

The Effect of AI on CSR and ESG Ethics

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Abstract:

Integrating Artificial Intelligence (AI) into business operations has brought about transformative changes, potentially reshaping industries and improving efficiencies. However, this technological advancement also presents new ethical challenges, particularly concerning Environmental, Social, and Governance (ESG) principles. As businesses increasingly adopt AI, balancing innovation with ethical responsibility becomes crucial. This paper explores the intersection of AI, CSR, ESG, and business ethics, emphasizing how AI can enhance sustainability, social equity, and governance standards. It examines the potential risks, such as algorithmic bias, data privacy concerns, and environmental impacts of AI infrastructure. It discusses strategies for mitigating these risks through ethical AI design, transparent governance structures, and adherence to ESG guidelines. Ultimately, the paper argues for the development of frameworks that ensure AI technologies contribute positively to societal well-being while aligning with the core values of corporate responsibility, ESG, and sustainability.

JEL Classification: G0, G19, G30

Keywords: Artificial Intelligence, ESG, CSR, Business Ethics

I Introduction

The Grand View Research estimates the global artificial intelligence market size at USD 196.63 billion in 2023. It is projected to grow at a capital asset growth rate (CAGR) of 36.6% from 2024 to 2030 (www.grandviewresearch.com) (see Figure 1). “By 2026, AI in the global ESG market is projected to reach approximately 7.8 billion USD.” In a world filled with data, the use cases for Artificial Intelligence (AI) in financial processes are expansive and never-ending (www.grandviewresearch.com). Over the next few years up to 2030, the market size of AI is expected to grow 788.64% from \$207.9 billion to \$1.8 trillion worldwide (see Figure 2). According to the data from Statista and Finbold, the global Artificial Intelligence (AI) market size is projected to reach approximately \$1.8 trillion by 2030, showcasing a significant compound annual growth rate (CAGR) during this period

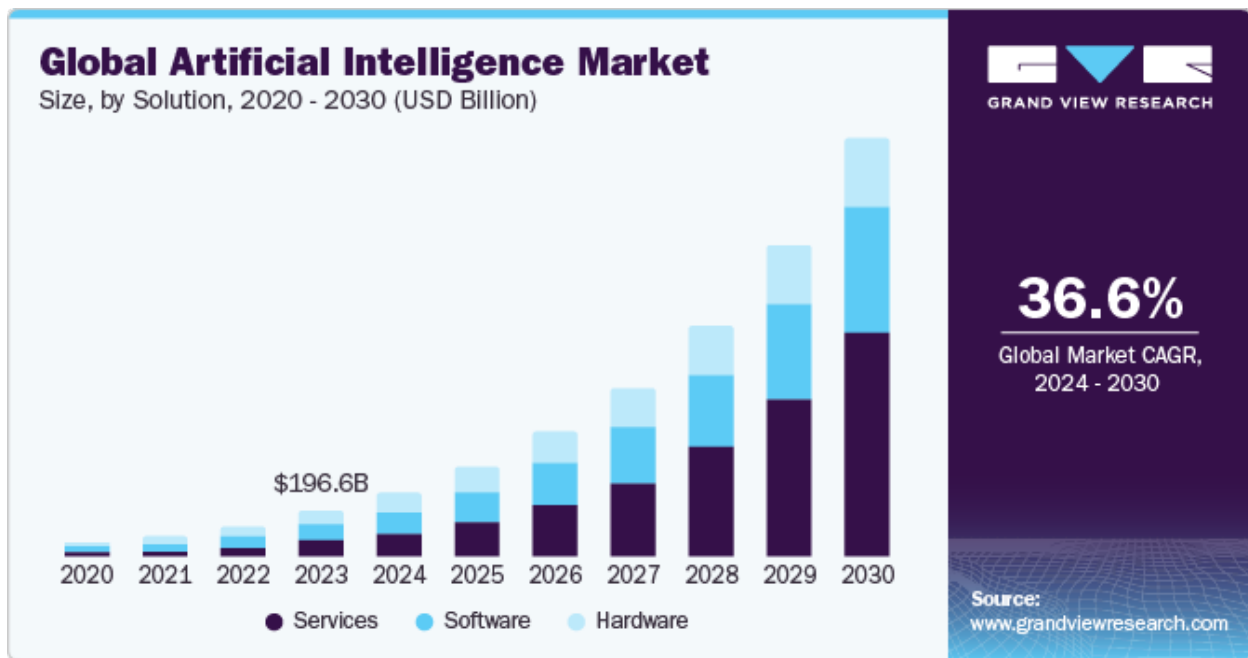
The increasing use of AI-powered technology profoundly affects various levels and sectors of businesses and finance, as shown in a recent survey paper on ESG and AI in finance (Lim, 2024). This development increases efficiency and productivity, fuels expansion and innovation, and reduces routine tasks' workloads. The new technology is a transformative force that will redefine societal norms, influence business practices, production and trade, and shape our future. It will increase efficiency and affect the quality of work; it will change collaborative structures and power relations in organizations, eliminate business models, and create new ones.

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Tech giants like Amazon.com, Inc.; Google LLC; Apple Inc.; Facebook; International Business Machines Corporation; and Microsoft are investing significantly in AI research and development (R&D), thus increasing the artificial intelligence market cap (www.grandviewresearch.com).

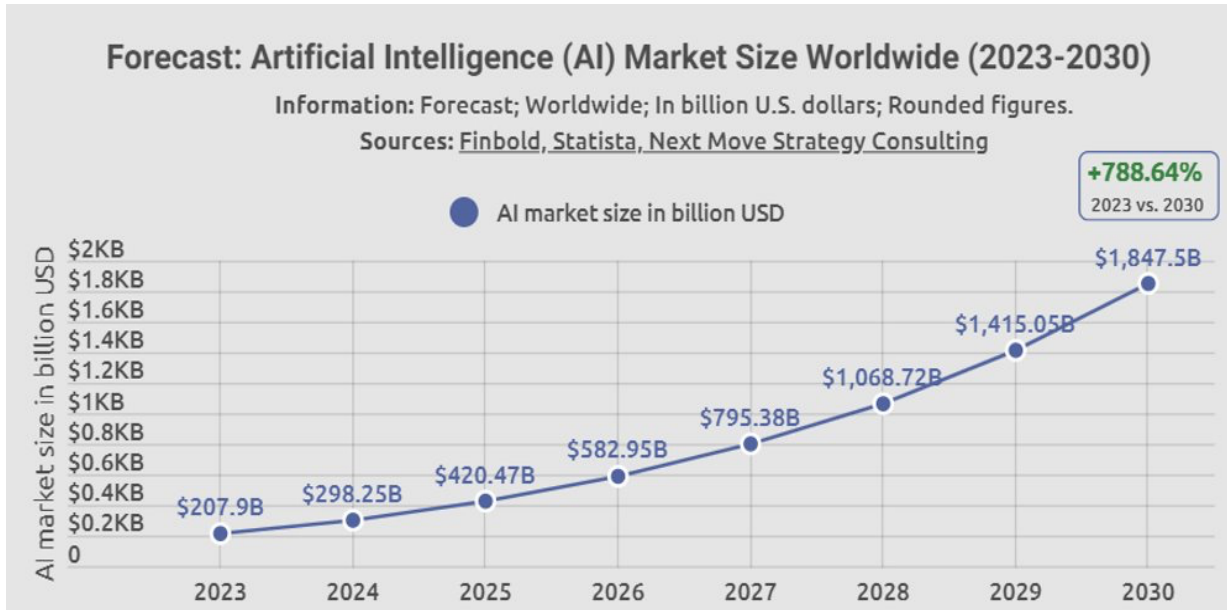
Figure 1 Artificial Intelligence Market Size & Trends

The continuous research and innovation directed by tech giants drive the adoption of advanced technologies in industry verticals, such as automotive, healthcare, retail, finance, and manufacturing. For instance, in December 2023, Google LLC launched ‘Gemini’, a large language AI model, made available in three sizes: Gemini Nano, Gemini Pro, and Gemini Ultra. Gemini stands out from its competitors due to its native multimodal characteristic (www.grandviewresearch.com).



In recent years, integrating Artificial Intelligence into Environmental, Social, and Governance (ESG) initiatives has emerged as a transformative force in the corporate world (Lim, 2024). As businesses face pressure from investors, consumers, and regulators to operate sustainably and ethically, AI provides a solid toolkit to meet these demands, revolutionize how companies enhance their ESG reporting, and uncover opportunities. The rise of AI in ESG practices is not merely a tech advancement but rather a strategy to reduce environmental and social risks, foster stakeholder engagement, and optimize operational efficiency. However, it is imperative to recognize that AI still has the challenges of algorithmic bias, data accuracy, and the need for human oversight, which is dangerous when addressing ESG issues.

Figure 2 The Artificial Intelligence market size forecast worldwide (2023-2030) (Source: Finbold, Statista, Next move strategy consulting).



This paper aims to further understand the impact of AI on CSR and ESG ethics by examining specific case studies and empirical evidence. The intersection of AI, CSR, ESG factors, and business ethics is rapidly evolving, with recent publications shedding light on their interplay. The impact of AI on CSR and ESG ethics is profound and multifaceted, as AI plays an increasingly prominent role in shaping how organizations pursue sustainability, fairness, and responsible governance. Francis (2024) discusses how AI integration and changing regulations will shape corporate ethics, compliance, and ESG by 2025. He emphasizes the importance of leadership in fostering ethical cultures and navigating complex ESG requirements.

By leveraging advanced data analytics and machine learning algorithms, Adeoye et al. (2024), using extensive ESG-related datasets and extracting actionable insights, have suggested AI empowers investors to analyze, and identify investment opportunities aligned with sustainability objectives. AI has emerged as a transformative force in ESG investing, enhancing portfolio performance Adeoye et al. (2024). Wang and Wang (2025) suggest that AI’s potential to drive operational efficiency and support regulatory compliance processes during turbulence offers a guide for practitioners grappling with the intricacies of restructuring and turnaround efforts.

Unlike the above studies, we aim to contribute to the AI literature in finance and suggest the relationship between AI and business ethics, AI and CSR, and AI and ESG issues to examine whether AI-driven strategies have successfully (or unsuccessfully) reduced risks, improved (or deteriorated) financial performance metrics, and provided companies with a competitive (or less competitive) edge. Through a balanced analysis of opportunities and failures, we aim to offer valuable insights for finance decision-makers considering the integration of AI into their ESG strategies ethically and effectively.

This paper uniquely contributes to the AI literature in finance by adding how the AI-driven strategies of business ethics, CSR, and ESG are functionally and qualitatively related to firm risk, performance, and competitive positions. To discuss how businesses can integrate AI to improve ESG performance while adhering to ethical principles, simple modeling about the impact of AI on

CSR, ESG, and business ethics are proposed. We also discuss the limitations in the context of ESG and business ethics, including bias and inequality, lack of transparency (black-box problem), ethical considerations in AI deployment, over-reliance on AI for decision-making, data quality and availability, regulatory and legal risks, environmental impact of AI, human displacement and labor concerns, long-term sustainability and unintended consequences, corporate governance and accountability, and lack of universal standards.

II Literature Review

AI's ability to concentrate large amounts of information into consumable, actionable intelligence is a crucial reason for its high adoption rate by many finance decision-makers. These cases may include how AI can predict future trends, optimize current infrastructure based on a metric, and reduce environmental footprint. AI can also enhance supply chain and process logistics by introducing traceability, enabling companies to find ways to reduce their environmental and social risks while strengthening societal well-being (Statman, 2024).

ESG and CSR topics have grown substantially recently; thus, it is crucial to differentiate ESG from CSR. CSR refers to businesses' sustainability strategies to ensure the company is carried out ethically. In contrast, ESG practices are criteria used to measure a company's overall sustainability. CSR and ESG are related but not the same. For instance, consider a paper bag manufacturer that wants to implement CSR and ESG policies. CSR can be incorporated by communicating internally and in press releases that the company is committed to being more sustainable and responsible. ESG builds on that foundation with measurable goals such as a 30% increase in recycled materials within five years and planting one million trees in 10 years. Thus, we can investigate ESG practices to evaluate how well a company adheres to its sustainability and corporate responsibility goals. Harder-to-measure indicators under the CSR banner include greater employee awareness of the company's environmental impact or internal and external messaging about sustainable practices. Whereas CSR is the ideal and gives context to sustainability agendas and corporate responsibility culture, ESG is the action and measurable outcome. To simplify, CSR can be thought of as the qualitative side and ESG as the quantitative side.²

ESG is growing but contentious. The concept of investing based on the criteria of ESG factors has proliferated since the term ESG was coined in 2005, and now more than 90% of S&P 500 companies provide ESG information (Perez, et al., 2022). Scholars and finance professionals wrote over 2,000 papers examining the pros and cons of investing based on ESG standards. Their findings substantiated the fundamental principles of ESG investing, with approximately 90% of the studies indicating a favorable relation between ESG and corporate financial performance (Friede et al., 2015). Previous studies have focused on the benefit side and found that ESG activities can increase firm performance or value (Cui et al., 2025; Jo and Harjoto, 2011, 2012; Servaes and Tamayo, 2013). Other studies provide contrary or no evidence (Buchanan, Cao, and Chen, 2018; Masulis and Reza, 2015; Matsumura et al., 2014). Different studies focus on the cost side of ESG engagement, including the opportunity cost of ESG investment and the potential waste

² CSR usually encompasses how a company will approach its internal framework of sustainability plans and responsible cultural influence, whereas ESG relates to the [assessable outcome](#) concerning a company's overall sustainability performance. Investors typically look at this framework when making financial decisions regarding the company in question (Oetzel, 2023). <https://kogod.american.edu/news/csr-or-esg>

of company resources (Lioui and Sharma, 2012) or lack of effective ESG communication through shared governance (Jo, Chun, and Song, 2025).

At the same time, the world is challenged by the evolving landscape of climate change and political transformations. Increasing public expectations and changing power relations threaten the stability of international trade relations and supply chains, and businesses increasingly must deal with many societal expectations. To review some of those recent AI applications, we will review a few AI-related studies. Taddeo and Floridi (2018) argue that Artificial intelligence (AI) is not just a new technology that requires regulation. It is a powerful force reshaping daily practices, personal and professional interactions, and environments. For the well-being of humanity, this power must be used as a force for good. They claim that ethics is key in ensuring AI regulations harness their potential while mitigating risks.

Francis (2024) discusses how AI integration and changing regulations will shape corporate ethics, compliance, and ESG. He emphasizes the importance of leadership in fostering ethical cultures and navigating complex ESG requirements. Adeoye et al. (2024) claim that AI empowers investors to analyze extensive ESG datasets, extract actionable insights, and identify investment opportunities aligned with sustainability objectives. AI has emerged as a transformative force in ESG investing, enhancing portfolio performance.

Abay (2022) examines the role of independent third-party ESG assurance in signaling higher ESG performance. While testing the hypothesis, a linear regression was applied using data from Thomson Reuters ESG scores and the global reporting initiative database from a sample of 645 unique European firms for 2012-2017. Firms with third-party assurance have a significantly higher ESG performance than those without assurance. He offers new evidence on the signaling value of an independent third-party ESG assurance in differentiating ESG performances. He confirms the incentive high-performing firms could use to separate from their counterparts with poor performance in a separate equilibrium.

Additionally, the University of Texas at Dallas data shows that “idiosyncratic risk decreases with CSR due to the intangibles improved by CSR” (Li, Li, & Sethi, 2021). Other examples include increasing efficiency by improving corporate culture and reducing company-specific risk by maintaining a high CSR reputation. Despite CSR's intangible benefits, AI uses concrete data to address CSR issues such as privacy concerns and data security. The AI tool should ensure fairness and transparency to its stakeholders, especially disadvantaged and marginalized consumers who are “more vulnerable to the harms of digital technologies, including privacy risks, fraud, and digital surveillance” (Du & Sankar, 2023).

Chouaibi et al. (2022) examine whether environmental disclosure (ED) practiced by firms listed on the ESG index affects their financial performance (FP) using the moderating effect of social and ethical practices. The results show a positive and significant relationship between environmental disclosure (ED) and financial performance (FP). This implies that a substantial environmental disclosure increases financial performance while a weak one decreases it. Furthermore, they suggest a moderating effect of social and ethical practices in the link between environmental disclosure and the firm's financial performance. These findings provide insights to stakeholders and regulators on integrating more social and environmental regulations to promote sustainability.

Investors have little guidance on how to meaningfully integrate ESG ratings into their investment decisions. Moreover, the opinions on whether ESG integration will reap financial benefits vary dramatically amongst academics and ESG professionals. To address this debate, Pederson et al. (2021) develop a theory that shows both - the potential costs as well as benefits of

ESG integrated investing. To conclude whether there is a relation between ESG and financial performance, Friede et al. (2015) conduct an extensive review of over 2000 empirical studies. This correlation has been debated since the 1970's. They claim that around 90% of all the studies find a positive ESG and financial performance relationship. They also find that this relationship appears to be stable over time.

Brusseau (2021) argues that the main issue with AI is related to data ownership and how companies use individuals' data, mainly whether AI usage benefits us or limits our self-determination. He contends that AI-intensive companies should be evaluated based on their impact on individuals rather than demographic segments or collectives. Brusseau proposes an alternative AI human impact model for evaluating AI companies, which utilizes a set of AI principles and assigns scores from 0 to 2 based on how well a company addresses these issues.

AI has revolutionized how companies collect, process, and analyze ESG-related data. Through advanced algorithms, AI can efficiently sift through vast amounts of information from internal databases and external sources, extracting relevant ESG metrics and classifying them into standardized categories, reducing manual effort and minimizing human error (Sandford, 2024).

III Simple Model of AI, ESG, and Business Ethics

As AI emerges as a pivotal tool in decision-making, concerns about biases and challenges have gained prominence. The inherent biases in training data and algorithms can perpetuate societal biases. Understanding and addressing these challenges is crucial for fostering equitable and effective AI-driven decision-making processes.

Indeed, the introduction of AI represents a significant shift in ethics. AI usage's various ethical problems stem from the lack of regulation and privacy, programmable biases, and job displacement. The absence of comprehensive regulatory frameworks has allowed for the unchecked development and deployment of AI technologies, raising concerns about the potential misuse of sensitive data and the infringement of individual privacy rights. Additionally, programmable biases within AI algorithms can perpetuate and even exacerbate existing social inequalities, as these systems may unintentionally discriminate against certain demographic groups. When further analyzing the integration of AI in investment decisions, ethical considerations that demand careful examination are raised. AI usage's ethical problems include its impact on the environment, its use of materials in training systems without consent, credit or compensation, the ease with which it creates deepfakes and allows for financial fraud, the unequal access to AI and the associated imbalance of power this creates, the gender gap that is emerging in its use, the impact on future generations without their input--the list is really quite long. It might be best to characterize the ethical issues we have called out as a sample of ethical issues that arise.

We consider various relationships between AI, CSR, ESG, and business ethics. To discuss how businesses can integrate AI to improve ESG performance while adhering to ethical principles, simple modeling about the impact of AI on CSR, ESG, and business ethics should be useful. We first consider the impact of AI on the business ethics equation.

$$AI\ Ethics\ Score\ (AES) = f(Transparency, Accountability, Fairness, Privacy, Bias, Environment) \quad (1)$$

Where Transparency (T): The clarity with which AI decisions and processes are communicated; Accountability (A): The extent to which responsible parties are held accountable for AI outcomes; Fairness (F): AI systems being free from discrimination and biased outcomes; Privacy (P): The adherence to privacy laws and ethical data usage; and Bias (B): How well the AI system avoids introducing or amplifying biases. A higher AES score indicates better alignment with ethical standards in AI usage.

We next consider AI's contribution to ESG goals:

$$ESG \text{ Score } (ESGS) = w_1 * \text{Environmental Impact} + w_2 * \text{Social Impact} + w_3 * \text{Governance Impact} \quad (2)$$

Where environmental impact (E): How AI is being used to reduce resource consumption, waste, carbon emissions, or enable sustainable practices (e.g., AI in energy optimization); Social Impact (S): The positive societal effects of AI, such as improving access to education, healthcare, or reducing inequality; and Governance Impact (G): How AI is used to improve corporate governance, risk management, and regulatory compliance. Weights (w_1 , w_2 , w_3) are assigned based on the organization's focus within these domains.

We next contemplate the cost-benefit analysis of AI for ESG:

$$Net \text{ ESG Benefit } (NEB) = (AI's \text{ Positive ESG Impact}) - (AI's \text{ Ethical/Operational Cost}) \quad (3)$$

Where Positive ESG Impact: Benefits from using AI to meet environmental sustainability, improve social justice, or strengthen governance frameworks; and Ethical/Operational Cost: Expenses or resources spent on ensuring that AI is ethically aligned (e.g., mitigating bias, protecting privacy, ensuring accountability). A positive NEB would indicate that the AI deployment is aligned with business ethics and ESG principles. At the same time, a negative NEB would suggest a potential trade-off between ethical and operational goals. While Kemell and Vakkuri (2023) provide an initial look into the cost of AI ethics and valuable insights from comparisons to software quality, implementing AI ethics remains nascent, and thus, a better empirical understanding of AI ethics is required going forward.

Next, we consider the return on ESG investment (ROESGI):

$$ROESGI = \frac{ESG \text{ Benefits (Revenue/Cost Savings from ESG)}}{ESG \text{ Investments (Capital allocated to ESG Initiatives)}} \quad (4)$$

Where ESG benefits: The tangible and intangible returns generated from sustainability efforts, social improvements, and governance actions enabled by AI (e.g., improved brand reputation, customer loyalty, regulatory compliance); and ESG investments: Resources spent on adopting AI systems that support ESG goals, including research and development, ethical audits, and compliance with regulatory frameworks. A higher ROESGI ratio indicates that AI investments to improve ESG outcomes yield significant returns.

Furthermore, we consider AI-driven ESG risk management:

$$ESG \text{ Risk Score (ESGRS)} = f(\text{Operational Risk, Regulatory Risk, Reputation Risk, Compliance Risk}) \quad (5)$$

Where Operational risk: Risks related to AI systems' reliability, security, and efficiency. Regulatory risks involve risks associated with AI compliance with environmental laws, labor laws, data privacy laws, and other regulations; Reputation risks are the potential for public backlash or negative media attention regarding AI's misuse (e.g., biased decision-making or environmental harm); Compliance risks are risks of failing to adhere to ESG-related standards and frameworks in the deployment and development of AI. A higher ESG risk score may require mitigation efforts to ensure AI is ethically sound and aligned with ESG principles. Therefore, investors must grapple with ethical dilemmas to ensure that AI deployment aligns with responsible and fair practices within the investment landscape.

IV Framework on AI, Business Ethics, CSR, and ESG

Analyses of AI and Business Ethics

Many different ethical and other adverse concerns arise from using AI in investing. The following analyses are based on our simple model of AI, ESG, CSR, and business ethics. First, there could be a hiring bias. AI algorithms trained on historical hiring data may inherit biases in the hiring process, potentially perpetuating discrimination. Recognizing and mitigating these biases is crucial to promoting diversity and inclusion within the workforce. To make matters worse, AI applications reduce the need for a human labor workforce.

Second, ESG rating bias is possible. AI models evaluating ESG factors may inadvertently incorporate biases, impacting the accuracy and fairness of ESG ratings. Addressing these biases is essential to ensure investment decisions align with ethical and sustainable practices. Third, there is also a geographic bias. Algorithms might inadvertently favor or disadvantage certain geographic regions, impacting the distribution of investments. Ensuring geographic neutrality is vital to avoid reinforcing disparities and to foster a globally equitable investment approach. Fourth, there might be a particular industry concentration. AI models may exhibit biases towards specific industries, leading to an overconcentration of investments in certain sectors. Diversifying investment portfolios and refining algorithms can help mitigate these biases and reduce industry-specific risks.

Fifth, there is a possible overemphasis on short-term metrics. AI models focused on short-term performance metrics may neglect long-term sustainability. Striking a balance between short-term gains and long-term stability is critical for responsible investment decision-making. Sixth, there are data privacy concerns as well. Using vast datasets in AI-driven investment decisions raises privacy concerns. Implementing robust data protection measures is imperative to safeguard sensitive information and ensure compliance with privacy regulations. Seventh, there might be overreliance on AI predictions. Blind reliance on AI predictions without human oversight can lead to misguided decisions. Balancing AI insights with human judgment is essential to avoid overreliance and to maintain a nuanced understanding of complex market dynamics. Ninth, there is risk of herd mentality. If multiple investors rely on similar AI models, there is a risk of herd

mentality, where market trends become exaggerated. Encouraging diversity in investment strategies can help mitigate the risk of following trends unquestioningly.

Tenth, we also could have some algorithmic complexity barrier. Complex algorithms may challenge understanding and interpreting decision-making processes. Striving for transparency in algorithmic operations is essential to build trust among investors and stakeholders. There is already some evidence from Pitchbook's Hodgson (2023) that technology may be better at investing. In an experiment in 2020, the Harvard Business Review built an investment algorithm and tested its performance against the returns of 255 angel investors. The results: The algorithm reported an internal rate of return of 7.26% compared to 2.56% for the angels. While the Harvard Business Review found that the algorithm outperformed humans, the results were markedly lower when compared against an elite group of experienced angel investors. The latter achieved an average IRR of 22.75%. But who knows? In a decade, founders may pitch ChatGPT or Bard for capital instead of a fellow human.

Eleventh, there is a lack of AI regulation in many industries. Thus, monitoring the adverse AI effects of protecting data privacy, short-termism, and various ESG reporting biases is hard. The development and deployment of artificial intelligence (AI) systems pose significant risks to society. AI companies need an effective risk management process and sound risk governance to reduce these risks to an acceptable level. Shuett et al. (2024) explore how AI companies can improve their risk governance by setting up an AI ethics board. They identify five key design choices: (1) What responsibilities should the board have? (2) What should its legal structure be? (3) Who should sit on the board? (4) How should it make decisions? (5) And what resources does it need? They break each of these questions into more specific sub-questions, list options, and discuss how different design choices affect the board's ability to reduce societal risks from AI. Several failures have shown that designing an AI ethics board can be challenging. They attempt to provide a toolbox to help AI companies overcome these challenges.

Twelveth, there is a lack of human interaction. The ability to look beyond numbers and find the potential for disruptive ideas is a uniquely human skill—at least for now. How well AI could adapt to unexpected events or rapidly changing market conditions, like the downturn we are currently experiencing, also remains to be seen (Hodgson, 2023).

Mitigating various risks associated with AI in investment involves a multifaceted approach. Establishing clear ethical guidelines, promoting diversity in AI development teams, and implementing ongoing audits of algorithms can help uncover and rectify biases. Additionally, fostering collaboration among industry stakeholders and policymakers is essential to create a framework that ensures responsible and transparent AI use in investment decisions.

Analyses of AI and CSR

Corporate Social Responsibility (CSR) is a business practice that encourages firms to work sustainably to mitigate their environmental footprint and participate in improving social justice and economic issues while considering stakeholders' interests (Deng, Kang, & Low, 2013; Ferrell, Liang, & Renneboog, 2016; Jo & Harjoto, 2011; Liang & Renneboog, 2017). This business model has become a new aspect that current businesses implement into their strategies, demonstrating a company's commitment to making positive societal contributions. As consumers become more conscious about the environmental and social challenges we face today, they will seek companies that are transparent about their CSR efforts and are investing in long-term sustainability. This consumer preference is noticeable in the financial performance of firms that actively engage in

CSR practice. A study from the University of Rennes found that the firms with very high CSR levels (generally above 95) will primarily “benefit from the positive effects on financial accounting performance” (Lachuer & Jabeur, 2022).

They suggest that firms must make substantial and meaningful CSR investments to benefit stakeholders. On the other hand, companies that engage in greenwashing will face both a negative reputation and a decrease in accounting performance. Another notable finding, illustrated in the graph, shows that CSR level positively correlates to betas that are either close to 1 or less than 0.5 (Lachuer & Jabeur, 2022). This indicates that sustainable companies are typically less volatile and provide more consistent returns over time. Further, CSR paired with AI innovation effectively works as an unsystematic risk management tool and improves operational efficiency. Under the resource-based view, we found that companies can differentiate themselves from competitors by fulfilling the VRIO framework. Intangible improvements such as a positive brand reputation, strong connections with stakeholders, and increased customer loyalty, can be improved with CSR initiatives.

Given the recent rise of AI, businesses have begun leveraging their unique technological capabilities to enhance CSR initiatives. Before integrating AI in developing CSR messages, firms should consider both the opportunities and risks of using AI tools. Some risks include ethical concerns regarding biases or misinformation embedded in AI algorithms, which would create a harmful brand image and have significant repercussions for society. To optimally integrate AI into the development of CSR initiatives, firms should consider investing in the research and development of socially responsible AI. Furthermore, AI can be a helpful tool to increase diverse stakeholder engagement, which would provide insight into the impact of these AI-driven CSR initiatives. Still, firms must be cautious about protecting their stakeholders' data given their access to sensitive information.

In determining how effective AI technology is in improving communication with stakeholders, we evaluated a study on consumer responses to AI-generated CSR messages. The first data set showed that consumers prefer human communication over AI messages. The supporting research found no strong correlation between human and AI CSR messages to brand innovativeness (Amani et al., 2024). AI technology seems to lack the emotional intelligence needed to address sensitive social, environmental, and economic issues; however, this technology may be helpful for more technical strategic planning. Additionally, due to the ongoing development of AI, many consumers lack trust in the authenticity and credibility of AI-generated CSR messages. To create trust, companies must ensure that they are transparent about the use of AI and review all AI-generated messages to align the message with company-specific or industry values. Although AI offers efficiency, managers should be mindful of potential errors and misinformation, so all AI messages should be reviewed by human employees before releasing any communication. Lastly, firms should consider incorporating feedback mechanisms and actively engage with stakeholders to address concerns regarding AI and build stronger relationships with their target audience.

As businesses move towards integrating AI into the workplace, specifically to help address CSR initiatives, they must consider the risks and opportunities that stem from this technology. Since CSR prioritizes ethical decisions, firms must be conscious of the potential for misinformation and take steps to mitigate that risk. If implemented ethically, firms with high CSR levels will reap the benefits of increased operational efficiency and a strong brand reputation.

Analyses of AI and ESG

Environmental, Social, and Governance (ESG) factors have recently become integral to investment decision-making. According to David F. Larcker, the James Miller Professor of Accounting, Emeritus, at Stanford Graduate School of Business, “Corporate governance is table stakes: All companies are expected to have it.” Governance has been a focal point for investors, who view governance quality as already embedded in asset prices. Environmental issues like climate risks are not yet perceived to affect the asset price, and social factors are seen as the least important when driving investment decisions.

As the investment landscape evolves, companies increasingly leverage AI to enhance their ESG initiatives and affect ESG outcomes. AI efficiently processes vast amounts of data, enabling companies to identify patterns and trends that might not be evident through traditional analysis. This allows for more accurate assessments of a company’s ESG performance and the long-term risks and opportunities associated with ESG factors. Here is one attempt to measure the growth of AI and ESG based on capital asset growth rate (CAGR) (see Tables 1A and 1B) based on various reports.

Table 1A Market Size of AI and ESG over time

This table summarizes the market size of AI (Artificial Intelligence) and ESG (Environmental, Social, and Governance) investments over time. The values in the table are estimates and represent global market sizes in billions of USD.

Year	AI Market Size (USD Billion)	Growth Rate (AI)	ESG Market Size (USD Billion)	Growth Rate (ESG)
2020	62.4	15%	35.3	10%
2021	93.5	25%	53.2	20%
2022	119.8	28%	80.0	23%
2023	164.9	38%	112.0	25%
2024	233.3	41%	150.4	30%
2025	325.5	40%	210.6	40%

Notes: AI Market Size is estimated using compound annual growth rates (CAGR) driven by machine learning, deep learning, robotics, and data analytics innovations. ESG Market Size refers to global ESG-related investments, including sustainable funds, corporate initiatives, and green finance.

Table 1B The estimated market size growth of AI and ESG-related markets between 2020 and 2030. These values are based on aggregated trends and projections from various market reports.

Year	AI Market Size (USD Billion)	CAGR (AI)	ESG Market Size (USD Billion)	CAGR (ESG)
2020	50	35%	15	15%
2021	67.5		17.3	
2022	91.1		19.9	
2023	123.0		22.8	
2024	166.1		26.2	
2025	224.3		30.1	
2026	302.8		34.6	
2027	408.8		39.7	
2028	552.0		45.6	
2029	745.2		52.4	
2030	1,006.0		60.3	

Notes: The AI market is estimated to grow at a CAGR of approximately 35%, and the ESG market is expected to grow at a CAGR of approximately 15%. The AI market shows more exponential growth due to technological innovations and adoption in the healthcare, finance, and manufacturing sectors. The ESG market grows steadily, driven by regulations, increasing investor interest, and corporate accountability efforts.

Case Studies of AI and ESG

AI has been shown to enhance operational efficiency in ESG activities by automating data collection, analysis, and reporting processes. Companies can make better-informed decisions because AI can quickly process large volumes of ESG data from various sources, identify trends, and generate insights. However, there are challenges in ensuring the accuracy and reliability of AI algorithms, especially when interpreting complex ESG data.

Several companies like Microsoft, Google, Unilever, Walmart, and IBM have begun implementing AI to further their operational efficiency in ESG activities. Microsoft uses AI to improve energy efficiency and reduce carbon emissions. The company's AI for Earth initiatives leverages AI technology to collect and analyze environmental data, helping in conservation efforts and sustainable agriculture. Microsoft also utilizes AI to optimize data center operations, significantly reducing energy consumption. Unilever's digital platform uses AI to track deforestation and support responsible sourcing of raw materials like palm oil, tea, and other commodities. Lastly, IBM uses AI-driven analytics to enhance corporate governance and transparency. Its AI tools analyze financial reports, board structures, and compliance records to ensure adherence to government standards.

Artificial intelligence can also help identify and assess ESG-related risks and help manage risks more effectively. AI algorithms can detect emerging risks such as environmental disasters, supply chain disruptions, or social controversies, allowing companies to take proactive measures to mitigate them. Companies like IBM, Nestlé, and BP have already integrated AI to help with risk management.

Microsoft developed the AI for Earth program for environmental sustainability, which uses AI to analyze environmental data related to climate change, biodiversity, and water resources. The

company also built an AI-powered Carbon Calculator to track emissions across its operations and supply chain. Microsoft also utilizes AI-driven platforms like its Power BI to create interactive dashboards that give stakeholders real-time insights into the company's ESG performance. These dashboards make it easy for investors, employees, and customers to access and understand complex data about sustainability and corporate governance practices. Unilever uses AI chatbots to enhance communication about its sustainability initiatives. The chatbots can provide data about Unilever's environmental impact, sourcing practices, and social responsibility programs, which can increase transparency and trust between stakeholders and the company. Salesforce is a company that uses AI to analyze employee feedback and employee surveys to provide management with actionable insights to improve the employee experience at their company and workplace practices. This allows AI to be a tool to help foster a more engaged and satisfied workforce.

Unilever partnered with AI startups and developed a platform called GeoAlert, which uses satellite imagery and machine learning to monitor deforestation in real-time for sustainable sourcing. The AI system analyzes vast amounts of data to detect illegal logging or unsustainable farming practices in its supply chain.

Google developed AI for Social Good, which includes projects like flood forecasting using AI models to predict floods in vulnerable regions. The company also uses AI to improve healthcare delivery, such as detecting diabetic retinopathy through retinal scans, aiming to use its technological expertise to address global social challenges, such as disaster response and healthcare accessibility.

IBM uses its Watson AI platform to enhance risk management by analyzing unstructured data from news articles, social media, and other sources to detect emerging ESG risks. This allows IBM to take advantage of the ability to get ahead of the problem before it escalates and address the potential issue by adjusting its strategies accordingly. Nestlé uses AI to manage supply chain risks, ensuring responsible sourcing and mitigating disruptions. AI algorithms analyze supplier data to identify risks related to labor practices, environmental impact, and social controversies. BP uses AI to monitor and manage environmental risks, such as oil spills and emissions. The AI systems analyze data from various operations to detect anomalies and predict potential hazards before they escalate.

Walmart implemented an AI-powered energy management system across its stores and distribution centers for energy efficiency. The system uses machine learning to optimize heating, cooling, and lighting based on real-time data.

Additionally, AI offers significant opportunities to enhance stakeholder engagement by providing transparent and accessible information about a company's ESG performance. Through interactive dashboards and chatbots, AI can enable more meaningful communication with stakeholders, including investors and employees. However, this technology comes with potential concerns about privacy and data security. Companies like Microsoft, Unilever, and Salesforce showcase the benefits of implementing AI to help with stakeholder engagement.

Further Analyses of AI and ESG

AI's ability to process and interpret complex ESG data enables companies to manage risks more effectively, identify opportunities for improvement, and align their strategies with long-term sustainability goals. As AI continues to revolutionize ESG initiatives, the integration of advanced technologies provides a robust framework for companies to enhance operational efficiency,

mitigate risks, and foster transparent stakeholder engagement. This new technology aids in making well-informed investment decisions but also drives positive environmental and social outcomes, reflecting the evolving priorities of modern investors and stakeholders.

However, the rapid adoption of AI in ESG also brings several drawbacks and challenges to light. Concerns around accuracy and biases within algorithms and issues related to privacy and data security are hurdles that must be addressed. Furthermore, the correlation between AI capabilities and ESG outcomes is not always straightforward, raising doubts about the potential unintended consequences and ethical implications of using AI to help decision-making.

AI is affecting the ESG in many more ways than people may think. According to the article " Implications for Artificial Intelligence and ESG Data, " financial firms now use AI to calculate companies' investment in ESG. This helps them to make decisions about investing or not in certain companies. Especially in recent years, ESG has become a larger variable for companies. This places a greater emphasis on ESG with AI; it will only increase the rate at which ESG becomes a more critical variable. This also means that companies that invest in ESG will receive more money at higher rates than other companies. This puts much higher emphasis on companies investing in ESG as it helps them grow as a firm in the long term.

However, many more challenges create problems for financial firms and AI in determining ESG efforts. There are difficulties in accurately measuring and rating a company's environmental and social impact. Particularly given that ESG remains an evolving concept and that there are many different reporting standards and frameworks. This has led to the so-called "aggregate confusion" among companies and investors. This confusion around ESG ratings and their biases is supported by academic evidence, "When assessing the landscape of ESG ratings, MIT Sloan found that the correlation among agencies' ESG ratings is on average 0.61; by comparison, credit ratings from Moody's and Standard & Poor's are correlated at 0.99. The research team found that rating agencies may adopt different definitions of ESG performance or take different approaches to measure that performance or weight the ESG attributes." They concluded that the information investment companies receive is unreliable or consistent.

This has led to funds being created to help create uniformity across the industry. The International Monetary Fund urges political leaders and regulators to develop standards, promote disclosure and transparency, and integrate sustainability considerations into investment and business decisions. It emphasizes the importance of ESG audits for the system's proper development. Recognizing the topic's complexity, several institutions are addressing the need for such audits. Despite significant advancements in Europe, particularly in the environmental dimension, much work must be done to incorporate non-financial corporate information into reporting standards to enhance transparency for companies and investors. This was recently highlighted by the Acting Director of the SEC's Division of Corporate Finance in a public statement listing critical issues for developing common global standards.

The module also allows for the analysis of industries' ESG performance, aiding in the selection of sustainable and socially responsible investments. Studies results show a 20% dependence of stock returns on ESG-related news, leading to the development of a tool that tracks this relationship. This tool complements quantitative strategies and facilitates ESG-informed investment decisions. This research demonstrates GPT-3.5's ability to generate accurate responses to ESG prompts, underscoring the importance of high-quality training data. It also contributes to the growing body of literature on AI in ESG research and provides a framework for future investigations.

Global ESG fund assets reached approximately \$2.5 trillion by the end of 2022. Research has indicated that ESG investing does not necessarily result in lower financial returns and can sometimes lead to higher returns. ESG investing has also garnered increasing interest from institutional investors, such as pension funds and insurance companies, who recognize that ESG factors can significantly impact long-term financial performance. These investors are integrating ESG considerations into their investment decision-making processes.

Overall, AI is being used in many ways, especially through finance. However, the help the AI is providing is not the most reliable. This is because ESG efforts are easily disguised as greenwashing. This makes it very hard for AI to be able to tell whether or not it's truly ESG or if it's greenwashing. Humans need to be able to know if the company cares about ESG or if they are faking it to gain more investment. This shows that AI can help with the basic retrieval of information but should not make decisions on its own.

Integrating Artificial Intelligence (AI) into ESG initiatives is pivotal in evolving corporate responsibility and sustainable business practices. As our study has illuminated, AI offers an array of capabilities that empower companies to navigate the complex landscape of ESG factors more effectively, from enhancing operational efficiency to mitigating risks and fostering transparent stakeholder engagement.

One of the key contributions of AI in ESG lies in its ability to process vast amounts of data and derive actionable insights that may not be readily apparent through traditional analysis methods. AI streamlines data collection, analysis, and reporting processes through automation, enabling companies to make better-informed decisions regarding their ESG performance. Case studies of companies like Microsoft, Unilever, and IBM demonstrate how AI is being leveraged across various industries to optimize energy efficiency, track deforestation, enhance corporate governance, and manage environmental risks.

Moreover, AI is a powerful tool for identifying and assessing ESG-related risks, allowing companies to proactively address emerging challenges such as environmental disasters, supply chain disruptions, and social controversies. By analyzing unstructured data from diverse sources, AI algorithms enable early detection of potential risks, empowering companies to adjust their strategies and mitigate negative impacts.

In addition to risk management, AI facilitates stakeholder engagement by providing transparent and accessible information about a company's ESG performance. Interactive dashboards and AI-driven chatbots offer stakeholders real-time insights into sustainability practices, fostering trust and accountability. However, it's crucial to acknowledge the concerns surrounding privacy and data security inherent in AI-driven communication platforms, highlighting the need for responsible AI development and implementation.

Despite AI's numerous benefits to ESG initiatives, challenges persist, including accuracy issues, algorithm biases, and ethical implications. The correlation between AI capabilities and ESG outcomes is not always straightforward, underscoring the importance of ongoing research and development to address these challenges. Additionally, the rise of greenwashing poses a significant obstacle, complicating AI's ability to discern genuine ESG efforts from superficial gestures.

Looking ahead, the continued integration of AI into ESG practices requires a concerted effort to overcome these challenges while maximizing the technology's potential for positive environmental and social impact. Standardizing ESG reporting frameworks, promoting transparency, and responsible AI development are critical steps in ensuring the integrity and effectiveness of AI-driven ESG initiatives.

In sum, while AI offers unprecedented opportunities to enhance ESG performance, its successful integration requires careful consideration of ethical, technological, and regulatory factors. By harnessing the transformative power of AI responsibly, businesses can navigate the complexities of ESG challenges more effectively, driving sustainable growth and creating long-term value for stakeholders and society as a whole.

V Discussions and Conclusions

Discussions

The intersection of Artificial Intelligence (AI), Environmental, Social, and Governance (ESG) principles, and business ethics is rapidly evolving. These three elements are increasingly critical in shaping corporate strategy, decision-making, and public perception. Here is an exploration of how they interact:

AI and ESG Integration

AI can transform how businesses approach ESG goals by improving efficiency, enabling more accurate data collection, and enhancing transparency. For instance, AI-driven analytics can monitor a company's environmental impact by tracking real-time carbon emissions, identifying supply chain inefficiencies, and recommending sustainable practices. Similarly, AI can enhance social initiatives by supporting diversity and inclusion efforts, through bias-reduction algorithms or by improving employee wellness programs.

In governance, AI's role in enhancing decision-making through data-driven insights can foster transparency and accountability, enabling organizations to adhere to the governance principles of fairness, responsibility, and oversight. However, the use of AI in ESG also raises concerns. AI systems are not immune to biases, and if these biases are not carefully managed, they can inadvertently undermine ESG goals. For example, AI algorithms that assess hiring or promotion decisions could perpetuate gender or racial disparities, thereby negatively impacting social equity.

AI and Business Ethics

The ethical use of AI in business is crucial to ensure that its deployment does not harm individuals or society. AI's power to automate decisions—whether in hiring, lending, or criminal justice—can raise serious concerns about fairness, transparency, and accountability. For instance, an AI algorithm that prioritizes profit over human well-being may undermine ethical standards by exploiting workers, encouraging environmental degradation, or perpetuating societal inequalities. Ethical AI development requires companies to commit to principles like fairness, transparency, privacy protection, and accountability. Businesses must take proactive steps to mitigate risks such as algorithmic bias, misuse of personal data, and lack of explainability in AI-driven decisions. Furthermore, ethical AI involves designing systems aligned with human rights and respecting individuals' dignity.

Balancing Profit and Responsibility

We should weigh AI's potential to drive business profitability against the broader social and environmental consequences. AI-driven automation could lead to mass layoffs, or AI's decisions could disproportionately impact specific marginalized communities. In contrast, businesses that proactively use AI to meet ESG objectives may gain long-term benefits, such as increased

consumer trust, regulatory compliance, and competitive advantage. However, there is a significant challenge in balancing short-term profit goals with long-term sustainability, mainly when AI solutions are expensive to develop and implement.

Governments and regulatory bodies are increasingly addressing these challenges by establishing AI ethics guidelines, ESG reporting standards, and sustainability regulations. Companies must align AI development and deployment with these evolving frameworks to avoid reputational risks and regulatory penalties.

Limitations of AI in the Context of ESG and Business Ethics

Bias and Inequality: AI models are trained on data that can inherit biases from historical patterns, human behavior, or biased datasets. In the context of ESG, this can result in discriminatory practices or perpetuating societal inequalities. For example, AI used to assess social responsibility or diversity may not account for nuanced or evolving societal norms, leading to biased outcomes in employee hiring or sustainability metrics.

Lack of Transparency (Black-box problem): AI systems, particularly deep learning models, often function as "black boxes" with decision-making processes that are difficult for humans to understand or audit. This lack of transparency can undermine trust, especially when applied to critical ESG issues such as governance, environmental impact reporting, or the ethical implications of business decisions. Businesses may struggle to ensure accountability and fairness without explaining how AI arrives at conclusions.

Ethical Considerations in AI Deployment: AI technologies may unintentionally conflict with core ethical principles such as privacy, fairness, and consent. In business settings, AI-driven tools for ESG monitoring may lead to concerns over surveillance, data privacy violations, or algorithmic decision-making that overrides human judgment. This raises critical questions about how AI impacts workers' rights, consumer protection, and environmental integrity.

Over-reliance on AI for Decision-Making: Businesses may become overly reliant on AI systems to decide ESG performance or ethical considerations, potentially sidelining human judgment, intuition, and moral reasoning. This over-reliance can result in decisions prioritizing efficiency or profitability over holistic social and environmental impact considerations. AI is often ill-equipped to fully account for the complexity of human ethics or environmental consequences, potentially leading to unintended adverse outcomes.

Data Quality and Availability: Effective AI models require large volumes of high-quality, accurate data to make informed decisions. However, in the context of ESG, data may be scarce, fragmented, or unreliable, especially for environmental and social metrics that are difficult to quantify. This lack of comprehensive data makes it challenging for AI systems to provide reliable ESG insights, leading to potential miscalculations or misleading assessments.

Regulatory and Legal Risks: As AI technologies continue to advance, there is a lack of universally accepted guidelines and regulations governing its ethical use, particularly in the ESG space. Businesses may face legal and regulatory risks when deploying AI in ways that infringe on human rights, privacy, or violate ESG principles. Inconsistent global regulations surrounding AI ethics can lead to challenges in maintaining compliance, especially for multinational corporations.

Environmental Impact of AI: While AI has the potential to help businesses improve their environmental performance (e.g., optimizing energy consumption or reducing waste), the environmental footprint of AI itself can be significant. The computational power required for training large AI models, especially deep learning, can be energy-intensive and contribute to carbon emissions. Companies must weigh AI's environmental impact alongside its benefits in achieving ESG goals.

Human Displacement and Labor Concerns: The widespread adoption of AI can lead to job displacement, which presents ethical challenges for businesses striving to promote fair labor practices. Automation and AI could exacerbate inequalities in the workforce, particularly if companies focus on maximizing profit without investing in reskilling or creating new job opportunities for displaced workers. This could undermine the social element of ESG, which emphasizes fair labor practices and inclusive growth.

Long-term Sustainability and Unintended Consequences: AI-driven solutions may prioritize short-term efficiency over long-term sustainability. For instance, optimizing for immediate financial returns may not align with long-term environmental goals, such as reducing carbon footprints or conserving natural resources. Without careful governance, AI systems may overlook the broader implications of business practices on future generations or fail to address systemic ESG issues adequately.

Corporate Governance and Accountability: AI can be a powerful tool for improving corporate governance by providing insights into decision-making, identifying risks, or enhancing compliance efforts. However, AI does not have the moral compass of a human decision-maker, which can create challenges in ensuring that business decisions align with ethical standards. Accountability mechanisms need to be in place to ensure that AI-driven decisions remain aligned with corporate values and ethical principles. This also raises concerns about shifting responsibility from human leaders to AI systems.

Lack of Universal Standards: There is currently no universally accepted framework for applying AI to ESG and business ethics. As a result, businesses may struggle to navigate different standards across regions and industries, creating confusion and inconsistency in how ESG goals are measured, reported, and achieved through AI-driven solutions. In summary, while AI offers significant potential for enhancing ESG practices and business ethics, it must be deployed carefully and with consideration for its limitations. Human oversight, transparency, and ethical governance are essential to ensure that AI's impact aligns with societal values and long-term sustainability goals.

Future Directions of Research on AI, ESG, and Business Ethics

The intersection of AI, ESG principles, and business ethics represents a rapidly evolving field with significant implications for the future of sustainable and responsible business practices. As organizations increasingly adopt AI technologies to drive efficiency, innovation, and decision-making, ensuring these advancements align with ethical standards and ESG goals is critical.

Below are key future directions for research in this domain: (i) Developing robust ethical frameworks that guide the integration of AI into ESG strategies. This includes ensuring transparency, fairness, and accountability in AI systems used for ESG reporting, risk assessment, and decision-making; (ii) Leveraging AI to improve the accuracy, reliability, and standardization of ESG metrics and reporting. AI can help analyze vast datasets to identify trends, predict risks, and measure the impact of corporate actions on sustainability goals; (iii) Addressing biases in AI algorithms that may disproportionately affect marginalized communities, particularly in areas like hiring, lending, and resource distribution. Research should explore how AI can promote social equity while adhering to ESG principles; (iv) Investigating AI's dual role in contributing to and mitigating environmental challenges. While AI can optimize energy use and reduce waste, future studies should also focus on carbon footprint and resource consumption; (v) Establishing governance frameworks to ensure responsible AI deployment in ESG-related activities. This includes regulatory compliance, stakeholder engagement, and ethical oversight; (vi) Enhancing stakeholder trust through transparent and explainable AI systems. Research should explore how AI can facilitate meaningful stakeholder engagement while maintaining ethical standards.

Conclusions

Artificial Intelligence (AI), CSR, and Environmental, Social, and Governance (ESG) have become increasingly intertwined, with AI playing a transformative role in advancing ESG initiatives across various sectors. The relationship between AI, CSR, and ESG is multifaceted, offering both opportunities and challenges for organizations striving to improve their sustainability and ethical practices. The future of AI, ESG, and business ethics presents both opportunities and risks. Companies that harness AI to advance ESG goals while adhering to ethical business practices can create long-term value and contribute to a more sustainable and equitable society. Conversely, failing to integrate these principles can lead to detrimental social, environmental, and ethical consequences.

For AI to contribute positively to ESG and ethical goals, businesses must adopt a responsible, transparent approach to AI design and implementation. This includes addressing biases, ensuring privacy, maintaining accountability, and aligning business practices with broader societal goals. The convergence of AI and ESG is not just a technological issue—it is a fundamental ethical challenge that requires collaboration between businesses, policymakers, and society to create frameworks that protect human rights and promote sustainable practices.

AI can be a powerful tool for achieving ESG objectives, but only if developed and deployed with a commitment to fairness, transparency, and accountability. Businesses and corporations can drive innovation and profitability through this responsible approach and contribute positively to the global community. We aim to contribute to the AI literature in finance by adding how the AI-driven strategies of business ethics, CSR, and ESG are functionally and qualitatively related to firm risk, firm performance, and the firm's competitive positions by showing their benefits and future challenges. In conclusion, the relationship between AI and ESG is symbiotic and evolving. AI is a powerful tool for advancing CSR and ESG initiatives, offering enhanced data analysis, predictive capabilities, and reporting efficiency. However, organizations must approach AI integration strategically, balancing the benefits with potential challenges to ensure responsible and sustainable implementation of AI in their CSR and ESG efforts.

References

- Abay, Z. (2022). The Signalling Role of Voluntary ESG Assurance. *International Journal of Managerial and Financial Accounting*, 14(3), 265-294.
- Adeoye, O., Okoye, C., Ofodile, O., Odeyemi, O., Addi, W., & Ajahi-Nifise, A. (2024). Artificial Intelligence in ESG investing: Enhancing portfolio management and performance. *International Journal of Science and Research Archive*, 11(1), 2194-2205.
- Amani, Nadir, et al. (2024). "Generative AI Hurts Brands? Exploring Consumer Responses to AI generated CSR Messages." AMA Winter Academic Conference Proceedings, vol. 35, Jan. 2024, 20–24.
- Buchanan, B., Cao, C.X. and Chen, C. (2018). Corporate social responsibility, firm value, and influential institutional ownership. *Journal of Corporate Finance*, 52, 73-95.
- Chouaibi, S., Rossi, M., Siggia, D., & Chouaibi, J. (2022). Exploring the moderating role of social and ethical practices in the relationship between environmental disclosure and financial performance: evidence from ESG companies. *Sustainability* (Switzerland), 14(1), 209.
- Cui, J., Jo, H., & Velasquez, M. G. (2025). Firm-level climate change initiatives and Christian religiosity. Unpublished working paper. Santa Clara University.
- Deng, X., Kang, J., & Low, B. (2013). Corporate Social Responsibility and Stakeholder Value Maximization: Evidence from Mergers, *Journal of Financial Economics*, 110, 87–109.
- Du, S., & Sankar, S. (2023) AI Through a CSR Lens: Consumer Issues and Public Policy, *Journal of Public Policy & Marketing* <journals.sagepub.com/home/ppo>.
- Ferrell, Allen, Hao Liang, and Luc Renneboog, (2016). Socially Responsible Firms, *Journal of Financial Economics*, 122, 585–606.
- Francis, T (2024) AI, ethics, and ESG in 2025. *Corporate Culture*.
- Friede, G., Busch, T., and Alexander Bassen. (2015). ESG and Financial Performance: Aggregated Evidence from More than 2000 Empirical Studies. *Journal of Sustainable Finance & Investment*, 5(4), 210-233.
- Grand View Research (2024). Artificial Intelligence Market Size & Trends. <www.grandviewresearch.com>
- Hoover Institution. (2024, May). 2024 CGRI/MSCI Sustainability Survey. <<https://www.hoover.org/sites/default/files/2024-05/2024-cgri-msci-sustainability-survey-FINAL.pdf>>
- Ildridge, Irene, and Payton Martin. (2022). ESG In Corporate Filings: An AI Perspective. 2022.
- Jo, H., Chun, H., & Song, H. (2025). Shared Governance and ESG Rating: Evidence from Korea, *Corporate Social Responsibility and Environmental Management*, 32(2), 2769-2782.
- Jo, H., & Harjoto, M. (2011). Corporate Governance and Firm Value: The Impact of Corporate Social Responsibility. *Journal of Business Ethics*, 103(3), 351-383.
- Jo, H., & Harjoto, M. (2012). The causal effect of corporate governance on environment society and governance. *Journal of Business Ethics*, 106(1), 53-72.
- Jo, H., Juarez, A., Rossi, A., Strauss, C., & Ressler, L. (2024). The Impact of Artificial Intelligence on Venture Capital Sourcing and Due Diligence, *Global Journal of Entrepreneurship*, 8(1), 12-33.
- Kemell, K., & Vakkuri, V. (2023). What Is the Cost of AI Ethics? Initial Conceptual Framework and Empirical Insights. 14th International Conference, ICSOB 2023, Lahti, Finland, November 27-29, 2023 Proceedings.

- Lachuer, J., & Jabeur S.B. (2022) Explainable Artificial Intelligence Modeling for Corporate Social Responsibility and Financial Performance, *Journal of Asset Management* <<http://doi.org/10.1057/s41260-022-00291-z>>.
- Li, G., Li, N., & Sethi, S.P. (2021) Does CSR Reduce Idiosyncratic Risk? Roles of Operational Efficiency and AI Innovation, *Production and Operations Management*, 30, 7.
- Liang, H., & Reneboog, L. (2017). On the Foundation of Corporate Social Responsibility, *Journal of Finance*, 72(2), 853-910.
- Lin, T. (2024). Environment, Socialal, and Governance (ESG) and Artificial Intelligence (AI) in Finance: State-of-the-art and Takeaways. *Artificial Intelligence Review*, 57(76).
- Lioui, A., & Sharma, Z. (2012). Environmental corporate social responsibility and financial performance: Disentangling direct and indirect effects. *Ecological Economics*, 78, 100-111.
- Macpherson, Martina and Gasperini, Andrea and Bosco, Matteo, (2021). Implications for Artificial Intelligence and ESG Data (June 8, 2021). Available at SSRN: <https://ssrn.com/abstract=3863599> or <http://dx.doi.org/10.2139/ssrn.3863599>
- Masulis, R.W. and Reza, S.W. (2015). Agency problems of corporate philanthropy. *Review of Financial Studies*, 28(2), 592-636.
- Matsumura, E.M., Prakash, R. and Vera-Munoz, S.C.(2014). Firm-value effects of carbon emissions and carbon disclosures. *The Accounting Review*, 89(2), pp.695-724.
- Microsoft. (n.d.). *Microsoft AI for Earth*. Microsoft. <<https://www.microsoft.com/en-us/ai/ai-for-earth>>
- Nestlé. (n.d.). *Nestlé uses AI to ensure responsible sourcing*. Nestlé. <https://www.nestle.com/sustainability/ai-responsible-sourcing>
- Oetzel, J. (2023). CSR or ESG: Where Do Sustainability Frameworks Fit In? Kogod School of Business. <https://kogod.american.edu/news/csr-or-esg>
- Pedersen, L., Fitzgibbons,S., & Pomorski, L. (2021). Responsible Investing: The ESG-Efficient Frontier. *Journal of Financial Economics*, 142(2), 572-597.
- Perez, L., Hunt, V., Samandari, H., Nuttall, R., & Biniek, K. (2022). Does ESG really matter – and why? McKinsey Quarterly, August 2022.
- Saetra, H. S. (2023) The AI ESG Protocol: Evaluating and Disclosing the Environment, Social, and Governance Implications of Artificial Intelligence Capabilities, Assets and Activities. *Sustainable Development*, 31(2), 1027-1037 <<http://doi.org/10.1002/sd.2438>>.
- Salesforce. (n.d.). Einstein Analytics. Salesforce. Retrieved from <https://www.salesforce.com/products/einstein-analytics/>
- Sandford, J. (2024). How Generative AI is Transforming ESG Reporting. SIA. <https://www.sia-partners.com/en/insights/publications/how-generative-ai-transforming-esg-reporting>
- Servaes, H., & Tamayo, A. (2013). The Impact of Environment society and governance on Firm Value: The Role of Customer Awareness. *Management Science*, 59(5), 1045-1061.
- Shuett, J., Reual, A., & Carlier, A. (2024). How to Design an AI Ethics Board? AI and Ethics, <https://doi.org/10.1007/s43681-023-00409-y>
- Statman, M. (2024). *A Wealth of Well-Being: A Holistic Approach to Behavioral Finance*. Wiley.
- Supply Chain Digital. (2023, April 18). *Unilever’s AI for sustainable sourcing*. <<https://www.supplychindigital.com/technology/unilever-s-ai-for-sustainable-sourcing>>

- Supply Chain Digital. (2023, March 20). *Nestlé's AI-powered supply chain risk management*. <https://www.supplychaindigital.com/technology/nestle-s-ai-powered-supply-chain-risk-management>
- Taddeo, M., & Floridi, L. (2018). How AI can be a force for good. *Science*, 361(6404), 751-752.
- Wang, Z., & Wang, Y. (2025). Leveraging AI for Compliance in Corporate Restructuring in Times of Financial Distress. Working paper. New York University and University of California, Berkeley.
- Wild, M. (2023, March 15). *Microsoft: How AI helps us build a sustainable future*. TechRepublic. <<https://www.techrepublic.com/article/microsoft-how-ai-helps-us-build-a-sustainable-future/>>
- World Economic Forum. (2023, February 10). *Unilever uses AI to combat deforestation*. <https://www.weforum.org/agenda/2023/02/unilever-uses-ai-to-combat-deforestation/>