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Guardians of green: Legal implications and best practices in AI-enabled CSR for environmental sustainability in India

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ABSTRACT

This research critically examines the intricate intersection of Artificial Intelligence (AI) and Corporate Social Responsibility (CSR), specifically focusing on environmental sustainability. It elucidates the legal implications and optimal practices inherent in their amalgamation. The study underscores the transformative potential for corporations to adopt the “Guardians of Green” role by leveraging AI technologies, such as data analytics, real-time monitoring, and predictive modelling, to enhance the efficacy of environmental stewardship initiatives. A meticulous analysis of the prevailing legal frameworks governing the integration of AI within CSR is conducted, emphasizing compliance paradigms and contemplating potential regulatory advancements that may shape corporate conduct. The paper also delineates best practices for corporations seeking to maximize the environmental impact of their CSR initiatives through the strategic integration of AI, examining its role in optimizing supply chains, improving energy efficiency, and revolutionizing waste management processes. Ethical considerations intrinsic to AI-driven sustainability practices are scrutinized, highlighting the importance of transparent and ethically responsible applications. By amalgamating legal analysis, empirical case studies, and practical insights, this research seeks to provide comprehensive guidance for corporations, policymakers, and legal professionals navigating the evolving landscape of AI-infused CSR for environmental sustainability in India. It establishes a scholarly foundation for future inquiries and discussions on the legal and ethical dimensions underpinning corporate environmental responsibility in the contemporary era of autonomous intelligence.

Keywords: sustainable development; corporate social responsibility; artificial intelligence; legal regulation; best practices

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1. Introduction

In the ever-evolving landscape of corporate conduct, the imperative for businesses to engage in meaningful Corporate Social Responsibility (CSR) has become increasingly pronounced. Among the myriad facets of CSR, integrating Artificial Intelligence (AI) into sustainability initiatives has emerged as a transformative force, promising to redefine corporations as proactive stewards of the environment. The impetus for this research arises from the growing recognition that the symbiotic relationship between AI and CSR presents a unique avenue for corporations to meet regulatory standards and become active contributors to global environmental well-being. As concerns over climate change and resource depletion intensify, there is an urgent need to explore the legal dimensions governing the intersection of AI and environmental sustainability within CSR frameworks. This research aims to fill this critical gap by delving into the legal implications and best practices associated with

AI-enabled CSR initiatives for environmental conservation. The investigation begins by elucidating the transformative potential of AI, particularly in data analytics, monitoring, and predictive modelling, to empower corporations as “Guardians of Green”. Subsequently, the study rigorously examines the existing legal frameworks guiding AI applications in CSR, emphasizing compliance paradigms and anticipating potential regulatory developments that may shape corporate behaviour. The paper also outlines exemplary practices for corporations seeking to maximize the environmental impact of their CSR endeavours through the strategic integration of AI. Therefore, this research responds to the imperative for corporations to embrace sustainable practices and contributes to the broader discourse on the ethical and legal considerations underpinning AI-infused CSR^[1]. The ensuing sections will comprehensively analyse the legal intricacies, case studies and practical insights, establishing a robust scholarly foundation for understanding and navigating the intersection of AI, CSR, and environmental sustainability.

2. Methods

This study adopts a primarily doctrinal and analytical research approach, emphasizing an in-depth examination of legal frameworks, regulations, and relevant literature pertinent to the intersection of Artificial Intelligence (AI), Corporate Social Responsibility (CSR), and environmental sustainability. The doctrinal aspect systematically synthesises existing legal literature, statutes, and case law to comprehend the normative landscape governing AI applications within CSR frameworks. This includes exploring international, national, and industry-specific regulations delineating the rights, responsibilities, and liabilities of corporations engaged in AI-driven CSR initiatives for environmental conservation. The analytical component of the research entails a critical assessment of the identified legal frameworks, emphasizing areas of coherence, inconsistency, and potential gaps. By employing analytical tools, this research aims to unravel the implications of existing legal paradigms for corporate conduct in the realm of environmental sustainability facilitated by AI. The synthesis of doctrinal and analytical perspectives forms the foundation for deriving nuanced insights into the legal intricacies surrounding AI-enabled CSR for environmental conservation, contributing to a comprehensive understanding of the subject matter and seeks to provide a conceptual model for use in the Indian scenario.

3. The transformative potential of AI in CSR

Integrating Artificial Intelligence (AI) within Corporate Social Responsibility (CSR) holds unparalleled promise in revolutionizing environmental sustainability initiatives. This section delves into how AI technologies can bring about transformative changes in CSR practices, particularly concerning environmental stewardship. From the lens of data analytics, AI emerges as a powerful tool, providing corporations with unprecedented insights into environmental trends and patterns. Predictive modelling further empowers entities to engage in proactive decision-making, addressing environmental challenges before they escalate^[2]. The section also explores the role of AI in optimizing supply chains for reduced environmental impact, tracing the origin and journey of raw materials, and promoting transparency. Additionally, the discussion encompasses the application of AI in enhancing energy efficiency, from smart buildings to integrating renewable energy sources into power grids. Furthermore, AI’s contribution to waste management and recycling processes is examined, demonstrating how automated systems can refine and revolutionize these critical aspects of CSR^[3]. By elucidating the transformative potential of AI across these dimensions, this section establishes a foundation for understanding how corporations can harness technological advancements to become effective stewards of the environment within the context of CSR.

3.1. Data analytics and environmental insights

One of the pivotal dimensions of the transformative potential of Artificial Intelligence (AI) in Corporate Social Responsibility (CSR) lies in its capacity to revolutionize data analytics, providing corporations with

profound insights into environmental dynamics. AI-driven data analytics enables an in-depth examination of vast and complex datasets related to environmental parameters. This section explores how corporations can leverage advanced analytics tools and machine learning algorithms to decipher environmental data patterns, trends, and anomalies. AI facilitates a comprehensive understanding of environmental factors ranging from air and water quality to biodiversity metrics by processing real-time information from diverse sources such as sensors, satellites, and monitoring devices.

Integrating AI in data analytics allows for identifying current environmental conditions and empowers predictive modelling, enabling corporations to anticipate future changes. This proactive approach equips entities to implement timely and effective measures to address environmental challenges, contributing to sustainable practices. Case studies and examples will be examined to illustrate how AI-based data analytics has been applied successfully in diverse sectors, demonstrating its versatility and efficacy in providing actionable insights for environmental conservation. This section aims to underscore the significance of data-driven decision-making facilitated by AI, emphasizing its role as a cornerstone for corporations aspiring to elevate their environmental stewardship within the purview of CSR. We begin by analysing various nuances of digital technology and then move on to exploring both the prospects and challenges posed by AI technology in a generalised sense.

3.1.1. Digital technology

Digital technology is the encoding of information in binary digits (bits). This minimises the expenses associated with storing, processing, and transmitting data. Research in the field of digital economics investigates the impact of digital technology on economic activity and explores how it brings about changes. Comprehending the impacts of digital technology does not necessitate a whole novel economic theory. Nevertheless, it necessitates a distinct focus. The study of digital economics begins by examining the aspect of “what sets it apart?” What becomes more convenient when information is encoded in bits instead of atoms? The presence of digital technology frequently imposes financial limitations on commercial activities. Hence, digital economics investigates the modifications in conventional economic models as specific costs decrease significantly and may reach a point close to zero^[4].

Many people tend to perceive digital platform businesses and their influence as unyielding. The conceptual and material tools provided by Western liberal law, politics, and economics are insufficient in dealing with the damages that impact individuals and society in the age of information. The actual damages frequently seem difficult to grasp, resistant to theoretical analysis, and subject to disagreement. One can wonder why our ways of thinking and governing are ill-prepared to tackle the perceived, yet often misunderstood, decline of fundamental human and societal needs in an increasingly digitalized society. To address this topic and envision the future of the digital platform economy, it is necessary to reflect on the past before progressing. By what means did we arrive at our present state? What influences have contributed to the formation of our individual and collective identities and the possibilities for our future development? How have these factors influenced our current situation and how might they shape our future decision-making^[5]?

Just as railroads were significant in the early 1900s, digital platforms have become equally significant in the early 2000s. The railroads and their digital successors have fostered unprecedented innovation and generated substantial wealth. Nowadays, digital services are present in almost every facet of modern life, and the digital economy is responsible for most economic growth^[6].

3.1.2. Predictive modelling for proactive environmental stewardship

In the pursuit of proactive environmental stewardship within the context of Corporate Social Responsibility (CSR), the integration of predictive modelling powered by Artificial Intelligence (AI) emerges as a paramount strategy. This research asserts that predictive modelling, facilitated by advanced

algorithms and machine learning, provides corporations with a forward-looking lens, enabling them to anticipate and mitigate environmental challenges before they escalate. By analysing historical data, real-time environmental metrics, and relevant contextual factors, predictive models can forecast potential environmental impacts, ranging from climate changes to resource depletion. This proactive foresight equips corporations with the ability to implement targeted strategies, adapt operations, and formulate policies that contribute to sustainable practices. This section will delve into case studies and empirical examples to illustrate instances where predictive modelling has been instrumental in averting environmental risks and optimizing CSR initiatives. The examination of best practices and challenges associated with the implementation of predictive modelling for environmental stewardship will further enrich the discourse. Ultimately, this research aims to underscore the transformative role of predictive modelling in fostering a proactive approach to CSR, positioning corporations as conscientious stewards of the environment in the face of evolving ecological challenges.

Unregulated implementation and assimilation of AI-imbued measures pose a significant threat to democratic processes on a global scale. Other fields have extensively explored the legal and political consequences of big data and AI, whereas philosophy has seen a significant increase in literature addressing ethical issues related to AI. From the standpoint of political philosophy, there has been limited research conducted thus far. This special issue emerged from the acknowledgment that political philosophy plays a vital role in discussions on how AI should transform our collective political, social, and economic existence. The extensive implementation of AI highlights fundamental, persistent issues in political philosophy with a heightened sense of urgency and gives rise to genuinely novel philosophical questions that hold political importance. Philosophical problems that already exist are reemerging on a larger scale. These include the question of whether decision-making procedures that rely on rules, whether carried out by bureaucrats, administrative officials, or algorithmic systems, are fair and valid. Another question is whether it is morally acceptable to make judgements based on statistical generalisations, and if so, when. Additional instances encompass enduring discussions in moral and legal philosophy regarding the rationale behind the immorality of discrimination; traditional debates in political philosophy concerning political equality in the face of uneven political sway; debates in political philosophy and the philosophy of economics regarding labour and estrangement; and broader debates on idealisation and abstraction that traverse political and moral philosophy, as well as the philosophy of science^[7].

The latest advancements in computational technology have caused concerns regarding a transfer of authority from human decision makers to machines. State actors are increasingly relying on machine-learning algorithms to directly distribute resources and exert control over individuals, ranging from welfare and employment to bail and other risk evaluations. Machine-learning tools are widely believed to be surpassing, and even eradicating, human control in ways that undermine significant personal concerns. A developing legal approach to address these concerns is to establish a new entitlement to a decision made by a human being. The General Data Protection Regulation incorporated the concept into European law. American legislation, particularly within the realm of criminal justice, is progressing in a similar trajectory. However, no governing body has provided a specific and detailed definition of the exact nature of that entitlement, presented a clear and compelling rationale for its establishment, or delineated its appropriate scope^[8].

Measures involving AI use in Human Resources have already made strides by exploring a new frontier called ‘People Analytics’, which emphasises predicting human intuition or gut-feeling to make decisions and new research in this area already proposes using a socially responsible AI (SRAD)^[9]. This does not seem like a far-fetched thing if we consider that AI and automation in general is speculated to assist directors in Australian companies in decision-making process^[10]. The widespread adoption of digital technology holds the potential for significant progress for humanity, but also brings up concerns about the ethical and responsible

creation and use of these technologies by enterprises. We appreciate the increasing presence of business ethicists who are focusing on the significant, challenging, and potentially negative consequences of these technologies for both company and society. The contributions of Big Tech corporations to the eventual emergence of a post-work society have the potential to greatly upset current allocations of income, wealth, work, and leisure time. However, if these transitions are fully realised over an extended period, business and business ethics (which are challenging to conceive of without the requirement of engaging in paid work) would become little more than a subject of historical significance. While certain individuals may rejoice at the prospect, others will view it as a significant source of apprehension. Regardless of the situation, the viewpoint of Big Business Ethics sheds light on these possibilities and highlights the role that the world's largest firms play in them. Big Business Ethics deserves examination, as it highlights potential trends that could bring about the demise of our existing understanding of business ethics^[11]. In a culture and economy characterised by the prevalence of knowledge, there is a need for novel forms of organisations and management. Instead of establishing organisations rooted in fear, some researchers believe we could construct organisations founded on playfulness. Traditional corporations emerged during periods characterised by intensive manual labour. Currently, most employees are classified as knowledge workers. Their primary driving force is creativity and challenge, as well as the sense of accomplishment and self-fulfilment, rather than control and fear. Brain-based organisations require a revised value system that is in harmony with ardour, zeal, zest for life, involvement, dedication, noble objectives, and resolve to have an impact. Contemporary students and workers lack the necessary preparation for collective undertakings, unconventional setbacks, and a desire for transformation^[12]. It is evident that being proactive entails that we address the emerging challenges posed by AI if we hope to exploit it to improve CSR and ensure that environmental sustainability stays at the forefront of economic growth.

3.2. Legal implications of AI in CSR for environmental sustainability with special reference to India

This section delves into the intricate legal landscape governing the integration of Artificial Intelligence (AI) within Corporate Social Responsibility (CSR) frameworks, particularly concerning environmental sustainability. As corporations increasingly turn to AI technologies to enhance their environmental initiatives, this study aims to critically analyse the legal implications inherent in such endeavours. The examination encompasses international and national regulatory frameworks, industry-specific standards, and emerging legal norms that delineate the rights, responsibilities, and liabilities of entities engaged in AI-driven CSR for environmental conservation. By scrutinizing existing legal paradigms, the research seeks to identify compliance challenges, ethical considerations, and potential gaps in the regulatory framework. Case studies and comparative analyses will be employed to elucidate instances where legal frameworks have been tested or successfully navigated in the application of AI for environmental sustainability within CSR. Moreover, the research will anticipate potential regulatory developments and their ramifications on corporate conduct. Through this exploration, the section aims to contribute nuanced insights into the legal dimensions that underpin AI-infused CSR initiatives, providing a foundation for informed decision-making, policy formulation, and future legal discourse in the dynamic intersection of AI, CSR, and environmental responsibility.

3.2.1. Brief overview of international AI regulatory frameworks

The burgeoning landscape of Artificial Intelligence (AI) has prompted an increased focus on developing regulatory frameworks at the international level. Recognizing the global implications of AI technologies, several organizations and initiatives have emerged to establish guidelines and standards that govern the responsible development and deployment of AI systems. The Organisation for Economic Co-operation and Development (OECD) has been at the forefront, producing the OECD Principles on Artificial Intelligence that emphasize transparency, accountability, and human-centric values^[13].

The European Union has also taken significant strides with the proposal for the Artificial Intelligence Act, aiming to create a harmonized regulatory framework across member states. Additionally, UNESCO has been active in developing a global standard-setting instrument on the ethics of AI, emphasizing the need for human rights, inclusivity, and cultural diversity in AI applications^[14].

The Global Partnership on Artificial Intelligence (GPAI), a multilateral initiative involving leading nations, focuses on fostering international cooperation to address challenges associated with AI, including ethical considerations and human rights implications. These frameworks collectively reflect an evolving consensus on the necessity of ethical and legal guidelines to govern the global development and deployment of AI technologies^[15].

However, challenges persist, including the need for alignment between diverse legal systems, the adaptability of regulations to rapid technological advancements, and the assurance of inclusivity in global discussions. As the international community continues to navigate these complexities, these regulatory frameworks stand as crucial milestones in fostering responsible AI innovation on a global scale. India has undertaken a proactive stance in exploring and implementing AI-based CSR initiatives, drawing inspiration from global practices. Notable among these is the adoption of technology for social impact, reflecting initiatives by global tech giants such as Microsoft and Google with their AI for Earth and AI for Accessibility programs, which focus on environmental sustainability and aiding individuals with disabilities. This global influence has prompted India to consider collaborations with international organisations and corporations, aiming to replicate successful models and emphasising the application of AI for social good, thereby aligning with prevailing global trends while addressing local challenges^[16]. We analyse some of these use cases and forecast some probable ones further in this research article.

3.2.2. Brief overview of Indian AI regulatory framework

India has been riding the wave of digital transformation on the back of a healthy digitally-literate youth and the rapid wave of digitalisation exacerbated due to the COVID-19 induced global lockdown protocols^[17]. A comprehensive and holistic legislative framework has been in the making since 2019. India has been actively involved in formulating regulatory frameworks to manage the growth of Artificial Intelligence (AI) technology within its jurisdiction. The National AI Strategy, announced by the Government of India in April 2020, delineates the nation's framework for AI governance. Although the strategy offered a general structure for the advancement of AI, there is still a lack of a thorough and particular legal framework for regulating AI, which is now in its early phases of development.

The Ministry of Electronics and Information Technology has played a crucial role in developing rules and norms related to Artificial Intelligence (AI). The AI Standardisation Committee was founded with the purpose of formulating standards that guarantee the ethical and secure implementation of AI technologies. In addition, the National Institution for Transforming India (NITI Aayog), a governmental policy think tank, has been actively engaged in formulating policies pertaining to the governance and ethics of artificial intelligence (AI).

The Personal Data Protection Bill, 2019, was a significant legislation aimed at regulating the processing of personal data and imposing requirements on businesses that use AI for data processing, with a focus on data protection. The measure highlights the significance of acquiring informed permission, guaranteeing data security, and granting individuals authority over their personal data. The Personal Data Protection Bill, 2019 faced a lot of criticism from most of the stakeholders and after receiving their feedback and implementing the suggested changes, the Digital Personal Data Protection Bill, 2022 was introduced which was further updated and finally the Digital Personal Data Protection Act, 2023 received the Presidential assent on 11 August 2023^[18].

India has made considerable progress in developing rules related to AI, but there is still a need for a specific and complete regulatory framework that expressly deals with the ethical, legal, and technical aspects of AI applications. The continuous development of AI technology highlights the necessity for a flexible and adjustable legal framework to tackle growing difficulties and ethical considerations.

Within the healthcare sector, India has drawn inspiration from countries like the United States and China, incorporating AI into telemedicine and diagnostic support initiatives. These efforts utilise AI algorithms for early disease detection and remote patient monitoring. In this context, India can continue to adopt and adapt AI-driven healthcare solutions, mainly to enhance rural healthcare accessibility and diagnostic capabilities. Such endeavours align with the government's commitment to providing affordable and inclusive healthcare solutions to its populace.

On the educational front, India has been influenced by global EdTech initiatives, mirroring trends observed in the United Kingdom and the United States. These initiatives leverage AI for personalised learning, skill development, and educational accessibility. India's potential adoption of similar AI-driven EdTech solutions aligns with the overarching goal of addressing challenges within the education sector, facilitating personalised learning experiences, and fostering skill development.

The agricultural sector has witnessed global precedents, notably in Israel and the Netherlands, where AI has been successfully integrated into precision farming. Such initiatives optimise resource utilisation and enhance crop yields. India, with its significant agricultural landscape, has the potential to adopt and implement AI-driven precision farming techniques. This could boost productivity and address challenges related to climate change and food security.

Environmental monitoring initiatives, particularly those in the European Union and the United States, have employed AI for climate modelling and biodiversity conservation. Drawing inspiration from these global endeavours, India can explore AI-driven solutions for environmental monitoring. This could prove instrumental in conserving biodiversity, tracking climate change impacts, and bolstering overall ecological sustainability.

While India has actively engaged with AI in CSR initiatives, continuous collaboration with global entities and adapting successful models from other countries remain pivotal. These initiatives must be contextualized to address specific societal challenges and ensure the inclusive and ethical deployment of AI technologies. It is advisable to ascertain the latest developments in this domain, recognising the evolving nature of this landscape.

3.3. Proposed best practices for AI-enabled CSR initiatives

Incorporating the recommended strategies in AI-powered Corporate Social Responsibility (CSR) activities will greatly enhance the efficient legal oversight of these endeavours. The use of ethical AI and active interaction with stakeholders promote transparency, establishing a basis for legal compliance and accountability. Stringent data privacy and security protocols effectively mitigate worries regarding potential breaches and unauthorised entry, ensuring compliance with data protection standards. Collaborative partnerships leverage different skills to develop comprehensive legal frameworks that take into account multiple views and potential issues^[19]. The practice of ongoing monitoring and evaluation, together with the ability to be flexible and adaptable, enables timely modifications to legal plans in order to address changing environmental and regulatory conditions. Design concepts that prioritise human needs and interests guarantee compliance with legal regulations that focus on the overall welfare of society^[20]. Practicing accessibility and inclusivity helps avoid discriminatory connotations and complies with legal requirements that promote justice. Comprehensive education and awareness initiatives play a crucial role in cultivating an informed citizenry, hence diminishing the probability of legal conflicts and promoting adherence to regulations. Collectively, these optimal methods build a forward-thinking, morally upright, and legally

conforming atmosphere for the oversight of AI-driven corporate social responsibility (CSR) project. This guarantees that companies function within established legal boundaries while maximising their beneficial influence on environmental sustainability. AI-related CSR is interlinked with both operational and organizational performance according to some studies^[21].

CSR, at its peak, is a crucial and harmonious partnership between businesses and governments that focuses on achieving comprehensive and sustainable development. Public policy is crucial in directing companies towards the use of socially responsible AI for customers. Essential for the development, evaluation, and supervision of socially responsible AI, ethical and regulatory guidelines like the United States' Blueprint for an AI Bill of Rights and the European Union's Ethics Guidelines for Trustworthy AI play a crucial role. Nevertheless, public policy must surpass basic regulation in order to direct socially responsible AI in many fields in a manner that is specific to the situation. Therefore, a primary focus of study is to examine the feasibility and effectiveness of particular forms of partnerships between the public and commercial sectors in optimising consumer welfare through artificial intelligence. Further research is required to provide precise policy suggestions tailored to different businesses or consumption domains. Within the realm of media and information, what legislative measures could be implemented to address the issues of disinformation and digital addiction? Would the dependence on algorithms in the retail and service industry diminish service quality and consumer satisfaction? How can healthcare providers achieve a balance between the advantages and drawbacks of utilising artificial intelligence in the healthcare industry? Government or third-party organisations should certify AI products as ethical or socially helpful if they meet specific technological responsibility standards. Obtaining such accreditation will decrease the imbalance of information, allowing customers to make well-informed choices. Research is necessary to determine the most effective public policy strategies that can encourage and, in some cases, compel companies to utilise their AI technology to promote positive and environmentally-friendly actions among consumers^[22].

3.3.1. Ethical AI adoption

The development and deployment of AI systems that adhere to ethical principles, ensuring transparency, fairness, and accountability, are prioritized; robust ethical guidelines that consider the potential societal impacts of AI applications in CSR initiatives are implemented^[23]. AI adoption needs to be in tune with the ethical principles of our times so that AI applications remain humane.

3.3.2. Data privacy and security

Stringent data privacy measures should be established to protect sensitive information, ensuring compliance with relevant data protection regulations; advanced encryption and cybersecurity protocols are employed to safeguard data integrity and prevent unauthorized access^[24]. Data Privacy is an underappreciated concern in our times. Most users do not comprehend the value of their personal data or even how their privacy is being infringed. Policymakers and legislators need to keep these things in mind while regulating AI so that the interests of consumers are safeguarded.

3.3.3. Stakeholder engagement

Fostering open communication with stakeholders, including employees, consumers, and local communities is paramount, to garner insights and address concerns regarding AI applications in CSR. Encouraging stakeholder participation in decision-making processes to promote inclusivity and transparency is of utmost importance. The journey of India's Personal Data Protection Bill to Digital Personal Data Act is a clear example how stakeholder engagement can reinforce legislative measures and ensure wider acceptance among all^[25]. Similarly, the stakeholder engagement as evident from EU draft AI Bill further reaffirms the need for increased dialogue and participation. In addition to its operational marketing roles, AI is expected to bring about significant changes in consumption behaviours. Presently, certain categories have experienced a transformation in consumer behaviour due to the influence of AI-driven societal changes^[26].

3.3.4. Collaborative partnerships

Collaborations should be formed with technology experts, NGOs, governmental bodies, and other stakeholders to enhance the effectiveness and credibility of AI-enabled CSR initiatives. Resources and expertise should be pooled to collectively address complex environmental challenges. The digital ecosystems and platforms are not limited to any single jurisdiction and thus the impetus for making policies that are compliant across jurisdictions is imperative^[27]. The role played by NGOs and various think tanks is a driving force behind shaping the legislation and policy regarding AI. NGOs also play an important role in championing the cause of environmental sustainability and their collaborations with companies in implementing environmentally beneficial CSR initiatives with the help of AI can be crucial.

3.3.5. Human-centric design

AI solutions that enhance human well-being and contribute positively to the community and environment should be prioritized. It should be ensured that AI technologies complement human efforts rather than replace them, thereby promoting job creation and skill development^[28]. It is quite evident that AI is rife with some programming biases. Making AI humanistic and more attuned to environmental sustainability will help companies utilise AI for better CSR policies. There have already been instances of AI being discriminatory towards certain group of people which prompted Amazon to discontinue the use of their AI-based recruitment system^[29]. Considering the fact that Amazon has one of the most advanced AI models and vast repositories of data to fuel its machine learning algorithms, these occurrences take a nasty angle and increase the need for humane AI solutions.

3.3.6. Continuous monitoring and evaluation

Robust monitoring systems should be implemented to assess the impact and efficacy of AI-driven CSR initiatives continuously. Key performance indicators (KPIs) should be utilized to measure the success of sustainability goals and adapt strategies based on real-time feedback^[30]. AI can be programmed to undertake continuous monitoring of CSR initiatives and if need be, modify the measures according to the desired results. Through AI use is rife with ethical challenges, we should continue to monitor its use closely and explore avenues of improving it to serve the needs of society. We believe law and policy will go a long way in achieving these needs.

3.3.7. Legal compliance

Policymakers and regulators should stay abreast of evolving legal frameworks related to AI and CSR, so that strict adherence to international, national, and industry-specific regulations is ensured. Regular legal audits should be conducted to identify and rectify any potential compliance issues promptly^[31]. AI can help companies with CSR related legal compliance and accountability.

3.3.8. Accessibility and inclusivity

It must be ensured that AI technologies are accessible to a diverse range of individuals and communities, considering factors such as language, culture, and socio-economic status. Biases in AI algorithms need to be mitigated to prevent inadvertent discrimination and ensure equitable access to the benefits of CSR initiatives^[32]. AI can accentuate the CSR initiative according to the needs of society and ensure inclusivity of all marginalised sections of the society.

3.3.9. Education and awareness programs

Educational initiatives should be launched to enhance awareness among employees, consumers, and the wider community regarding the positive impact of AI in CSR initiatives. Training programs must be provided to build digital literacy and encourage the responsible use of AI technologies^[33]. Education and awareness are the key to ensuring increased and informed stakeholder engagement.

3.3.10. Flexibility and adaptability

AI-enabled CSR strategies should be designed with the flexibility to adapt to changing environmental conditions, regulatory requirements, and technological advancements. A culture of innovation and continuous improvement ought to be fostered to stay at the forefront of sustainable practices.

By incorporating these best practices, we envision that companies and policymakers can navigate the ethical, social, and legal considerations associated with AI-enabled CSR initiatives, ensuring a positive and lasting impact on environmental sustainability.

4. Theoretical framework for integrating AI-enabled tools for CSR in environmental sustainability

So far, we hope we were able to illustrate the instrumental role AI can play in implementing CSR goals in tune with environmental sustainability. The mainstream is now expressing concerns over the fairness, accountability, and transparency of algorithmic governance. However, scientific and policy discourses around algorithmic governance have notably overlooked the significance of social mobilisation and opposition. This exclusion is an error. The prominence of demands for bottom-up control should be emphasised in current discussions around algorithmic governance. It is imperative to now contemplate how law and policy may redistribute the authority to regulate algorithms to people who are most directly impacted. However, confining these measures solely to the state is insufficient.

Ultimately, the demands for social and labour activism revolve around the need for increased regulation of both powerful state institutions and the companies that support these activities. Collaboratively, labour and social movements amplify some of the most incisive criticisms of algorithmic governance: inequity, lack of transparency, and absence of responsibility contribute to the belief that AI/ML is untrustworthy and should be demolished. However, these movements also extend beyond the typical criticisms, advocating for further regulation of technology and its utilisation by influential entities. These demands encounter substantial impediments. While the political system assumes that algorithmic governance is impartial, unbiased, just, and effective, and supports privatisation while only allowing distant bureaucratic scrutiny, it will be challenging to attain a more equitable allocation of political power. The lessons from these grassroots movements provide valuable insights for promoting progressive change during a time when privatisation is prevalent. The state's dependence on emerging technology demonstrates the extensive interconnection between public and private authority, while private dominance is also widespread in less technologically advanced situations. The blurring of the distinction between public and private governance necessitates the development of novel methods of mobilisation, resistance, and involvement that transcend traditional boundaries. Privatisation increases the need for progressive labour and social movements to collaborate in order to establish opposing influence.

Indeed, it is important to acknowledge that not every endeavour to 'democratise' algorithmic governance will achieve its intended goals. However, the endeavours to promote democratic algorithmic governance in cities, workplaces, and communities are not merely initiatives to disrupt or obstruct the system. Instead, they articulate a specific conception of democracy, wherein regular citizens should have the ability to determine how influential institutions, whether they are private or public, should rule our society. The law impedes our capacity to exercise these options, which is counter-intuitive^[34].

Now we seek to propose some theoretical frameworks that will lay the foundation for AI-driven change in the realm of CSR.

4.1. Institutional theory

Organisational behaviour is influenced by institutions. Integrating AI into CSR projects corresponds to

the changing cultural standards and demands for sustainable business operations. Organisations that use AI-driven environmental sustainability initiatives conform to established standards, hence improving their credibility and standing. The process of digitalization is reshaping the interactions between companies and their customers, and it is also impacting the internal operations of organisations. Algorithmic, data-driven management is becoming more prevalent in both internal and external operations of organisations. Internally, algorithms are used to monitor employee performance and improve organisational structures and human resource management. Externally, digital supply chain management can be used to contractors. It can be utilised to comprehend not just the conduct and proficiency of individual employees, but also the wider dynamics of employee networks and to synchronise work tasks. When algorithmic management is pushed to its limits, the primary role of management shifts from overseeing the business to overseeing the automated systems that oversee the business. The ethical concerns surrounding employee surveillance and control mostly pertain to matters of individual freedom, privacy, and respect^[35].

4.2. Stakeholder theory

The theory emphasises the significance of including stakeholders in designing corporate social responsibility (CSR) strategy. Artificial intelligence solutions enable organisations to engage in dynamic interactions with stakeholders, enabling them to effectively address a wide range of stakeholder problems. AI-driven engagement tools enhance openness and inclusion in environmental decision-making^[36]. Stakeholder engagement is paramount to an efficient and inclusive democracy.

4.3. Technology adoption model

The effective implementation of AI-powered tools for corporate social responsibility (CSR) projects depends on how stakeholders evaluate the technologies' ease of use and use. Organisations should give priority to interfaces that are easy for users to navigate and should provide concrete evidence of how AI applications can help achieve environmental sustainability objectives^[37]. Technology adoption is viral in today's day and age. Legislative and policymaking measures need to be prompt and swift too.

4.4. Environmental contingency theory

The environment is constantly changing, but AI-powered systems provide flexibility by analysing real-time data. The approach highlights the importance of AI applications that can adapt CSR initiatives in response to environmental changes, assuring ongoing relevance and efficacy.

4.5. Resource-based view

The RBV theory emphasises the strategic utilisation of AI resources to gain a competitive edge. Corporations should prioritise utilising AI technology in a distinctive manner to achieve a competitive advantage in conducting corporate social responsibility (CSR) initiatives for the sake of environmental sustainability.

4.6. Triple bottom line

CSR projects should be in accordance with the Triple Bottom Line (TBL) framework, taking into account social, economic, and environmental considerations. AI technologies can enhance this equilibrium by offering insights into the comprehensive ramifications of efforts and assisting with decision-making that is in line with sustainability objectives^[38].

4.7. Diffusion of innovation theory

The framework incorporates elements of the Diffusion of Innovation Theory to tackle obstacles in the implementation of AI-enabled solutions. To expedite the spread of AI advances in CSR activities, strategies should prioritise efforts to reduce opposition, encourage trial and adoption, and highlight tangible benefits^[39].

Research also indicates that CSR policies coupled with innovative measures reduces idiosyncratic risk (IR)^[40].

These theoretical frameworks offer a thorough perspective for organisations aiming to use AI-powered solutions into their CSR campaigns for environmental sustainability. Corporations may successfully implement AI by understanding and managing the interactions between institutional, stakeholder, and technological elements. This approach will lead to ethical, effective, and sustainable results.

5. Indian policies through Nehruvian and Gandhian lenses

India's post-independence trajectory has been significantly shaped by the visions and philosophies of two stalwart leaders, Jawaharlal Nehru and Mahatma Gandhi^[41]. Their ideologies, often viewed as divergent, have nonetheless left a lasting impact on the formulation of policies and the socio-economic fabric of the nation.

5.1. Nehruvian perspective

Jawaharlal Nehru, as the first Prime Minister of independent India, played a pivotal role in shaping the country's policies during its formative years. His vision was characterized by a commitment to modernization, industrialization, and scientific temper. The 'Nehruvian model' emphasized the role of a strong, centralized state in steering economic development and social progress^[42]. This vision is vividly reflected in the establishment of large-scale industries, educational institutions, and scientific research centres. The initiation of the Five-Year Plans, inspired by socialist principles, aimed at reducing poverty, promoting industrial growth, and fostering self-sufficiency.

Nehru's policies were also characterized by a commitment to democratic governance, secularism, and a non-aligned foreign policy. The *Panchsheel*, a set of principles outlining peaceful coexistence, reflected India's diplomatic stance during Nehru's era. This approach sought to navigate the Cold War dynamics by maintaining a neutral position, thus shaping India's foreign policy trajectory.

5.2. Gandhian influence

On the other hand, Mahatma Gandhi's influence on Indian policies is profound, rooted in his philosophy of non-violence, self-reliance, and decentralization. Gandhi's emphasis on rural development, community-based economies, and the upliftment of the marginalized informed policies that aimed at inclusive growth and social justice.

Gandhi's vision found expression in the post-independence era through initiatives such as the Community Development Programme and the Panchayati Raj system. The idea was to empower local communities, ensuring participatory decision-making and socio-economic development at the grassroots level. The emphasis on khadi (hand-spun cloth) and village industries reflected Gandhi's commitment to self-sufficiency and the promotion of cottage industries^[43].

5.3. Harmonizing Nehruvian and Gandhian ideals

While Nehru and Gandhi's perspectives are often seen as divergent, there were moments of convergence. Nehru himself acknowledged the importance of Gandhian ideals, particularly in the realm of rural development. The integration of the Gandhian model into the Five-Year Plans, known as the 'Gadgil Yojana', aimed at fostering rural development and community participation.

In essence, India's policies reflect a nuanced interplay between Nehruvian and Gandhian ideals. The country's commitment to socialism and secularism coexists with initiatives promoting rural development, self-reliance, and decentralized governance. The coalescence of these visions is evident in policies addressing poverty alleviation, education, healthcare, and rural development^[44].

5.4. Contemporary relevance

The Nehruvian and Gandhian perspectives continue to influence contemporary policy debates in India. The emphasis on inclusive and sustainable development, echoed in the Sustainable Development Goals (SDGs), resonates with Gandhian ideals^[45]. Additionally, the push for technological innovation, scientific advancements, and global engagement reflects a Nehruvian approach to modernization and progress.

The synthesis of Nehruvian and Gandhian ideals has profoundly shaped India's policy landscape, contributing to the nation's socio-economic development and its role on the global stage^[46]. The ongoing discourse on inclusive growth, environmental sustainability, and social justice attests to the enduring influence of these visionary leaders on the formulation and evolution of Indian policies.

Gandhian and Nehruvian perspectives, rooted in the historical context of India's independence movement, continue to hold relevance in contemporary discussions pertaining to the formulation of Artificial Intelligence (AI)-enabled Corporate Social Responsibility (CSR) policies. Gandhian philosophy, advocating for decentralized and community-centric development, finds resonance in the current discourse surrounding inclusive AI technologies^[47]. This aligns with the imperative to ensure that AI applications benefit local communities and contribute meaningfully to societal challenges. In the context of AI-enabled CSR policies, a Gandhian perspective would emphasize local empowerment, community involvement, and equitable distribution of the benefits derived from AI initiatives. This may involve the incorporation of AI applications that directly impact and uplift marginalized communities, particularly in rural areas^[48].

Conversely, the Nehruvian perspective, emphasizing scientific temper, education, and industrialization, remains pertinent in the contemporary technological landscape. This aligns with the imperative for responsible AI development, continuous learning, and the integration of technology for societal progress. In formulating AI-enabled CSR policies from a Nehruvian standpoint, there is a need to prioritize education and training programs to bridge the digital divide, foster innovation, and leverage AI for sustainable industrial growth. The Nehruvian lens advocates for a balanced approach that ensures technological advancement is in harmony with societal well-being.

A synergistic application of both perspectives creates a comprehensive framework for AI-enabled CSR policies. Such an approach ensures that technological innovation aligns with community needs, upholds ethical standards, and contributes positively to environmental sustainability. Balancing economic growth with social and environmental responsibility reflects the harmonized approach advocated by both Gandhian and Nehruvian perspectives.

Ethical considerations, central to both Gandhian and Nehruvian ideologies, play a pivotal role in policy formulation. Gandhi's emphasis on non-violence and truth aligns with the imperative for ethical AI practices, while Nehru's commitment to democratic values underscores the importance of inclusive and transparent decision-making in the realm of AI policy formulation. Consequently, policies aimed at integrating AI into CSR initiatives must prioritize ethical considerations, ensuring transparency, fairness, and accountability. Inclusivity in decision-making processes, considering diverse stakeholder perspectives, resonates with the democratic principles highlighted by Nehru.

The application of Gandhian and Nehruvian perspectives in formulating AI-enabled CSR policies provides a nuanced and holistic approach. By incorporating community-centric development, ethical considerations, and responsible technological use, these perspectives offer valuable guidance in addressing contemporary challenges while upholding India's historical values.

5.5. Theoretical policy framework for AI-enabled CSR in India: Synthesising Nehruvian and Gandhian perspectives

In developing a theoretical policy framework for the integration of Artificial Intelligence (AI) into

Corporate Social Responsibility (CSR) initiatives in India, a synthesis of Nehruvian and Gandhian perspectives offers a comprehensive and culturally resonant approach.

5.5.1. Empowering local communities (Gandhian Lens)

Gandhian philosophy, rooted in decentralized and community-centric development, underscores the importance of empowering local communities^[49]. A policy framework must prioritize the localization of AI applications, ensuring that technological interventions directly benefit and involve communities, particularly in rural areas. Initiatives such as skill development programs tailored to local needs and the establishment of AI-driven community centres can foster grassroots engagement, aligning with Gandhian principles of self-reliance and community-driven development.

5.5.2. Ethical AI development (synthesis of Nehruvian and Gandhian values)

Both Nehruvian and Gandhian perspectives emphasize the ethical dimensions of progress. A theoretical policy framework should prioritize ethical AI development that aligns with Gandhian principles of truth and non-violence, while also considering Nehruvian ideals of scientific temper. This involves implementing robust guidelines for AI developers, emphasizing transparency, fairness, and accountability. Ethical considerations should extend to the impact of AI technologies on marginalized communities, ensuring that technological advancements contribute positively to societal well-being.

5.5.3. Inclusive education and digital literacy (Nehruvian Lens)

Nehruvian ideals highlight the importance of education and scientific knowledge. A policy framework should include initiatives focused on inclusive education and digital literacy, ensuring that individuals across diverse socio-economic backgrounds can harness the benefits of AI. This aligns with Nehru's vision of using education as a tool for societal progress. By investing in educational programs that promote AI literacy and accessibility, the policy framework aims to bridge the digital divide and create a more inclusive AI ecosystem.

5.5.4. Sustainable industrial growth (Nehruvian perspective)

Nehruvian principles advocate for industrialization and scientific advancement as catalysts for economic growth. The policy framework should prioritize the integration of AI in industries, fostering innovation and sustainability. This involves incentivizing AI research and development in industries that contribute to environmental conservation^[50]. By aligning AI-enabled CSR initiatives with sustainable industrial growth, the framework aims to fulfil both Nehruvian economic aspirations and Gandhian principles of environmental stewardship.

5.5.5. Community-driven decision-making (synthesis of Gandhian and Nehruvian democratic values)

Both Gandhian and Nehruvian perspectives uphold democratic values. The policy framework emphasises community-driven decision-making in the implementation of AI-enabled CSR initiatives. This involves establishing mechanisms for community consultations, ensuring that the deployment of AI technologies aligns with the needs and aspirations of local communities. Fostering a participatory approach, the framework seeks to fulfil both Gandhian ideals of decentralised governance and Nehruvian principles of inclusive democracy.

A theoretical policy framework that synthesizes Nehruvian and Gandhian perspectives for AI-enabled CSR initiatives in India must prioritise community empowerment, ethical AI development, inclusive education, sustainable industrial growth, and community-driven decision-making. Amalgamating the strengths of these two influential philosophies, the framework aims to create a culturally resonant and ethically robust approach to leveraging AI for societal progress in the Indian context.

6. Conclusion

This study has aimed to thoroughly examine the incorporation of AI-powered tools in Corporate Social Responsibility (CSR) efforts with the purpose of promoting environmental sustainability. Based on a theoretical framework that incorporates Institutional Theory, Stakeholder Theory, and the Technology Adoption Model, our study provides practical guidance for organisations that want to effectively utilise AI while being responsible. Our methodology provides a path for enterprises to negotiate the complexity of AI adoption in the CSR landscape by focusing on the active involvement of stakeholders, strategic allocation of AI resources, and adherence to changing societal standards. Integrating AI tools enhances the effectiveness of CSR tactics while also ensuring they are in line with ethical, transparent, and adaptable standards. Amidst the world's environmental difficulties, combining artificial intelligence (AI) with corporate social responsibility (CSR) presents a hopeful approach to achieving sustainable, adaptable, and ethically accountable company strategies.

It is imperative for the Indian government to proactively facilitate the integration of enterprises with start-ups. The Indian government should establish incubation centres specifically for start-ups involved in the field of artificial intelligence (AI). The government of India should promote and support research and publishing. It is necessary to initiate the process of accepting research ideas and projects in order to gain a comprehensive grasp of artificial intelligence in different industries. India should establish consortiums and councils to develop precise criteria for the ethical use of AI applications. India is an emerging country that has multiple operational limitations, resulting in elevated difficulties in commercial decision-making. Therefore, frequently it is challenging for a manager to successfully integrate CSR into corporate operations. The policy component involves the integration of Corporate Social Responsibility (CSR) with Artificial Intelligence (AI) to achieve a forward-thinking and comprehensive vision. These policies should establish guidelines for integrating daily activities with the AI system. These could manifest as company-wide code of conduct and purpose statements. The strategy component involves the integration of artificial intelligence (AI) into the field of social work. The conventional capabilities of artificial intelligence must be transformed into applications for the field of social work. These social work outcomes need to be converted into the concept of triple bottom line sustainability once again. Other research in this same area suggests that there should be a plan incorporating life cycle analysis and sustainability practices into the product's life cycle in order to make it more environmentally friendly. The plan should be highly pragmatic, utilising viable, cutting-edge, and environmentally friendly technologies. The goal is to integrate artificial intelligence (AI) in order to achieve sustainability in a startup company. In India, where there is a lack of development, high population, and little resources, this model could assist in raising a manager's awareness. This could contribute to the 'Make in India' strategy of the Indian government, promoting job creation and poverty alleviation^[51].

We anticipate that our research will stimulate future empirical investigations, fostering ongoing examination and improvement of AI applications in order to achieve a balanced cohabitation between corporate pursuits, societal demands, and environmental preservation, particularly in the Indian context.

Author contributions

Conceptualization, ZA, NA, AD and RS; methodology, ZA, NA, AD and RS; software, ZA, NA, AD and RS; validation, ZA, NA, AD and RS; formal analysis, ZA, NA, AD and RS; investigation, ZA, NA, AD and RS; resources, ZA, NA, AD and RS; data curation, ZA, NA, AD and RS; writing—original draft preparation, ZA, NA, AD and RS; writing—review and editing, ZA, NA, AD and RS; visualization, ZA, NA, AD and RS; supervision, ZA; project administration, NA; funding acquisition, NA. All authors have read and agreed to the published version of the manuscript.

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Conflict of interest

The authors declare no conflict of interest.

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