

Empowering Women in the Digital Age : Leveraging AI for Economic Inclusion and Advancement

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Abstract

Purpose : Gender equality and inclusive economic growth enable women to have control over resources, employment, and entrepreneurship. This has the potential to encourage involvement and have a good economic impact. In light of the changing environment, this study investigated how artificial intelligence (AI) may support the objective of women's empowerment.

Research Methodology : The research methodology for this study was secondary research, specifically thematic analysis and observational study. A wide range of sources, including academic journals, books, research reports, and reputable online platforms, were analyzed alongside analysis of AI-based women empowerment initiatives undertaken across various economies.

Findings : The results showed that hiring and employment practices may be made less restrictive by utilizing AI, which would improve the representation of women in traditionally male-dominated fields. Modern technology has also made it simpler to identify and address gender pay disparities, ensuring equitable remuneration. Virtual assistants with AI capabilities have made financial services more accessible to women, enabling them to make well-informed financial decisions and strategic investments. The study highlighted how AI benefits women's health by enhancing healthcare outcomes with precise diagnosis and practical telemedicine solutions.

Practical Implications : This study has implications for policymakers, advocates for women's rights, AI developers, and gender equality campaigners. Economic empowerment programs, technological innovation, and policy frameworks that are focused on women can all benefit from these ideas. Economic success can be reconfigured for a future focused on growth by optimizing women's potential equity.

Originality Value : This study has original insights into the intersection of gender disparities, AI accessibility, and empowerment, informing strategies for inclusive development.

Keywords : women empowerment, artificial intelligence (AI), economic inclusion, gender equality

JEL Classification Codes : G15, I3, O1

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The rapid adoption of technology and corresponding changes brought forth by the fourth industrial revolution have necessitated government and stakeholders to adapt, innovate and capitalize on the benefits of this progressive ecosystem (Patanjali & Subramaniam, 2019). As per World Bank Group (2022), globally, almost 2.4 billion women face the lack of basic economic rights, that are seamlessly available for

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men. Furthermore, women make up the majority of those living in extreme poverty worldwide, with almost 50% representation. Around 33% of the global population lacks financial literacy, and there is significant women representation, especially in impoverished nations. Gender biases and societal standards exacerbate the financial difficulties that women now confront. These factors have contributed to the obstacles that women face in attaining financial independence, which remains a critical aspect of driving economic growth (FINCA, 2021). Positive economic outcomes can be achieved when women have equal access to opportunities and are empowered to contribute to the workforce. With the inclusion of women in the labor force, the skill and talent pool enlarges significantly. By leveraging this, higher production levels and economic output can be achieved. This may lead to higher GDP growth rates and sustained economic growth (Council of Economic Advisers, 2019). Women who earn, also contribute to their household expenses and investments, thus resulting in enhanced financial well-being of the family. A rise in household income leads to increased spending and consumption of products and services, stimulating economic activity and business growth. As per a survey by India Lends (2023), 90% of women help pay for home expenses, 40% of them contributing more than 50% of their income. However, women frequently depend on males to make financial decisions, even when they are financially independent and contribute significantly to home expenses. In addition to the above benefits, the economic empowerment of women has the potential to generate a domino effect in communities and societies. When women achieve economic independence, they become influential figures and catalysts for generational transformation. According to Bordoloi (2015) and Deshpande (2023), this cascading effect generates a cycle of enablement that promotes sustained societal growth.

An analysis of artificial intelligence (AI's) potential to alleviate gender disparity in the workforce was conducted by the European Institute for Gender Equality (2021). They find that AI can create new job opportunities for women in the maintenance, education, and health sectors and can improve the work environment. However, there is a warning about the risks of AI deepening economic crises and gender bias due to job losses or algorithmic biases. The report emphasizes the need for regulatory authorities to develop appropriate frameworks that promote gender equality. These frameworks should address concerns around data collection methods, algorithmic bias, and pay parity (Basumatary & Das, 2018; Khosla & Tara, 2019). When AI systems are educated on biased data, they may provide results that discriminate against women. For example, in recruitment, algorithms may be compromised due to historical bias and may pick only male candidates for higher positions. This promotes men in hiring, exacerbating already-existing gender disparities. This need for transparent algorithms, a variety of data, and the ability to identify bias; generative AI is predicted to revolutionize this area (Khan, 2023). Responsible AI development and deployment are essential to optimize the potential of technology in achieving gender equality and creating an inclusive society.

This paper outlines strategies for empowering women in the digital era through AI, facilitating advancement and economic inclusion. The gender gap in tech access and associated opportunities remains significant despite progress (Kuroda et al., 2020; Sicat et al., 2020). The main focus of the research is on using AI to close these gaps and allow women to fully engage in the digital economy. While previous research examines how technology affects gender equality, little is known about the precise mechanisms by which AI empowers women. This work advances a thorough comprehension of gender-inclusive AI tactics. This study targets gender inequities, encourages financial inclusion, and provides chances for women by utilizing AI.

Literature Review

UNESCO (2020) established a plan for integrating education for sustainable development (ESD) within the sustainable development goals (SDGs) framework. It underlined how important ESD is to achieving the SDGs by fostering sustainable lifestyles, addressing environmental problems, and creating just and equitable communities. The guiding principles of fairness, sustainability, active participation, holistic learning, and

equality were used to prioritize the integration of ESD at all educational levels. AI may be used to expand data-driven decision-making, virtual environments, and tailored learning, which will empower women in education. This addressed gender gaps in STEM, promoted workplace equality, and empowered women to take action for sustainability. Using AI responsibly and ethically is essential to preventing inequality from getting worse (Zacharia et al., 2020). Hamdan et al. (2021) observed that women are paid 23% less than men for doing the same work worldwide. Women held only 24% of senior management positions in the private sector. The study further observes that AI is expected to cause 800 million job displacements by 2030, and women are more likely to be affected by this. Upon examining the impact of AI on gender equality in the workplace, it became apparent that job displacement, discrimination, and empowerment were key areas affected by AI. The study acknowledges that AI can aggravate the gender parity problem by displacing women from their traditional job roles and perpetuating discrimination with biased algorithms. The work underscored the need for responsible AI practices to achieve positive outcomes for gender equality. It also recognized the influence of factors pertaining to local culture, geography, and industry and suggested further research to provide insights that can guide policy formulation within the realm of AI integration within legacy systems that promote women's empowerment.

In another study, 1,200 Indian women were polled to evaluate their level of empowerment in terms of economic, social, political, psychological, and health aspects. The study formulated an “autonomy index” and revealed a disparity between perceived and actual autonomy, with only 40% possessing high autonomy based on specific decision-making spheres. The study finds that empowered women were more likely to be employed, earn higher incomes, access better healthcare, and engage in community activities. The findings underscored women's empowerment being a multifaceted issue, and successfully addressing it can have positive impacts on various life aspects, emphasizing the necessity for further research (Bhattacharya & Banerjee, 2012). Heneghan (2023) observed that integration of technology can help address gender disparities effectively. Utilizing data for progress measurement, leveraging metaverse to enhance education accessibility, using AI-driven programs such as recruiting, career development plans, flexible work arrangements, enhancing workplace security, promoting digital literacy to mitigate cyber violence, and encouraging greater participation of women in technology are ways to empower women. The transformative power of technology is underscored by its ability to facilitate career advancement and generate equal opportunities for women. Women are still underrepresented as leaders and users of financial services despite the growth of digitization and expanded reach of financial services changing access to financial possibilities.

The research indicates that having more women in fintech leadership roles can contribute to better firm performance, further demonstrating the economic benefits of gender diversity. However, it has also been observed that firms founded by women generate less revenue and receive less funding, possibly due to historical investment bias. It is essential to encourage women's participation in digital finance, both as users and leaders for economic growth and gender equality (Khera et al., 2022). According to Marwala (2024), inclusive growth has been hampered by the underrepresentation of women in technology, especially in AI. Women's involvement in technology is expected to rise by 2026, according to initiatives like the Action Coalition on Technology and Innovation for Gender Equality. Efforts should be channeled to prioritize equal opportunities in STEM education, reduce gender bias in AI algorithms, and ensure optimal diverse representation in tech governance. Ramos (2022) emphasized that eliminating the gender gap in AI is essential to preventing inequality in the digital age from continuing. UNESCO's international standard-setting programs emphasize the importance of promoting inclusion, equality, and justice in the rapidly evolving digital world. Prioritizing research on women in technology is essential to achieving true inclusion and empowerment. Numerous other studies, including those by Chaudhary et al. (2012), Goel and Chakravarty (2023), Jabbar and Zaza (2016), and Parvathy and Kavitha (2023), highlighted the significance of women's empowerment for sustainably growing economies; the majority of these studies concentrated on emerging and frontier economies.

It is apparent that women's empowerment is a global problem and there is thin literature exploring the

transformative power of AI in promoting financial independence among women. It underscores the need for investigation and innovation to arrive at possibilities that can help women leverage AI for their own upliftment. In order to inspire academics and practitioners to investigate this unrealized potential, the article highlights the promise of AI in areas such as social support, political involvement, economic opportunity, and education. Ultimately, this work aims to contribute to more comprehensive strategies for achieving economic empowerment of women and gender equality globally.

Research Methodology

The study employed a combination of thematic analysis and observational studies to investigate the potential of AI to empower women financially. Thematic analysis is used to identify patterns and themes in qualitative data to gather insights (Bartlett, 1932; Braun & Clarke, 2006). In this study, thematic analysis was employed to analyze various secondary data sources such as reports, scholarly articles, and policy documents related to the use of AI for women's empowerment from economic contexts. The acquired was evaluated using thematic coding in order to identify significant patterns and connections. Insightful findings were reached after a thorough examination of the themes that surfaced. This procedure ensured that the research work's credibility and rigor were maintained by continuously comparing, validating, and interpreting the results. To corroborate these findings, observational studies were conducted to document real-world initiatives and practices. This methodology enables comprehension of interdisciplinary synergy by explicitly watching and recording real-world phenomena, exposing interactions and effects between many aspects across disciplines (Alavanja et al., 2003).

This involved carefully analyzing documented initiatives taken up by various countries and corporations with the underlying intent of promoting financial independence among women. Valuable insights were gained into the practical applications and outcomes of leveraging AI for women's economic inclusion. The approach included keeping an eye on AI-based platforms, digital entrepreneurial projects, and skill-building courses specifically designed for women. This study uses Taguette, an open-source qualitative data software program. This study spans the years 2012–2024, with a specific focus on more recent research.

The study's results elucidate that AI has immense potential to enhance women's economic autonomy. The thematic analysis effort revealed several key topics, including gender inequalities ingrained in AI algorithms, enhanced access to markets and finance, and AI-enabled skill augmentation. Real-life practices from observational studies corroborate the findings and deepen the understanding of the positive effects of AI-driven initiatives on women's economic inclusion. Numerous studies employ this mixed technique (thematic and observational studies) to identify themes and patterns in research related to human resources, psychology, and the social sciences (Blacker et al., 2017; Schwendimann et al., 2019). The potential of developing technology to economically empower women is identified in this research, and the study's validity and applicability are supported by the main themes and empirical data.

Results and Discussion

Table 1 lists some of the major projects being undertaken by different economies that are now using AI to empower women economically.

Table 1. AI for Women Empowerment Initiatives Across Various Economies

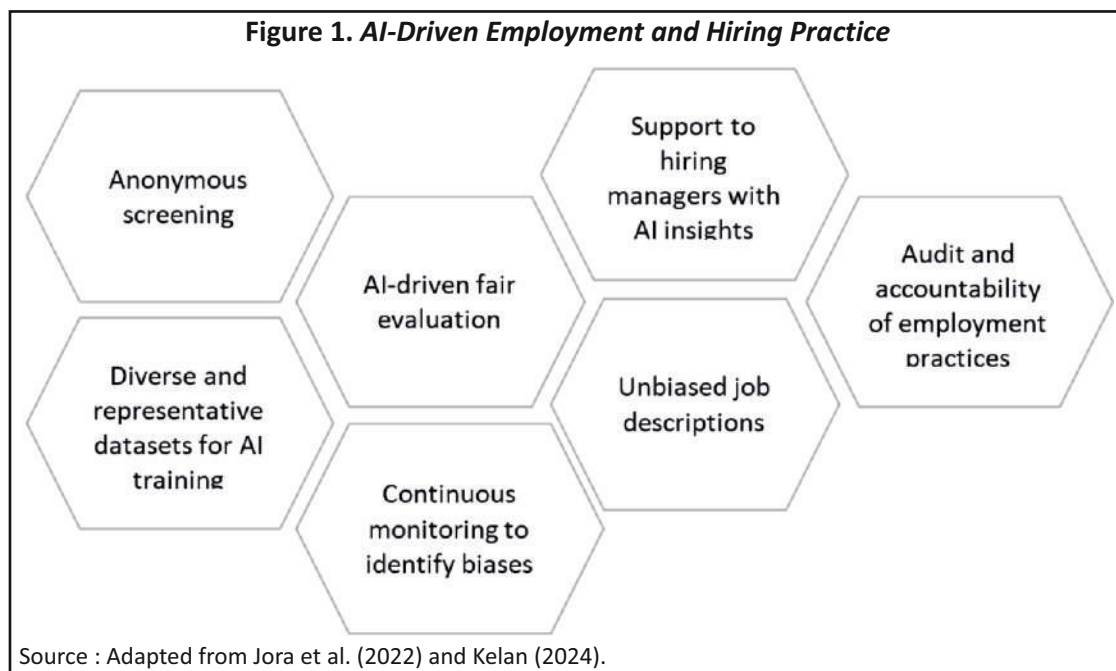
Country/Region	Program Name	Description
APAC	Google Anita Borg Memorial Scholarship (Paul G. Allen School of Computer Science and Engineering, 2024)	Offered to women enrolled in APAC University pursuing master's degrees in computer science or any related field.

Global	AI for Women and Girls Initiative	Led by the International Telecommunication Union (ITU) and supported by other organizations, this global initiative intends to address the gender digital gap by increasing women's access to AI education and training. It promotes the participation of women in AI fields and leverages AI to address gender-based violence. Training, research funding, networking, and awareness campaigns are key elements of this initiative.
Global	Women in Technology International (WITI, 2024)	It is a non-profit organization (NPO) that focuses on empowering women in the technology sector by offering networking opportunities, educational resources, and mentorship programs. It also leverages AI to match women with mentors and sponsors, thus enabling personalized career recommendations and analyzing data on women's representation in technology.
Global	AI for Good Global Summit (AI for Good, 2023)	It is an annual event organized by ITU and supported by other organizations. It brings together AI leaders to discuss methods to leverage AI and address global challenges. The summit features high-profile speakers, panel discussions, workshops, and opportunities to network. The 2023 summit in Geneva focused on AI for a Sustainable and Inclusive Future; it addressed aspects such as climate change, social inclusion, and human rights.
Canada	Women's Empowerment with AI (Clement, 2024)	The Canadian government partnered with private organizations to initiate several programs that leverage AI for women's empowerment. Initiatives include – AI education and training through programs like the Women in Technology (WIT) Mentorship Program and the Women in STEM Scholarship. It also supports the participation of women in AI fields to reduce the gender digital divide. Additionally, AI is being used to address gender-based violence through the development of applications for prevention and intervention.
Asia-Pacific	Women in AI (WAI) Awards 2023 (Clement, 2024)	It is an annual ceremony held in Sydney, Australia, where the accomplishments of women in AI across various sectors, such as universities, research institutes, startups, NGOs, industry, and government, are acknowledged and awarded. It provides opportunities to network and creates awareness of contributions by women to the AI field in the APAC region.
UK	Women in Data Science and AI project (The Alan Turing Institute, 2024)	The project initiated at the Alan Turing Institute, led by Dr Claudia Perlich, aims to address the gender gap in the data science and AI fields. It develops resources and raises awareness around the importance of women in these fields.
UK	Ada Lovelace Institute (Ada Lovelace Institute, 2024)	An NPO that works to increase the number of women in STEM fields, particularly in AI. It offers scholarships and grants, mentoring programs, events, and advocacy to encourage women in AI.
India	Women Entrepreneurship Platform (WEP) by NITI Aayog (Women Entrepreneurship Platform, 2024)	Utilizes AI and machine learning (ML) to connect women entrepreneurs with mentors and sponsors. It provides customized recommendations for training and resources. The program also leverages AI to monitor the performance and make improvements.

It is imperative to note that these programs are typically limited to enhancing the commitment of women to tech education and entrepreneurship with greater emphasis on data science and AI. There are many other means by which AI can be leveraged for the economic empowerment of women, especially those who operate beyond the realm of technology or AI. Some such methods are mentioned below.

Reducing Bias in Employment and Hiring

AI has the potential to eliminate gender bias in recruitment and hiring by automating initial screenings based on qualifications capabilities rather than personal characteristics. Generative AI can be used to simulate dataset that filters out gender bias; training ML models using such datasets can address this aspect meaningfully. Women will be given equal opportunity thanks to this impartial attitude. Some strategies to lessen AI bias are listed below (see Figure 1).

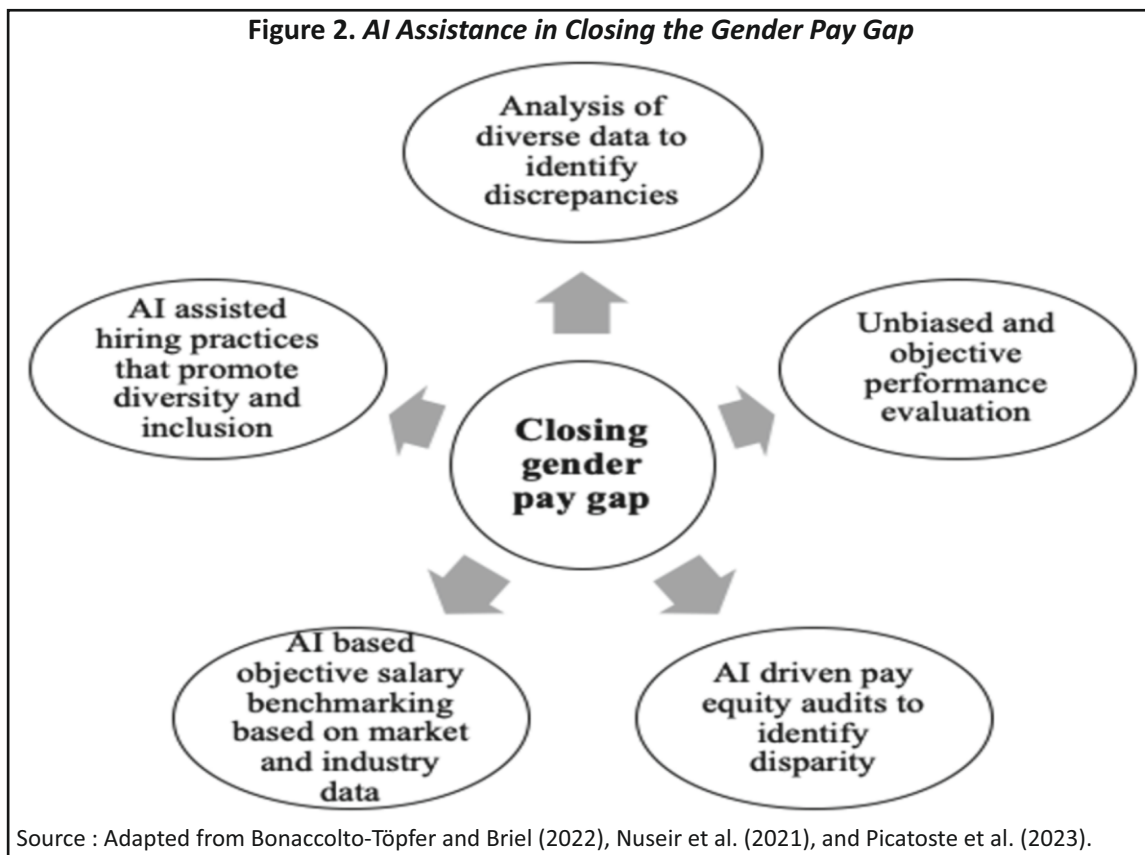


Closing the Gender Pay Gap

The quality and diversity of the data are essential for assessing how well AI-driven algorithms that try to close the gender wage gap work. To avoid perpetuating biases, it is crucial to ensure diverse representation in data collection and continuously monitor AI systems. Moreover, AI should be viewed as a supportive tool in decision-making, not a standalone solution, with ongoing human supervision to ensure ethical and fair outcomes is essential. Furthermore, the organization's gender pay inequalities can be reduced through training initiatives aimed at upskilling women (see Figure 2).

Access to Financial Services

AI has the potential to provide personalized financial advice through virtual assistants such as chatbots or robo-advisors; they can foster improved and informed decision-making. AI algorithms can also assess creditworthiness more accurately, benefiting women with limited credit histories and promoting better



accessibility to funding (von Hoyersthal, 2023). AI can also be used to enhance data security and fraud detection, protecting financial transactions. AI-powered educational platforms can offer tailored financial literacy programs, improving knowledge and skills for women. Automated budgeting and savings systems assist women in keeping tabs on spending and reaching their financial objectives. Language translation tools powered by AI can ensure women from diverse communities can access financial services. However, it is essential to prioritize ethical considerations, transparency, and human oversight to mitigate biases, protect data privacy, and maintain fair outcomes. Several ways applying AI to financial services could promote women's financial empowerment and help close the gender gap (Silva, 2024).

Improving Healthcare Solutions for Women

Women can become more economically empowered through the use of AI in healthcare by having better access to high-quality care, early disease detection, individualized treatment options, and increased convenience. These developments could lead to improved health outcomes, lower healthcare costs, and greater economic empowerment for women in general. Nonetheless, in order to guarantee that moral principles are respected and that public confidence in AI-powered healthcare services is built, it is imperative to prioritize data privacy, reduce biases, and retain human oversight. Ramakrishnan et al. (2021) stated that AI offers new approaches for prediction analytics, diagnosis, and monitoring in perinatal health. ML has been used to predict preterm birth, pre-eclampsia, and more. Real-time electronic health recording and AI-based predictive modeling in fetal monitoring and gestational diabetes management have yielded promising results. AI has applications in assisted reproductive technologies and prenatal diagnosis. Initiatives for women's health improvement that use AI can support their health improvement in a variety of ways (see Figure 3).

Figure 3. AI for Women's Health Improvement

Enhanced diagnostics and early detection

- AI algorithms accurately analyze medical images like mammograms or pap smears, enabling early detection of diseases and improving treatment outcomes while reducing costs.

Personalized treatment and care

- AI-powered personalized treatment plans can improve effectiveness, minimize side effects, and optimize resources

Remote and accessible healthcare

- Data-driven telemedicine can provide remote healthcare to rural women, reducing travel and time off work.

Source : Adapted from Bagdy and Juhasz (2013), Houssami et al. (2019), and Jheng et al. (2020).

AI-driven health services contribute to economies of scale, which reduces overall healthcare expenses. This can help economically disadvantaged women have easier access to health care, which frequently leads to increased productivity in both their personal and professional lives. Technology can be leveraged to foster timely reproductive healthcare, allowing women to plan pregnancies, pursue education, and participate effectively in the workforce. Early disease detection and availability of preventative care also lower the need for expensive treatments, protect financial resources, and improve economic stability. Addressing health disparities and promoting equal opportunities for women in healthcare is a fundamental right. Wang (2018) indicated through empirical evidence that preventive healthcare leads to optimal health status; this, in turn, fosters enhanced productivity and economic performance.

Combating Gender-Based Violence

Natural language processing (NLP) algorithms analyze text and speech, and they can be leveraged to detect indications of violence or harassment, allowing for early intervention and support for victims (Redondo et al., 2023). There are several ways to address gender-based violence by utilizing AI-powered solutions:

↳ By examining trends and identifying risk factors, AI can be helpful in recognizing and preventing gender-based violence. Integrating across Internet of Things (IoT) devices in the vicinity can provide timely intervention in the event of violence or assault. Alerts can be triggered to notify authorities or nearby individuals on a real-time basis through sensors, cameras or connected devices. Local data processing, pattern analysis, anomalous activity or possible threats detection, and alert triggering are all possible with edge computing without sending private data to external servers. Effective encryption, anonymization strategies, and restricting data gathering to essential

information can all help to protect privacy. Safer surroundings allow women to pursue their careers and studies without worrying about assault or violence. Abdulkareem and Karan (2022) indicated that the increasing problem of gender-based assault, particularly affecting women, demands action from nations, organizations, and data experts. Deep learning techniques can play a crucial role in predicting and addressing this violence by analyzing data from digital footprints as well. By understanding the prevalence and impact of such violence by analyzing extensive data, policymakers and organizations can develop targeted interventions and policies to address the issue effectively (Heard et al., 2020).

✍ Survivors of gender-based assault can receive individualized, private support services enabled by AI. AI-based platforms can provide survivors with counseling, legal assistance, and job training tailored to their specific needs, and they can also proactively monitor their recovery process. AI helps survivors reconstruct their lives and seek fulfilling career possibilities by providing them with the tools and skills they need, enhancing their long-term financial security.

Promotion of Work-Life Balance

Women can be empowered by smart technologies powered by AI that support work-life balance, promote better time control and help them participate fully in both their personal and professional lives. This empowerment enhances job satisfaction, reduces stress, and improves overall well-being. AI can help streamline work processes and facilitate flexible arrangements, helping women to efficiently manage their schedules and balance career aspirations with personal commitments. This can also reduce the number of women dropping out of the workforce due to motherhood. Capelli et al. (2023) observed that AI could help address work-life balance challenges for women surgeons, closing the gender gap in surgical specialties through flexible schedules, childcare facilities, paternity leave, and mentorship. Paigude and Shikalgar (2023) used ML to examine the perceptions of 150 female IT workers on work-life balance. The study found that the multilayer perceptron and long short-term memory (LSTM) models exhibited the potential to accurately predict future business conditions and offer valuable insights for organizational research. Tools like these that provide tailored advice and resources for well-being and self-care can help avoid burnout. Additionally, AI support for caregiving tasks, like elder and child care (real-time monitoring, medication reminders and routine checkups, smart sensors for identifying emergencies or abnormal patterns, and cognitive engagement), helps women manage work and caregiving roles by reducing responsibilities (Madakam & Ramaswamy, 2014).

These applications demonstrate how AI can advance women's economic independence and well-being. Nonetheless, responsible AI must be implemented; safety, privacy, and ethical issues must be given top priority when developing and deploying AI systems (Ricaurte, 2022). The possibilities for uplifting women have only increased with the development of generative and explainable AI. To guarantee the beneficial effects of new technologies, it is imperative to prioritize diversity, inclusivity, and the defense of fundamental rights.

Theoretical and Managerial Implications

This study has several implications for various stakeholders:

✍ **Academic Community** : By shedding light on critical gender disparities in education and the under-representation of women in STEM, it underscores the urgency for inclusive educational policies and practices that foster inclusion. Designing AI-driven treatments that address these structural disadvantages and give women economic empowerment in the digital age requires an understanding of these discrepancies.

✍ **Women Rights Activists** : By emphasizing the benefits that women derive from leveraging AI technologies, such as increased access to opportunities, reduced bias, improved work-life balance, and enhanced economic

empowerment, the study provides specific use cases that can be pursued. Women can break through barriers and achieve greater economic independence and success by realizing and utilizing the power of AI.

↳ **Corporations and Employers** : The study highlights the advantages for businesses and industries in engaging more women and leveraging AI for economic inclusion. This approach enables organizations to access a wider range of talent, drive innovation, and gain a competitive advantage. The findings can be used for improved productivity, narrowing gender pay gaps, and the creation of inclusive workplaces that attract and retain diverse talent.

↳ **Tech Developers** : Software developers and service providers can use the results of this study to create ethical AI systems that support diversity and justice. The study stresses the need for continuous research and development to tackle gender disparities and biases in AI algorithms. Technology researchers and developers can help create a more equal and empowering digital environment by considering how their work affects women's economic inclusion.

Conclusion

The report emphasizes the importance of women's economic empowerment in achieving gender equality and inclusive economic growth. Leveraging AI can improve healthcare outcomes, decrease gender pay inequalities, increase women's representation in male-dominated industries, and give women better access to financial services. The insights from this study provide significant value to multiple stakeholders who are committed to the advancement of the economic empowerment of women. Organizations committed to gender equality can leverage AI to foster an inclusive work environment, drive innovation, and gain a competitive advantage. AI developers are crucial to ensuring that moral principles are respected, prejudices are addressed, and AI systems are created ethically. This research can be used by advocates for women's rights to support the inclusion of AI in programs that support women's economic inclusion and equitable access to resources, jobs, and entrepreneurship. The adoption of AI must be inclusive and responsible in order to ensure women's empowerment and fair access in the digital age. The study's framework and conclusion provide particular use cases within each of the topics covered, which can support women's economic empowerment through the application of AI. Stakeholders must give ethical concerns, privacy protection, and bias reduction a top priority in order to build a society in which women may thrive and gender equality becomes a reality.

Limitations of the Study and Scope for Future Research

This research is limited because it is a secondary research study and depends on pre-existing data sources. Potential biases in the data, discrepancies between sources, and the inability to access particular datasets are some examples of these limitations. Furthermore, owing to secondary data, the study may not be able to fully capture localized or real-time variations in gender disparities. Thus, the findings should be interpreted with caution, considering the constraints of the data used.

Future research could delve into empirically assessing the impact of AI accessibility on gender disparities in the education sector and organizations, considering intersectional factors such as socioeconomic status and geographical location. Important data for program implementation and policymaking would come from empirical studies on how well AI interventions address gender disparity.

Authors' Contribution

Dr. Madhavi Lokhande and Dr. Rangapriya Saivasan conceived the idea and developed a qualitative design to

undertake the exploratory/conceptual study. Dr. Rangapriya Saivasan extracted research papers with high reputations, filtered these based on keywords, and generated concepts and codes relevant to the study design. Dr. Madhavi Lokhande and Dr. Rangapriya Saivasan verified the analytical methods and supervised the study. The analysis was conducted by Dr. Rangapriya Saivasan and subsequently validated by Dr. Madhavi Lokhande. Dr. Rangapriya Saivasan wrote the manuscript in consultation with Dr. Madhavi Lokhande.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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