

AI Role Towards The Women's Welfare and Sustainable Development

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Abstract:

Artificial Intelligence (AI) is increasingly influencing women's welfare and sustainable development by expanding access to education, healthcare, employment, financial services, and digital resources. This article examines the role of AI in promoting women's empowerment, economic participation, safety, and social inclusion. It also highlights the potential of AI-driven solutions to support gender-responsive policies and sustainable development initiatives. However, challenges such as the digital gender gap, algorithmic bias, privacy concerns, and unequal access to technology may limit its benefits. The study emphasizes the need for inclusive, ethical, and accessible AI systems to ensure that technological advancement contributes meaningfully to women's welfare and sustainable development.

Keywords: *Artificial Intelligence; Women's Welfare; Women's Empowerment; Gender Equality; Sustainable Development.*

Introduction

Artificial Intelligence (AI) has emerged as a transformative technology with significant implications for social and economic development. Its applications in education, healthcare, employment, finance, agriculture, governance, and social welfare are expanding rapidly. For women, AI can create new opportunities for education, entrepreneurship, skill development, employment, and access to essential

services. AI-based platforms can also improve access to healthcare information, financial services, digital learning, and government welfare programmes. The effective use of AI can contribute to women's economic empowerment, social inclusion, and greater participation in decision-making processes. At the same time, unequal access to digital technologies may widen the existing gender digital divide. Issues such as

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algorithmic bias, data privacy, online safety, and limited digital literacy can also affect women disproportionately. Therefore, the benefits of AI need to be examined alongside its social, ethical, and economic challenges. From a sustainable development perspective, inclusive AI can support gender equality and contribute to broader development goals, particularly those related to education, health, decent work, and reduced inequalities. This article examines the role of AI in women's welfare and sustainable development, with particular attention to opportunities, challenges, inclusion, and the need for gender-responsive and ethical technological development.

Artificial Intelligence and Women's Welfare

Artificial Intelligence (AI) is increasingly becoming an important tool for addressing social and economic challenges. Its capacity to analyse large amounts of data, automate tasks, provide personalised services, and support decision-making creates opportunities for improving women's welfare. AI can be applied in areas such as healthcare, education, employment, financial inclusion, agriculture, public administration, and social protection. When designed and implemented inclusively, these technologies can help women access services and opportunities that may otherwise remain difficult to reach.

Women's welfare is closely associated with access to education, healthcare,

economic resources, social security, safety, and participation in decision-making. AI can support these areas through digital platforms and data-driven services. However, technological solutions alone cannot eliminate structural inequalities. Their effectiveness depends on affordability, digital literacy, infrastructure, social support, and the extent to which women are included in the design and implementation of technological systems.

AI and Women's Education

Education is one of the major areas where AI can contribute to women's empowerment. AI-supported learning platforms can provide personalised learning materials, adaptive assessments, language support, virtual assistance, and flexible learning opportunities. Such technologies can benefit women who face geographical, economic, family, or social barriers to conventional education.

AI can also support skill development by identifying learning needs and recommending relevant courses. Women seeking employment or returning to the workforce after career interruptions may benefit from flexible online learning and AI-assisted vocational training. In rural and disadvantaged communities, digital learning platforms can potentially expand access to educational resources.

However, unequal access to smartphones, computers, reliable internet connectivity, and digital skills can restrict these benefits. Therefore, AI-based

education initiatives should be accompanied by digital literacy programmes, affordable connectivity, accessible content, and appropriate institutional support.

AI and Women's Healthcare

AI has significant potential in healthcare through disease detection, medical image analysis, health-risk assessment, remote consultations, and personalised health information. AI-supported healthcare systems can assist in identifying health risks and improving access to medical services, particularly where healthcare professionals and facilities are limited.

For women, technology-supported healthcare can contribute to better access to information concerning maternal health, reproductive health, nutrition, preventive care, and other health needs. Digital health assistants and telemedicine services may also help women obtain information without travelling long distances.

At the same time, healthcare AI requires careful attention to privacy, informed consent, data security, and accuracy. If datasets used to develop AI systems do not adequately represent women from different social, economic, ethnic, and geographical backgrounds, the resulting systems may perform unevenly. Thus, gender-sensitive and representative data are important for responsible AI in healthcare.

AI and Women's Economic Empowerment

Economic independence is an important dimension of women's welfare. AI can contribute to women's economic empowerment by supporting entrepreneurship, employment, financial management, market access, and skill development. Digital platforms can help women entrepreneurs identify markets, analyse consumer preferences, manage inventories, advertise products, and communicate with customers.

AI-enabled financial technologies can also support access to digital banking, credit assessment, financial planning, and other services. For women engaged in small businesses, self-employment, agriculture, handicrafts, or home-based enterprises, appropriate digital tools may improve productivity and market connectivity.

However, automation may also transform labour markets and affect occupations in which women are concentrated. Therefore, women need opportunities to acquire new digital and technical skills. Policies for AI-driven economic development should focus not only on technology adoption but also on reskilling, employment security, entrepreneurship support, and equitable access to digital infrastructure.

AI and Women in Agriculture and Rural Development

Women make significant contributions to agricultural and rural economies,

including cultivation, livestock management, food processing, household production, and allied activities. AI-based agricultural technologies can provide information relating to weather, crop conditions, market prices, pest management, irrigation, and farm productivity.

Mobile-based AI applications can potentially provide women farmers with timely information and connect them with markets, financial services, and agricultural extension resources. AI can also support the identification of crop diseases and improve resource management.

Nevertheless, rural women may face greater barriers to technology access because of limited digital literacy, inadequate connectivity, lack of ownership of digital devices, and social restrictions. Consequently, AI-based rural development programmes should be designed with local language support, community-level training, affordable technologies, and specific attention to women's access and participation.

AI and Women's Safety

AI-based technologies are increasingly being explored for improving personal and public safety. Applications may include emergency-response systems, location-based alerts, detection of harmful online content, and digital tools for reporting incidents. Such technologies can potentially improve access to assistance

and strengthen institutional responses to safety concerns.

AI can also help identify patterns in large datasets that may assist public agencies in planning safety measures. However, surveillance-oriented technologies can create significant privacy risks. Facial recognition, location tracking, and automated monitoring should therefore be subject to appropriate legal safeguards, transparency, accountability, and protection of personal data.

Technology should complement, rather than replace, effective legal institutions, social support systems, public awareness, and preventive measures addressing violence and discrimination against women.

AI and Digital Financial Inclusion

Access to financial services is an important component of women's economic independence. AI-powered financial technologies can assist with digital payments, financial education, fraud detection, customer support, and access to certain financial services. These applications may be particularly useful for women who have traditionally had limited access to formal financial institutions.

AI can also help develop personalised financial information and support small-scale entrepreneurs in managing income and expenditure. However, automated financial decision-making can reproduce existing inequalities if the underlying data contain social or economic biases.

Transparency in automated decisions and appropriate mechanisms for grievance redressal are therefore important.

Digital financial inclusion should be accompanied by financial literacy, cybersecurity awareness, consumer protection, and accessible banking services.

AI, Employment and Skill Development

The growing use of AI is changing the nature of work. Some routine tasks may be automated, while new occupations and skill requirements are emerging. This transformation creates both opportunities and challenges for women. Women with access to digital education and technical training may benefit from emerging employment opportunities in areas such as data services, digital marketing, technology support, education, healthcare, and entrepreneurship.

At the same time, women who lack digital skills may face greater employment disadvantages. Career interruptions associated with family responsibilities can further affect their ability to adapt to rapidly changing labour markets.

Therefore, lifelong learning, reskilling, flexible work opportunities, career counselling, and affordable digital training are important for ensuring that women can participate meaningfully in AI-driven economies.

AI and Gender Equality

Gender equality is not automatically achieved through technological progress.

AI systems are developed using data, algorithms, institutional practices, and human decisions. If these elements contain gender biases, AI may reproduce or even amplify existing inequalities.

For example, biased training data can affect automated recruitment, credit assessment, recommendation systems, and other decision-making processes. Gender representation among technology developers and decision-makers is therefore important. Women should have opportunities to participate not only as users of AI but also as researchers, developers, policymakers, entrepreneurs, and technology leaders.

Gender-responsive AI requires systematic assessment of how technological systems affect different groups of women and whether their benefits and risks are distributed equitably.

AI and Sustainable Development

AI can contribute to sustainable development by improving resource management, strengthening public services, supporting climate-related analysis, and promoting innovation. Its applications can contribute to several Sustainable Development Goals (SDGs), including quality education, good health and well-being, gender equality, decent work, reduced inequalities, and responsible innovation.

For women, the relationship between AI and sustainable development is particularly significant because gender

equality is closely connected with broader social and economic development. Greater access to education, healthcare, employment, financial resources, and digital technologies can strengthen women's participation in sustainable development.

However, sustainable AI must also consider energy consumption, electronic waste, data governance, environmental impacts, and unequal access to technology. Thus, technological development should be evaluated not only in terms of efficiency and innovation but also in terms of social inclusion and environmental responsibility.

Challenges in Using AI for Women's Welfare

Despite its potential benefits, several challenges may limit the contribution of AI to women's welfare. The digital gender divide remains an important concern, particularly among women in rural, low-income, and socially disadvantaged communities. Limited access to devices, internet connectivity, digital skills, and technological education can prevent women from benefiting equally from AI.

Algorithmic bias is another major concern. AI systems may produce discriminatory outcomes when they are trained on incomplete or biased datasets. Privacy and data protection are also important because many AI applications depend on the collection and processing of personal information.

Other challenges include cybersecurity threats, misinformation, lack of awareness, affordability, limited institutional capacity, and inadequate regulatory mechanisms. Addressing these challenges requires cooperation among governments, educational institutions, technology companies, civil society organisations, and communities.

Strategies for Inclusive and Gender-Responsive AI

Several measures can strengthen the contribution of AI to women's welfare and sustainable development. First, governments and institutions should promote affordable and universal digital access, particularly for women in rural and disadvantaged communities. Second, digital literacy and AI-related skills should be incorporated into education, vocational training, and women's empowerment programmes.

Third, AI systems should be developed using diverse and representative datasets and should undergo regular assessment for potential gender bias. Fourth, strong privacy, cybersecurity, transparency, and accountability mechanisms should accompany AI deployment. Fifth, women should be encouraged to participate in technology education, research, entrepreneurship, policymaking, and leadership.

Finally, women's experiences should be considered during the design and evaluation of AI systems. A participatory approach can help ensure that

technological solutions respond to actual social needs rather than assuming that one technological solution will work equally for all women.

AI as a Tool for Inclusive Women's Empowerment

AI should be viewed as a tool that can support women's empowerment rather than as a substitute for social institutions and human decision-making. Its contribution depends on the social environment in which it is introduced. Where women have access to education, infrastructure, financial resources, social support, and decision-making opportunities, AI may strengthen these existing capabilities.

An inclusive approach therefore requires moving beyond the idea of simply providing women with access to technology. The focus should be on meaningful access, digital confidence, skills, safety, affordability, participation, and the ability to influence technological development. Such an approach can help ensure that AI contributes to women's welfare while supporting broader goals of social justice and sustainable development.

Conclusion

Artificial Intelligence has the potential to become an important instrument for advancing women's welfare by expanding access to education, healthcare, employment, financial services, entrepreneurship, and social protection. However, technological progress alone

cannot ensure gender equality or sustainable development, particularly where women continue to face unequal access to digital resources, skills, economic opportunities, and decision-making. The benefits of AI therefore depend on how inclusively, ethically, and responsibly these technologies are designed and implemented. Gender-responsive policies, digital literacy, affordable connectivity, protection of privacy, and measures to reduce algorithmic bias are essential for ensuring that women are not merely consumers of AI but active participants in its development and governance. Ultimately, AI can contribute meaningfully to sustainable development only when technological innovation is combined with social inclusion, equal opportunity, human rights, and women's meaningful participation in decision-making.

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