environmental risks and investor behavior vary a great deal from region to region. As a result, conclusions from developed economies

may not be representative of ESG dynamics in developing countries where challenges related to sustainability are often more severe.

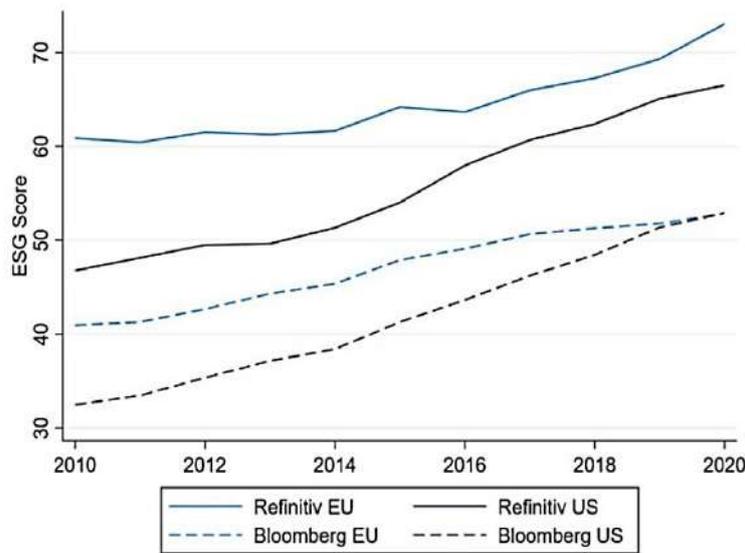


Figure 5: ESG Score Comparison (Refinitiv vs Bloomberg EU/US)

Distortion of the sector is the other significant limitation. In order to penalise industries with high environmental footprints, and reward industries such as technology and services, ESG scoring systems tend to punish energy, mining and manufacturing industries, for example [70]. However, high-impact sectors also are a key part of the global sustainability transitions; emissions and green innovation. Uniform ways within which to score may therefore be misleading in respect to progress on sustainability in particular industries. Some companies of carbon-intensive sectors may be rapidly advancing but are nevertheless said to score low [71], when compared to the low-impact industries. This structural bias may cause distortion in analysing performance as well as allocation of investment.

Data reliability is always a constant problem. Many ESG indicators are based on corporate self-reporting, which can differ in quality, depth and transparency. [72] More than actual performance, firms with good reporting systems may have an aura of greater sustainability. Smaller companies

and companies based in developing economies may not have comprehensive sustainability disclosures and this may result in certain missing or incomplete data. Furthermore, the qualitative indicators are hard to validate objectively thus making the rating processes more subjective [73].

The issue of greenwashing also adds to the complication of ESG measurement. Several studies indicate that it is possible for firms to claim to be sustainable and to undertake sustainability language, policies and reporting practices, without making any meaningful changes in their operations [74]. And where rating systems put such a big emphasis on disclosure and not verified impact, companies are able to increase ESG scores through communications strategies rather than actual increases in sustainability. This discredits the nexus of ESG ratings and the real-world environmental or social outcomes.

These limitations of measurement link closely to the different methodologies used by ESG providers, summarized in Table below.

Table 1: ESG Measurement Providers and Key Characteristics

ESG Provider	Method Type	Main Strength	Main Limitation
MSCI ESG	Risk exposure model	Strong focus on financial risk	Limited methodological transparency
Refinitiv ESG	Disclosure-based scoring	Broad global coverage	Sensitive to reporting volume
Bloomberg ESG	Disclosure intensity	Detailed firm-level data	Rewards disclosure over impact
Sustainalytics	Risk materiality approach	Strong downside risk assessment	Less focus on sustainability opportunity
S&P Global ESG	Survey + public data	Industry-adjusted comparisons	High response bias

In the above Table 1 highlights the fact that while both the providers have their own valuable contributions to provide, none of the providers offer a totally comprehensive and objective ESG assessment. Risk-focused systems capture financial exposure and might miss the bigger picture on

sustainability. Systems based on disclosure are more transparent but are often a reflection of the quality of reporting and not necessarily actual performance. Survey-based models improve the comparability of industry but are subject to participation bias. Taken together, these

weaknesses go a long way to explaining much of the divergence found in ESG scores and mixed findings reported from empirical studies.

Overall, ESG measurement challenges are the fundamental obstacle to improving the quality of research and effectiveness of investment. Inconsistent metrics produce contradictory results, causality issues undermine performance conclusions, regional and sectoral biases reduce applicability and data reliability concerns reduce credibility. Without better global reporting standards, increased transparency among rating agencies, better verification mechanisms and broader geographic coverage, ESG research is likely to continue producing uncertain and fragmented evidence.

## VIII. FUTURE RESEARCH AGENDA

The results of this systematic review show that a lot of progress has been made in the research related to ESG investing, but also show that there are important gaps which need to be closed in order to enhance the development of theory and practice. Future research should focus on improving the consistency of measurements, increasing geographic coverage, improving the methodological rigor and better understanding the long-term effects of sustainability performance.

One of the most pressing needs is to create standardized ESG metrics. Current rating systems have been developed based on different sets of indicators and weighting that generates inconsistent scores and mixed empirical results [75]. Scholars should strive to have common reporting frameworks, which seek to harmonize financial materiality and environmental and social impact. Greater cooperation between regulators and academic researchers and rating agencies could aid in the development of transparent measurement standards with higher levels of comparability between firms and regions. Standardization would go a long way to increase the credibility of ESG-based investment analysis as well as decrease the confusion of investors.

Another field of study that offers tremendous potential is the use of artificial intelligence and big data methodologies in the ESG scoring domain. Machine learning models can work with massive amounts of structured and unstructured data such as corporate reports, news articles, satellite imagery and social media data [76]. These tools may be useful to capture the performance on sustainability in real time and detect greenwashing better than in the traditional disclosure-based methods [77]. The future research should study the comparison between AI-driven ESG assessments vs. traditional ratings and check whether ESG assessments are better at predicting financial risk and performance. Expanding ESG Research in Emerging Markets is also Important Most of the existing studies are done on developed economies, particularly Europe and North America.

However, sustainability challenges tend to be more acute in the developing world, where environmental degradation, labour problems and weak governance are more prevalent [78]. Future research should consider the impact of the ESG practices on the performance of the firm in Asia, Africa, Latin America, and in the Middle East. Such studies would help in improving global relevance and it will support policy makers in designing region specific sustainability strategies. Another important area for research is the role of

regulation. Governments are also increasingly introducing mandatory ESG disclosure requirements, climate risk reporting standards and sustainable finance taxonomies [79]. Future research should investigate the effects of such regulatory frameworks on corporate behavior, performance of ESGs and the allocation of capital.

Comparing voluntary and mandatory disclosure regimes could yield interesting information on whether regulation improves the quality of data and reduces greenwashing. Longitudinal research designs are further needed to get a better understanding of the long-term effects of ESG investing. Many of the existing studies are based on short time horizons, which may not reflect the full benefits or costs of sustainability strategies. Longer-term analysis of panel data could help explain whether ESG investments are associated with sustained financial benefits, crisis resilience and sustainable value creation of decades, not years. Together, these directions of research can help make ESG investing a more reliable and evidence-based discipline than it currently is-a patchwork and sometimes spotty discipline. Improving the quality of measurements, covering a broader area, taking advantage of the benefits of new technologies, as well as improving causal analysis, allows for the scholarship of the future to be used by investors, firms, and policymakers to provide guidance.

## IX. CONCLUSION

This systematic literature review covered the development of ESG investing, the relationship between financial performance and this type of investing and the challenges of measurement underlying sustainability research. The results show that the change in ESG investing has moved from an ethical screening to investing for strategic risk management, regulatory pressure, issues related to climate change and long-term value creation. Most studies demonstrate positive or mixed relationships between the performance of ESG and financial performance, with strong evidence of resilience in times of economic stress. However, results are inconsistent due to limitations of methodology as well as divergence of measurement.

One of the main contributions of this review is to bring together performance and measurement issues in a single comprehensive framework. While the past has frequently seen reviews only focus on either the financial consequences or the reporting of issues of sustainability, the research paper draws connections between how ESG is measured and the reasons for the variations in research findings. The analysis points to the fact that inconsistent rating systems, disclosure bias, regional concentration, sectoral distortion and data reliability issues still limit the credibility of ESG research.

By performing a systematic review of the literature and identifying the dominant themes and key issues, this review gives an overview of the ESG investing literature. It clarifies what is now known on the performance effects of ESG, exposes structural weaknesses in measurement systems and shows the need for better methodological approaches.

Importantly, the study provides a clear research agenda going forward that includes standardized metrics, artificial intelligence (AI) based scoring methods, a greater focus on emerging market research, regulatory evaluation and long-term analysis. These directions offer useful suggestions for

those scholars who are interested in pursuing sustainability finance research.

Overall, this review adds value to the current new generation of studies and research on sustainable finance that offers a concise understanding of the dynamics of ESG investing; hitherto fragmented. It helps investors, policymakers and academics to navigate the complex environment around ESG and highlights pathways to develop more reliable, transparent and impactful sustainability measurement systems in the future.

## CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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