Al-Tatawur : International journal of Social Science (TIJOSC)

E-ISSN: 3005-5342
P-ISSN: 3005-5334

Research Article

Constructing Gender Justice in the Age of Artificial Intelligence: A Social Construction Theory Analysis

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Abstract. Gender injustice remains a persistent phenomenon in contemporary society, requiring strategic efforts to anticipate and overcome it. This paper aims to analyze the role of artificial intelligence (AI) in fostering gender justice, examined through the lens of opportunities and challenges within the framework of social constructionism theory. The study employs a literature review approach, with data gathered from books, scientific articles, and other relevant sources. The process involves data collection, selection, descriptive analysis, and content analysis, followed by drawing conclusions. The findings reveal that gender injustice in the era of AI is largely shaped by structural and technological factors. These include the replication of existing social inequalities within digital systems, the underrepresentation of women in AI development, limited and biased datasets, algorithmic discrimination, as well as the absence of comprehensive policies and regulations to address these issues. Such challenges demonstrate how technology may reinforce, rather than diminish, societal biases if left unexamined. Nonetheless, AI also presents significant opportunities to advance gender justice. AI systems can be designed to identify and reduce discriminatory practices, promote women's participation in technological development, and encourage multi-stakeholder collaboration between governments, industries, and civil society. Furthermore, AI can support educational initiatives and awareness programs aimed at building more inclusive digital ecosystems. By addressing both risks and opportunities, the integration of AI into society has the potential to serve as a transformative force in reducing gender disparities. This study concludes that achieving gender justice through AI requires critical reflection on social structures, proactive regulation, inclusive participation, and ethical innovation to ensure that technology contributes positively to equality.

Keywords: Algorithmic Bias, Artificial Intelligence, Gender Justice, Inclusivity, Social Construction,

Received: July 05, 2025;
Revised: July 25, 2025;
Accepted: August 17, 2025;
Online Available: August 19, 2025
Curr. Ver.: August 19, 2025

1. Introduction

Gender inequality is a longstanding issue, including in Indonesia (Augustia et al., 2024). Gender is not the same as biological destiny as Sari explains, gender refers to the distinction in status, roles, division of labor, or responsibilities between men and women (Sari, 2021). Dewayani argues that gender equality is a fundamental human right, encompassing the right to live with dignity, free from fear, and with the ability to make life choices. Gender equality is not only for men; in essence, women also have the same rights. However, gender equality should not necessarily be interpreted as identical rights and responsibilities without consideration of context. Nevertheless, gender injustice persists to this day, with women often perceived merely as complements. One form of gender injustice is violence (Dewayani, 2021).

According to Prabawati, the Gender Development Index (GDI) for East Kalimantan ranks 32nd, and the Gender Empowerment Index ranks 26th out of 34

provinces. This condition reflects a gap in human resource development between men and women. In a socialization event on "Increasing Women's Participation in Politics, Law, Social, and Economic Sectors," it was stated that women's representation in East Kalimantan is only 18%, indicating that further efforts are needed to reach the ideal target of 30% (Prabawati, 2023). In light of this, strategic efforts are required—one of which involves the utilization of technology. The Minister of Communication and Information Technology has stated that it is time for society to use digital technology to reduce ongoing gender disparities (Biro Humas Kementerian Kominfo, 2024). Artificial Intelligence (AI) has emerged and presents positive potential, particularly if women's involvement is enhanced (Biro Humas Kementerian Kominfo, 2024). Women can contribute to greater diversity in AI development, particularly by ensuring algorithms are designed to be free from gender bias (Irawan et.al., 2024).

Based on the author's review, gender injustice has been widely discussed in the literature. For instance, articles such as "Artificial Intellegent Efforts in Addressing The Humanitarian Crisis: A Study on Rohingya Refugees" (Mutaqin et.al., 2024), "Artificial Intelligence (AI) Dimasa Depan : Tantangan dan Peluang" (Rozali et al., 2024), "Peluang dan Tantangan Kecerdasan Buatan Bagi Generasi Muda" (Pongtambing et al., 2023), and "Integrasi Kecerdasan Buatan Dalam Berbagai Sektor: Dampak, Peluang, dan Tantangan" (Putra et.al., 2024). have addressed the prospects and challenges of AI in various fields.

However, as far as the author has found, previous studies have not specifically addressed the opportunities and challenges of AI in building gender justice, particularly through the lens of social construction theory.Therefore, this paper aims to analyze about 1. How does gender bias manifest in artificial intelligence?., 2. Why does gender bias occur in the era of artificial intelligence?., 3. What efforts can be made to build gender justice in the era of artificial intelligence?.

2. Methods

This research is a literature study on artificial intelligence in building gender justice. The material object of this study is gender justice in the era of artificial intelligence, with data collected from relevant books and previous articles related to the topic. Once the data were collected, a selection process was carried out, followed by descriptive analysis and content analysis. After the data were analyzed, the next step was drawing conclusions.

3. Results and Discussion

Gender Bias in Artificial Intelligence

The term gender is often equated with sex, but these two concepts are fundamentally different. Sex refers to biological traits that are inherent and immutable between men and women, and is considered permanent as it is a gift from the Almighty. In contrast, gender is a cultural construct formed, socialized, and learned within a society's social reality. The process of construction takes time, eventually becoming normative and socially recognized (Wahyuningsih et.al., 2023). The discourse on gender cannot be separated from the feminist movement. The term "feminism" began to be used around the 1890s, referring to the theory of equality between men and women and also to the movement advocating for women's rights. Feminism gained historical momentum around the 1960s by highlighting the imbalanced structure of modern society caused by patriarchal culture. The marginalization of women's roles in various aspects of life, especially in politics and economics, became concrete evidence raised by feminists (Niswah, 2021).

From the Islamic perspective, the issues of feminism, gender, and women's rights are often debated ideologically. These three aspects have created persistent discourses that seem to separate Islamic and Western views. In contemporary realities, the gender discourse is framed by history as a political conflict between Islam and Christianity, as well as a result of Western colonialism over the Muslim world. There are several factors that contribute to the emergence of gender bias within Islamic contexts:

- The use of Islamic studies as a comprehensive framework without sufficient contextual understanding, especially in the 4.0 era.
- A lack of self-awareness regarding the inconsistencies in scriptural interpretation due to the division between universal-normative and temporal-practical approaches.

- Shock arising from the large number of scriptural references to women due to partial or incorrect interpretations.
- The inevitable influence of foreign cultures on Islam, especially as a result of globalization.
- Male dominance in understanding and interpreting religious texts.
- Generalized discussions of specific cases without contextual nuance.
- The influence of political power structures and authority figures in legitimizing interpretations (Wahyudi et al., 2020).

From these causes of gender bias, it can be reaffirmed that gender is not biologically inherited, but rather shaped through complex social processes. Gender is often viewed through gender stereotypes, which refer to beliefs about a person's characteristics, personality traits, values, and behaviors. These stereotypes are the result of complex interactions among religion, ethnicity, culture, politics, and social relationships (Sriwijayanti et al., 2024). As Berger and Luckmann explain, gender is the result of complex social construction processes. Every aspect of social reality, including gender identity and norms, is constructed through human interaction within society. There are three main stages in this process:

- Externalization: This is the process by which individuals or groups express their understanding of the world into a social reality—through actions, behaviors, and norms. Regarding gender, society creates expectations and norms about what is considered "masculine" and "feminine," expressed through behavior, language, culture, and policies.
- Objectivation: This is the process by which social norms initially created by humans begin to appear as objective, natural, and permanent realities. Gender norms, such as ideas of "masculinity" and "femininity," are increasingly perceived as biologically determined, even though they are originally social constructs.
- Internalization: In this stage, individuals accept social norms as part of their identity. People learn to see themselves and others through the lens of socially constructed gender norms. Children internalize gender roles through family education, media, school, and social experiences. This process makes gender norms appear natural, even though they are products of long processes of externalization and objectivation (Berger & Thomas, 1991).

According to Berger and Luckmann, the gender discourse is the result of:

- The formation and reproduction of social norms through externalization and objectivation.
- Continuous social interaction, in which gender roles are learned, transmitted, and reinforced across generations.
- Social environments such as family, schools, religion, and media, which normalize and legitimize traditional gender roles.
- Power structures that often legitimize and maintain gender inequality through these processes (Berger & Thomas, 1991).

Before discussing gender bias in artificial intelligence further, it is necessary to clarify the meaning of artificial intelligence (AI). According to Mutaqin et al., AI is a form of machine intelligence designed through advanced processes to mimic human intelligence and is embedded in devices as artificial smart tools. These tools are especially helpful in education because they can search for various types of knowledge quickly and accurately. AI can also be used without time and space limitations and is capable of analyzing data beyond human capacity (Mutaqin et.al., 2023). Siahaan et al. also describe AI as the intelligence of a scientific entity, defined as intelligence added to a system that can be controlled scientifically. This system is typically a computer that has been programmed to perform human-like tasks. Based on these explanations, AI can be interpreted as a system equipped with multiple features that, when input into a machine, enable it to perform human-like activities (Siahaan et al., 2020).

However, the advancement of AI has also reinforced gender bias. As Napitupulu (2024) notes, only 18% of authors at major AI conferences are women, while 80% of AI professors are male (Napitupulu, 2024). Furthermore, algorithmic data often exhibits a higher error rate in recognizing white women compared to white men reaching 34.7% for Black women, versus just 0.8% for white men (CNN Indonesia, 2022). Such evidence shows that gender justice must become a critical focus as AI continues to develop. This is

especially true because the data used to train AI models often come from historical records that may contain gender bias. AI systems are built using algorithms that whether intentionally or not can reflect bias. This bias may stem from non-representative training datasets or design decisions that fail to account for user diversity, leading to discriminatory outcomes in AI decisions (Rifky et.al., 2024).

Second, representation in AI development remains an issue. As previously mentioned, the number of women in the AI industry is still relatively low, which affects how AI products are designed and implemented. Pal et al., state that only 22% of AI professionals worldwide are women, with the figure dropping below 15% at senior executive levels. This shows that women are underrepresented and often face barriers in technical careers (Pal et.al., 2024). Third, ethical considerations and the fair use of AI are crucial. Policies are needed to ensure AI technologies are applied equitably (Irfansyah, 2024). In Indonesia, the Directorate General of Informatics Applications (Ditjen Aptika) reports that women still experience a significant digital access gap. According to Google's research, women spend 3.8 hours daily on household chores, while men spend only 1.5 hours. This time imbalance results in women having less access to the internet and fewer opportunities to develop digital skills (Rizkinaswara, 2020).

Causes of Gender Bias in the Era of Artificial Intelligence

With regard to the causes of gender bias in the era of artificial intelligence, the author has interpreted them based on previously published works. The result of the author's interpretation is presented in Table 1 below:

Source	Interpretation
APC, 2024	Replication of social inequalities
Daraz et al., 2022	Lack of women's representation in AI development
Kundu, 2024	Data limitations and algorithmic bias
Napitupulu, 2024	Lack of effective policies and regulations

Based on Table 1, it can be interpreted that there are several causes of gender bias in the era of artificial intelligence. The first is the replication of social inequalities. Artificial intelligence systems are developed by humans who carry inherent biases, which means the data used to train AI models is often unbalanced and can result in discriminatory outcomes. For instance, algorithms may reinforce gender stereotypes and produce new forms of injustice in areas such as advertising and recommendation systems (APC, 2024). D'Ignazio and Lauren emphasize that data is never neutral; it carries the historical inequalities embedded in society. Historical data about employment, healthcare, or political participation often reflect long-standing gender roles and biases. When AI systems are trained on such data without correction or critical understanding, the social inequalities embedded in the data can be perpetuated in the automated decisions made by these systems (D'Ignazio & Lauren, 2020).

The second cause is the lack of female representation in AI development. Daraz et al., highlight that one of the main reasons for gender bias in AI is the underrepresentation of women in AI development teams. As previously discussed, when development teams are male-dominated, the needs and perspectives of women are often overlooked. This results in technologies that are not gender-responsive (Daraz et al., 2022). Similarly, D'Ignazio and Lauren note that the tech field remains largely male-dominated, which contributes to gender bias in both data and algorithms. They also argue that power structures in technology development can create gender stereotypes and exclude women. Therefore, a feminist approach in data collection and analysis is essential to ensure that perspectives are inclusive, balanced, and not solely male-dominated (D'Ignazio & Lauren, 2020).

The third cause is data limitations and algorithmic bias. Kundu (2024) explains that the data used by AI often reflects historical biases, which can result in models that produce discriminatory patterns. One example is facial recognition bias, where algorithms tend to have lower accuracy when identifying women with certain skin tones (Kundu, 2024). According to D'Ignazio and Lauren, algorithmic bias occurs when AI systems are trained on imbalanced or discriminatory data, which further amplifies those biases in the outcomes and analyses produced. Therefore, as previously mentioned, it is crucial to adopt development approaches that are more transparent, diverse, and socially contextualized in order to minimize bias and promote gender justice (D'Ignazio & Lauren, 2020).

The fourth cause is the lack of policies and regulations. Many companies focus on developing artificial intelligence, but there is still a lack of effective policies to address gender bias. A UNESCO study recommends that governments develop clear regulatory evaluation frameworks to monitor and assess bias in AI systems (Napitupulu, 2024). D'Ignazio and Lauren also highlight that data is often collected and analyzed without considering social contexts, including gender inequality. The absence of regulatory standards for data collection and analysis allows bias to persist undetected and uncorrected (D'Ignazio & Lauren, 2020).

Efforts to Build Gender Justice in the Era of Artificial Intelligence

In relation to efforts to build gender justice in the era of artificial intelligence (AI), the author has compiled several previous studies, which are interpreted in Table 2 below:

Source	Interpretation
Irawan et.al., 2024	Identification of discrimination
Suryaningsih et.al., 2024	Encouraging women's participation
Salsabila, 2024	Multi-stakeholder collaboration
Mukaromah, 2023	Education and awareness

Based on Table 2, several strategies can be outlined to promote gender justice in the era of AI. First, through identifying discrimination, AI is capable of detecting patterns of bias and discrimination. Irawan et al., explain that AI supports diversity and inclusion efforts aimed at reducing bias. However, this depends on how the algorithm is designed; thus, AI algorithms should focus on skills and qualifications rather than irrelevant personal attributes, enabling more inclusive and diverse outcomes (Irawan et.al., 2024). AI systems can monitor interactions and detect biased patterns, a point also supported by D'Ignazio and Klein, who highlight that AI can help uncover historical bias embedded in data that reflects systemic gender injustice. By analyzing such data, AI can identify internalized discrimination. (D'Ignazio & Lauren, 2020).

Furthermore, AI can detect discrimination in algorithmic decision-making by examining whether certain algorithms consistently disadvantage particular groups. Another tool is data visualization, where AI can highlight disparities experienced by marginalized groups in areas such as education, health, and finance. AI can also be used in algorithmic audits to ensure fairness and transparency. D'Ignazio and Klein emphasize the importance of auditing algorithms to identify and address discriminatory outcomes. Through these audits, AI can assess whether decision-making processes are equitable across all demographic groups. They also stress that to effectively achieve these goals, AI systems must be developed with inclusive, ethical, and transparent principles in order to support social justice and avoid perpetuating existing biases (D'Ignazio & Lauren, 2020).

Second, encouraging women's participation is a vital step. Various initiatives have been implemented in the industrial sector, including collaborations through training programs such as CodingMum, organized by the Creative Economy Agency (Suryaningsih et.al., 2024). D'Ignazio and Klein argue that AI can be used to promote women's involvement, particularly in STEM fields typically dominated by men. This can be done by providing AI-based platforms that empower women to speak up, share experiences, and collaborate on projects. Additionally, AI can offer insights into economic opportunities for women by analyzing data to identify gender gaps in specific sectors, which can inform policy and training programs that enhance female participation (D'Ignazio & Lauren, 2020).

Third, collaboration among stakeholders is essential. Cooperation between governments, the private sector, and communities plays a significant role in creating a digital environment that is inclusive of women. This includes policy development that ensures equitable access to and utilization of technology (Salsabila, 2024). D'Ignazio and Klein emphasize that addressing gender inequality requires cross-disciplinary and cross-sector collaboration. Gender justice cannot be achieved by one party alone. Such collaboration also fosters accountability, particularly in patriarchal systems, and must be approached with awareness of power imbalances and potential biases in data collection and analysis (D'Ignazio & Lauren, 2020).

Fourth, education and awareness are crucial. AI can play a transformative role in raising awareness and educating the public on gender issues, including supporting more effective information campaign (Mukaromah, 2023). D'Ignazio and Klein (2020) emphasize the potential of AI to enhance public awareness of gender inequality using feminist data principles. Several approaches highlight how AI can serve as an educational tool:

- Uncovering gender bias through data: AI can reveal hidden gender biases in employment, healthcare, or education. For example, AI analysis can expose wage disparities or hiring discrimination. Presenting this data to the public raises awareness about systemic injustice and the need for change.
- Data visualization for public education: AI-generated visualizations effectively communicate gender issues in a clear and accessible way. By visually presenting inequalities or discrimination, the public can better understand the challenges faced by women and gender minorities, thereby fostering dialogue and advocacy.
- Building inclusive narratives: AI can promote positive representation of women and gender minorities and counter negative stereotypes in the media. It can be used to create and disseminate content that supports gender equality.
- AI to combat gender-based violence: By combining AI with data analysis, it is possible to identify patterns of violence and map high-risk areas or vulnerable groups. These insights can inform educational efforts and support gender-equitable policy advocacy (D'Ignazio & Lauren, 2020).

4. Conclusion

Gender justice is a principle that must be upheld amidst the persistence of patriarchal culture. In today's digital era, marked by the development of artificial intelligence (AI), there is a growing risk of embedded gender injustice, particularly against women. This injustice in the age of AI can manifest through the replication of social inequalities, the underrepresentation of women in AI development, limited data and algorithmic bias, and the lack of comprehensive policies and regulations. However, AI also offers potential solutions for promoting gender justice. These include identifying discrimination, encouraging women's participation, fostering collaboration among various stakeholders, and providing education and awareness.

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