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ARTIFICIAL INTELLIGENCE FOR SOCIAL GOOD

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ABSTRACT: *The rest of the world, striving for sustainability, has increased the demand for social good projects and made the role of Artificial Intelligence (AI) a more prominent contributor to the world. Now, armed with the great transformative potential of AI, various technologies are being deployed in sectors such as healthcare, education, agriculture, and the environment, uniquely placing them to address urgent global challenges like poverty, inequality, and climate change. This chapter takes a closer look at the role of AI in social good, focusing on public health, education, environment, and humanitarian efforts Building on the literature that has emerged and tapping into well-documented case studies, the work shows that AI is demonstrably capable of optimising resource allocation, improving service delivery and encouraging inclusivity in growth while also heightening the importance of having responsible AI through the lens of transparency, accountability and public goods.*

KEYWORDS: Artificial Intelligence, Climate Action, Education, Humanitarian Efforts, Public Health, Social Good, Sustainability, Sustainable Development Goals.

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INTRODUCTION

Artificial Intelligence (AI) is revolutionising several industries, and its use can fuel solutions to challenging issues at the local, regional and global scale. In terms of sustainability and sustainable development, AI has much to offer, as it can be applied to address problems such as poverty, inequality, and climate change that are directly connected to the United Nations Sustainable Development Goals (SDGs) (Vinuesa et al., 2020). The use of AI in SDGs can improve decision-making, optimise resource spending and improve public health (Bhatia et al., 2021; Alami et al., 2020).

This work examines the role of AI in creating social value, including its power to deliver beneficial environmental, economic and societal impacts (Fig 1). AI has proven to be capable of inefficient resource extraction and waste management (Ametepey et al., 2024) and is essential to create a healthier society, stimulating higher access to healthier healthcare pathways (Astobiza et al., 2021). The smart city and smart transportation have also been heavily influenced by AI-based data analytics for better urban planning and management (Al-Raeei, 2024; Apata et al, 2024). In addition, AI in precision agriculture promotes environmental sustainability and food security by minimising resource inputs (Wang et al., 2024).

As organisations globally adopt AI-enabled solutions, it is critical to ensure that practitioners approach these technologies with a humanitarian perspective, simultaneously mitigating the potential for these technologies to cause harm. Rationale sensitivity about biased AIs and biased AIs decision-making algorithms, privacy and deployment of fully autonomous systems is driving a call for transparency, accountability, and equitable access to AI benefits (Jungwirth & Haluza, 2023; Beduschi, 2022; Alkire et al., 2024; Naeeni, 2023).

By analysing cases and literature, this work aims to illustrate the implications of AI on the well-being of humans and the environment. Importantly, it addresses both sides of AI, the potential for the public good and the ethical governance frameworks necessary for it to be responsibly developed. Complemented by interdisciplinary cooperation and other responsible AI ecosystems, AI can be a linchpin for sustainable innovation rooted in frameworks of equity, access, and democratic decision making (Singh et al., 2023; Floridi et al., 2018; Hasas et al., 2024; Adanma & Ogunbiyi, 2024; Khan et al., 2024).

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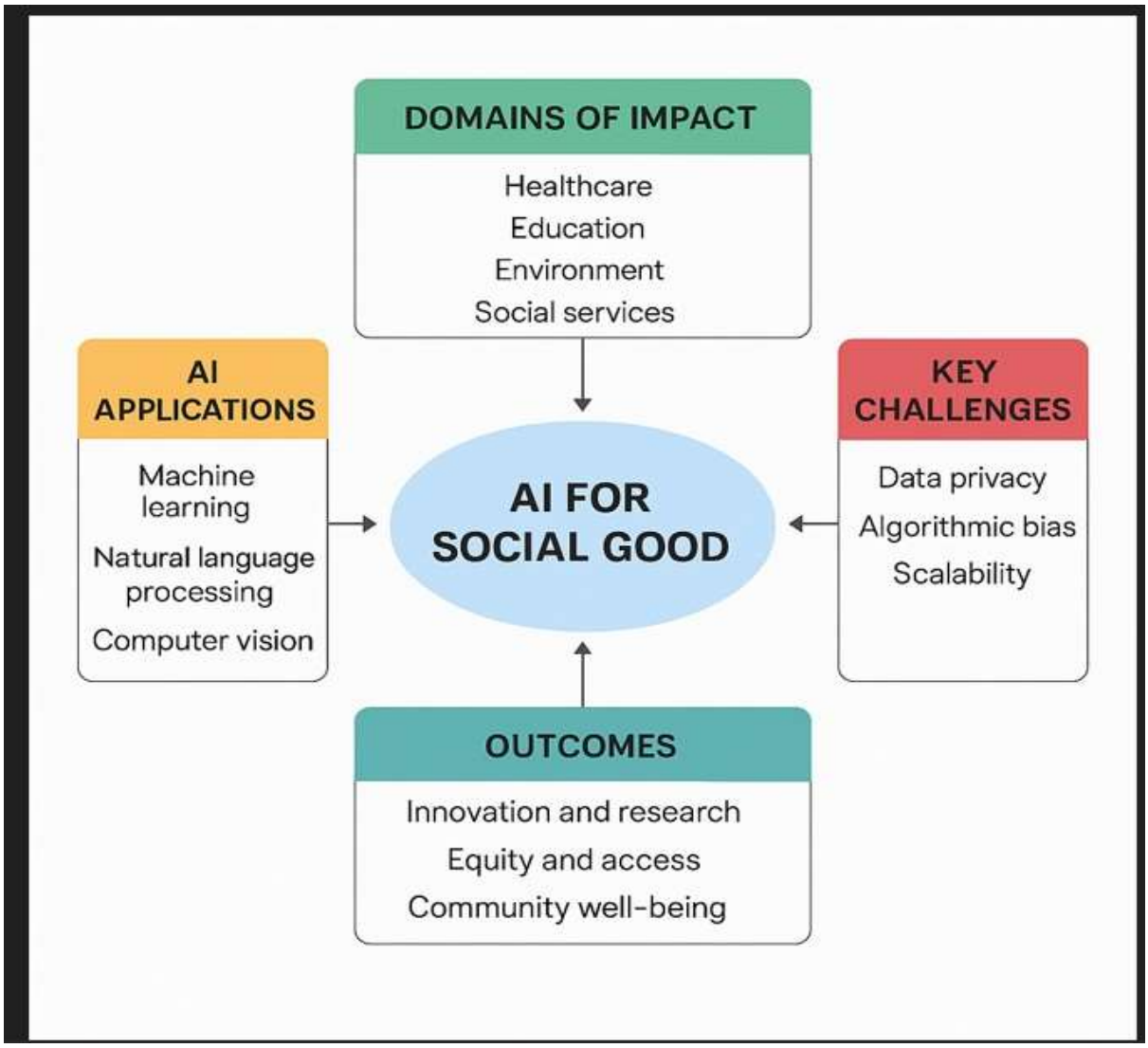
CONCEPTUAL FRAMEWORK OF AI FOR SOCIAL GOOD

Fig 1: Key areas for the application of AI



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Key Areas of Application

AI in Public Health

It is becoming increasingly evident that the incorporation of AI is a priority for the future of public health (Figure 1), a discipline that already seeks opportunities to utilise AI to strengthen health outcomes, operations, and health equity (Morgenstern et al., 2021). Machine learning algorithms can efficiently process extensive data to estimate not only an infectious disease outbreak but also the spread and possible impact of the outbreak to enable timely solutions to be applied, as evident in the COVID-19 pandemic (Bazzano et al., 2025; Al-Hwsali et al., 2022). In addition, the automated data processing possible with AI helps in clinical decision-making for health care professionals to more accurately and rapidly diagnose diseases and improve the quality of care provided for their patient outcomes (Wagner et al., 2024; Olawade et al., 2023).

AI can also help figure out how to distribute resources for public health data. For example, AI is facilitating fast reaction to emergent health risks (Chen & Zhang, 2025). Given that AI deployment is contingent on stakeholder cooperation (Oyedele, 2025; Oyenuga & Jeresa, 2025), physicians, technologists, and policymakers must cooperate in the application of AI tools to support the solutions of pressing health problems (Ben-Gal, 2023). However, there are implementation issues, particularly ethical aspects that include privacy concerns, algorithmic bias, and the potential for chronic disease inequality in vulnerable groups to worsen (Zhang & Ran, 2022; Andreychenko et al., 2022). As such, public health actors should prioritise the ethical design and implementation of AI technologies (Ghanem et al, 2025; Couture et al, 2023) to ensure that these tools have a substantive impact on equity-enhancing health advances.

Moreover, AI provides value to healthcare professionals through personalized learning and intelligent tutoring systems that adapt to a learner's specific knowledge gaps (Wang & Li, 2024), also a form of public health education to health professionals that can be seen as an indirect form of public health intervention. Such innovations are needed to ensure that the next generation of public health practitioners is armed to address the complexities of 21st-century health challenges. There are tremendous prospects to improve public health with AI; however, the power of the initiatives is only realised if AI is regarded at a time as complementary with ethical contextualization, the emphasis of interdisciplinarity, and the focus on the voices of stakeholders.

AI in Education

AI in education is a concept on the rise in recent years, and it is sweeping and reshaping the spirit of teaching and learning in diversified learning environments (Apata & Oyenuga, 2025). The implementation of AI technologies results in enhanced efficacies among education providers, increasing adoption personalized learning systems, and flexible learning (Chen et al., 2020); for example, AI can analyze large datasets and personalize educational content to learners' preferences, resulting in better engagement and success (Chen et al., 2020; "The Impact of AI on Teaching and Learning in Higher Education Technology," 2022). Furthermore, the use of AI under the education system facilitates the design of intelligent tutoring systems that respond to learner pace and learning style, thereby enhancing the accessibility of education and personalised learning for diverse groups of learners (Ríos-Campos et al., 2023; Oyenuga et al, 2024).

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However, there are obstacles to AI in education that must be tackled if it is to be truly realised. One substantial question is whether educators feel ready to embrace these technologies effectively. Numerous teachers report confusion about the pedagogical integration of AI and applying it in their teaching practices in meaningful ways (Aghaziarati et al., 2023; Kranz & Abele, 2024). In addition, educators need to be trained sufficiently on the ethical considerations and social aspects of AI, including bias, privacy, and data security (Akgün & Greenhow, 2021; Sarwar et al., 2024). Studies emphasise the need for developing AI literacy on the part of educators and students if they are to take full advantage of AI in education (Lérias et al., 2024).

The other important aspect is that of AI in curricula. For a transition away from merely teaching the technology of AI to nurturing social and emotional learning to better prepare students as members of society who interact with that AI, educational courses must include critical discussion on the implications of AI (Kim, 2023) and ethics surrounding its use, as they are more than just using a tool; they are joining a discussion on the purpose of use (Fahimirad & Kotamjani, 2018;, Park & Kwon, 2023). AI is an exciting opportunity for education, but in implementing it, it will also be important to consider what it represents, else we risk losing the fundamental impulse that needs to drive it towards respectful and potential development.

AI in Environment and Climate Action

AI has demonstrated itself as a transformative technology with great potential for environmental conservation and climate action. Artificial intelligence (AI) enhances our ability to accurately seed climate models, which puts us in a better position to make informed decisions at both international and local scales regarding mitigation and adaptation strategies (Lu, 2024; Adapa, 2024). A good example is the use of machine learning models for enhancing the precision of climate modelling capacities and allowing researchers to create their extreme weather events and comprehend their effects on ecosystems as well as human communities (Rolnick et al., 2022). Advancements in AI also contribute to the optimisation of renewable energy systems, such as through predictive analytics and smart grid technologies improve the generation of wind and solar energy efficiency (Cowls et al., 2021).

For further successful climate action, we can leverage how AI is already being used in sectors like agriculture. These methods aim to maximise the output and reduce the negative impacts of agricultural production on the environment by employing AI-based precision agrotechnology practices to maximise resource utilisation (Debnath et al., 2023). Moreover, AI technologies are pivotal in carbon capture and sequestration methods, offering promising pathways to tackle the issue of greenhouse gases (Lu, 2024). Even if AI merely offers the chance to analyse complex data, such as environmental studies, those studies can tell us where the watersheds in the ecosystem are, so we can work towards more effective conservation efforts(Adapa, 2024). However, such AI applications in climate action are not without their challenges. The contemplation on algorithmic prejudices may lead to divergent attributes compared to the algorithm outputs and even agitate such societal disparities (Gatla, 2019). Moreover, the impact of training such AI models on the environment, particularly in the form of energy expenditure, has raised concerns regarding their sustainability over the longer term (Cowls et al., 2021).

To address these challenges and safety that AI fosters environmental sustainability and social equity, comprehensive ethical principles and governance structures are needed (Vinuesa et al., 2020; Kaack et al., 2022).

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AI has great potential to play a beneficial role in climate action if done mindfully and responsibly (Debnath et al., 2023; Cowls et al., 2021). So if leaders can let the thoughtful roll out of AI technologies roll on, then it may very well raise society's awareness of their own problems, an understanding of the moving parts in climate change, a moral vision and an ability to move toward a more sustainable future (Jafar et al, 2025).

AI in Humanitarian Efforts

AI is contributing more to humanitarian work, providing new approaches in many aspects of crisis response. AI has enormous potential in disaster response. AI technologies, for example, can help predict and fast–track natural disasters to enable early interventions that considerably lessen their impacts on vulnerable populations (Elamin, 2024). This predictive capacity has been applied in multiple contexts, showcasing the potential of combining AI with disaster management and enhancing the ease of distributing humanitarian assistance (Beduschi, 2022).

AI also supports optimising humanitarian logistics by facilitating supply chain coordination and trust-building between key parties. Applied usage of AI within the humanitarian supply chain promotes communication and coordination for the continuation of humanitarian actions before and after major disasters, but also during them, such as ensuring that all actors request resources and send the same goods based on requirements (Shayganmehr et al., 2021). Humanitarian organisations may now use such insights effectively because AI can work on large datasets, and in turn, translate to better operational efficiency (Beduschi, 2022). It further highlights the interconnectivity of artificial and human intelligence in managing cross-cultural knowledge in humanitarian scenarios to respond adequately to the diverse needs and cultures of affected communities (Chin et al. 2024); this process is evident across humanitarian contexts, especially when logistics comes into play as the resources to be managed may go beyond the physical.

However, the use of AI in humanitarian action comes with ethical dilemmas and risks. The use of AI technologies has implications for privacy, data security, and biased decision-making, which can adversely affect marginalised populations (Beduschi, 2022). Second, the emphasis on data-driven decision making is not always synonymous with better outcomes, as it can reify existing inequities if not managed correctly (Fejerskov et al., 2023). Thus, it is for this reason that AI carries much potential also for humanitarian response work and that ethical imperatives and robust systems are needed to prevent misuse (Burkle et al., 2025).

AI can also help greatly in humanitarian efforts, more efficient allocation of resources, and actions being more knowledge-based. Nevertheless, successful implementation needs to follow a moderate path or addressing ethics and fairness at stake, delivering fair outcomes, ensuring that the technology effectively serves the global humanitarian cause (Devidal, 2024; Shevchenko, 2023). Above all, sustained conversation and cooperation between stakeholders, the technology developers, humanitarian organisations and affected communities will be critical to realising what AI can do in humanitarian action.

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AI in Social Justice and Governance

Artificial intelligence can also make markets more transparent and the public sector more efficient. For example, Kuziemski & Misuraca (2020) contend that automated systems for decision-making can bypass most of the bureaucratic process and provide a more agile model of governance. But employing systems of AI for use in public has significant ethical implications related to bias and accountability. Behind such an effective governance of AI, it is, therefore, essential to ensure that algorithms do not perpetuate current social inequalities or that it does not lead to unfair outcomes(Jobin et al., 2019).

Moreover, artificial intelligence can be an important tool to accelerate and monitor social transformation and, in turn, promote social justice. Aghaziarati & Darbani (2023) argue that AIs can serve as a tool to examine how novel policies influence underrepresented communities and contribute to the process of reforming policies on a solid data basis. This insight illustrates the importance of including a range of stakeholder viewpoints in the development of AI governance systems, as a joint effort can more effectively mitigate possible biases inherent to AI algorithms (Agbese et al., 2021; Baronchelli, 2024). By entering data analysis in social justice programmes, even at the start, coalition members produced new models for the use of this information by local activists and change in societal norms to make them more just (Pauketat et al., 2024).

As powerful as AI systems can be in these cases, the use of AI is concerning for both privacy and security. Parameters to ensure the ethical consequences of AI technologies, like their corresponding human rights safeguards, will be required to prevent the misuse of these technologies. Others propose data governance at a more structural level, recommending a regulatory watchtower that includes ethical standards, technical standards, and persistent stakeholder engagement (Aghaziarati & Darbani, 2023; Batool et al., 2024). And as the AI systems become more advanced, an equally pressing need to address and manage the impact of AI systems on social equity and their impact on public governance more broadly will become as important as ever (Lillywhite & Wolbring, 2020; Georgieva et al., 2022).

Governance and Policy Considerations

The evolution of Machine Learning (ML) and Artificial Intelligence (AI) has shifted the way governance issues and potential uses are posed in practically every field, with its enormous possibilities and pressing challenges. It must be reflected by a nuanced perspective on the implications of AI, including questions of transparency, accountability, fairness and ethical considerations (Dixon, 2022; Leslie, 2019). Such governance frameworks that reach beyond mere fulfilment of technical standards while being sensitive to the socio-political context of AI implementation can build public trust (Margetts, 2022).

At a high level, one of the foundational precepts of AI governance is the necessity of developing wide guardrail-like ethical guidelines to direct responsible AI application. For instance, the formulation of principles defined by the OECD and European Union illustrates the deployment of transparency and accountability in artificial intelligence (Silitonga et al., 2024; Li, 2024). These conceptual frameworks should be modified to keep pace with the increasingly rapid pace of advances in AI and the governance implications of such advances (Dixon, 2022). This adaptability is particularly critical in domains such as public health, where AI-based decisions could influence resource and health allocations. To prevent biases and to ensure uniform

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treatment, it is important to have a mechanism for cross-verification or checks (Reddy et al. 2019).

In addition to these inherent aspects of technology, the involvement of AI in environmental governance raises challenges that can only be resolved by informed policy choices. Artificial intelligence applied to environmental impact assessment can better understand the potential risks of technology deployment and contribute to achieving sustainable development goals (Yiğitcanlar, 2021; Zehner & Ullrich, 2024). Governance strategies must be advanced to address these multiple goals via innovation, environmentally sound practices, and social equity, especially, further legitimising and utilising AI applications in environmental management through participatory governance models with public involvement, and integrating critical community perspectives (Alberto, 2024) can take that a step further.

In essence, AI governance and policies should be tackled with a diverse array of strategies that include social imperatives, collaborative stakeholder initiatives with industry players and regulators, and dynamic, evolving frameworks. These themes are even more pressing as AI increasingly influences the social fabric and policymakers will play an important role in enabling and ensuring responsible and inclusive AI in practice addressing not only the opportunities presented by AI but also its challenges while upholding public interests and maintaining public trust in governance systems (Cao & Meng, 2025; Rohde et al., 2021).

Challenges and Risks of AI deployment for social good

Applying artificial intelligence (AI) to social good efforts can have challenging and at times risky implications that both the industry and community must be mindful of and address. AI can revolutionise and improve social services, humanitarian response, and governance, but the introduction of AI into these sectors presents a series of ethical, operational, and technical challenges.

One primary fear is that there is a threat of deepening and worsening the existing inequalities and biases, particularly in humanitarian environments. Beduschi (2022) examines the possibilities of AI technologies to transform humanitarian action, as well as the dangers they pose to vulnerable persons during conflict and crisis. AI systems may also just be perpetuating biases present in their training data, resulting in biased service delivery, such as allocating resources on a biased basis or identifying the wrong recipients (Duclos et al., 2019). While the risk of harm here is clear, it underscores a need to vet the data sets that inform AI architectures and ultimately to lace in diverse perspectives as these systems are constructed.

And then there are the serious ethical consequences of deploying AI systems. If extensive predictive analytics were to be applied in health and humanitarian action, the consequence could be the automation and dehumanisation of decision-making, with algorithmic outputs overruling the judgment of human actors. Madianou (2021) raises the paradox of "nonhuman humanitarianism" (the AI technology that was developed to do good but may produce harm when targeting populations affected by the disaster without discrimination). The use of technology as a crutch in emotionally charged situations can not only neutralise the human component, but it can also dumb down those whose emotional processes have been drained and simplified.

There are also practical impediments to the successful deployment of AI for social good. But while there is some growing traction of AI-specific infrastructures among humanitarian actors,

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there is little infrastructure to support the mainstreaming of AI, for example, concerning data access, interoperability and technological literacy among staff. Shamoug et al. (2023) discuss the need to build tools for semantic machine reasoning, as an important task for more efficient information retrieval in humanitarian domains, and that it cannot be assumed about a bridge between AI's potential and how AI operate.

Furthermore, there are also further challenges due to privacy issues and security-related risks. The IVs collection of personal data for AI processing can also raise provocative ethical questions regarding informed consent and data abuse. The application of biometric technology to humanitarian systems introduces significant worries about affected people's privacy and trust in humanitarian organisations (Jacobsen, 2015). Such privacy concerns call for virtuous ethical models and governance that balance the need to protect individuals and to exploit AI.

Nevertheless, it should be noted that avoiding the harms of AI in deployment requires proactive measures. The only way to do that is to establish ethics codes, be transparent about algorithmic decisions and engage with stakeholders, including the communities affected using AI, to ensure that it is rooted in their needs and cultural context (Floridi et al., 2018). Cross-cultural knowledge encapsulation should similarly be prioritised to fill the chasm between AI capabilities and humanitarian values (Chin et al., 2024; Oyedele & Akwen, 2025).

The Future of AI for Social Good

For the past few years, there has been a deluge of written literature about the promise of Artificial Intelligence (AI) for social good and how AI can be used to solve the many large-scale, complex issues facing society today, including health care inequality, climate justice, and social justice at large (Fisher et al, 2023). As the space becomes more developed, the possibility for AI-powered levers for meaningful and transformative social change is large, through several key levers across aspects of society, from interdisciplinary collaborations to governance and community participation. One underexplored avenue for pursuing AI for social good is within co-design approaches, where you involve end users directly (which also can include marginalised communities) in the technology development process. In general, these collaborative tactics increase the appropriateness of AI adoptions and guarantee mutual ownership and confidence in the resulting technologies (Ayobi et al., 2021).

In health care, for example, diabetes management AI assistance tools have helped demonstrate the value of a multidisciplinary approach in speeding up the development of technologies that better target patient-specific needs and population health management (Shaw et al., 2019). This type of engagement is important as it allows for an in-depth understanding of health inequities and allows end-users, who have lived experience, to shape design.

Moreover, there are ethical and use cases involving concern space on AI technologies. The governance along with AI needs to be scaled, and mapping how societies operate on fairness, accountability, and transparency is a big need in the current day scenario. Developing ethical standards should be a collaborative conversation between ethicists, technologists, policymakers, and community advocates, so that AI systems ultimately serve the interests of social equity rather than solely profit (Jobin et al., 2019). The discussion also needs to address the risks of embedded bias and discrimination in AI algorithms, a more scorching narrative that also has its agencies, but one that should pay attention to the necessity for frameworks that promote justice and hinder harm (Jobin et al., 2019; Pantano & Scarpi, 2022).

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Further, the potential impact of AI on social justice is immense as its use case expands across a multitude of industries, from healthcare to environmental governance. The emergence of artificial intelligence intersects with environmental sustainability and other issues on the policy agenda, and policymakers must get onto the train exemplified by efforts to mitigate climate change with the help of AI technologies (Kshirsagar et al., 2021).

In the future, the focus to be nurturing AI for social good should be integrated with education and capacity building in communities to make sure that the advantages of AI are reaching everyone (Oyenuga & Omale, 2024). Given the growing awareness about the power of technology to either reinforce or mitigate existing inequities, organisations and innovators need to be part of conversations that centre on inclusivity and social responsibility in the age of AI and ethics (Lim et al., 2022; Hastuti & Syafruddin, 2023; Oyedele, 2025; Oyenuga & Jeresa, 2025; Fasanmi et al, 2025). Thus, the future of AI is replete with opportunities if there is an underlying commitment to collaboration, ethical governance, and community engagement in its design and use.

CONCLUSION

The scope of what AI can do for social good in the next decade is huge, but it needs to be guided by efforts from multiple fields. AI's implications for healthcare, education, environmental sustainability, and social justice depend on a framework rooted in ethical principles, stakeholder engagement, and multidisciplinary collaboration. The issues at the heart of deploying AI technology are complex, and ensuring that such technology is developed and deployed ethically is a challenge we can only take on if stakeholders, AI researchers, healthcare professionals, ethicists and policymakers collaborate. Such a participatory approach can render these AI systems more relevant to real-world problems and, in so doing, make use of AI better aligned with the broader public interest as opposed to serving narrow interests and propelling the inequality of opportunity that is already more than what we would consider reasonable. Also, naturally, firms must prioritise AI ethics training in education to prepare future practitioners to address the distinctly complex context that AI introduces so that they will be well equipped to negotiate some of the challenges of the ethical dilemmas, and become advocates for inclusivity, for maximising the potential utility of AI technologies.

Also, as the number of AI applications grows, so do the challenges of putting in place governance that is responsive to the ever-evolving technology. Tackling biases, protecting people’s data, and creating accountability are important to maintaining public trust in AI systems. This essentially refers to the need for collaborative multi-stakeholder action for a positive, ethical, holistic and responsible AI, which includes cross-disciplinary coalition, values-based governance and community engagement. By adopting these principles, practitioners can leverage the innovative potential of AI to address social challenges, create equitable systems, and ensure a sustainable future for all. Together, these efforts will lay the foundation for a successful, prosperous and inclusive society that harnesses the benefits of the AI revolution while safeguarding against its perils.

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