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Gender, Technology, and the World of Work: Exploring the Digital Divide Among Female Workers

***Inayah[1], Diana Magfiroh[2]**
[1]UIN Siber Syekh Nurjati Cirebon, Indonesia [2]Universitas Cendekia Mitra Indonesia
Email: Inayahnay0903@gmail.com*, dianamagfiroh0002@gmail.com

ABSTRACT
The digital revolution has significantly reshaped the global labor market, yet its benefits remain unequally distributed—particularly along gender lines. Women in many regions face considerable barriers in accessing digital tools, acquiring digital literacy, and participating in digital economies. This research aims to explore the gendered digital divide in the world of work by identifying patterns of inequality, understanding underlying socio-cultural and institutional factors, and proposing inclusive solutions. A mixed-methods approach was adopted, combining a structured survey (n=1,500 across three countries) with in-depth interviews and focus group discussions among female workers from diverse sectors and regions. Quantitative findings reveal that women consistently lag behind men in internet access, digital confidence, and participation in online labor platforms. Only 37% of women reported digital confidence at work compared to 66% of men. Qualitative insights highlight barriers such as gender norms, limited policy outreach, and insufficient institutional support. Moreover, many women are excluded from workplace decision-making in digital transformation processes. These disparities not only restrict individual economic mobility but also hinder broader development goals. The study concludes that the digital divide is both a technological and structural issue requiring holistic intervention—ranging from digital infrastructure to gender-responsive training and workplace inclusion policies. Findings support the need for national and international action to ensure that digitalization advances, rather than limits, gender equality in the labor force.

Keywords: gender digital divide, women and technology, digital literacy gap, female labor inclusion, digital economy participation, gender equality in work

INTRODUCTION
The rapid development of digital technologies has revolutionized the way people work and interact in the global labor market. However, access to and proficiency in technology is not evenly distributed, especially between men and women. According to the World Economic Forum, women globally are 20% less likely to have internet access compared to men (World Economic Forum, 2023; ITU, 2022; Ayanore et al., 2024). This digital divide exacerbates pre-existing gender inequalities in the workforce, hindering women's access to flexible and promising opportunities in the digital economy.

The gender digital divide is not merely an issue of technology access but also one of women's inclusion and economic empowerment. Studies by Bagheri et al. (2024) and UN Women (2022) emphasize that women face structural barriers in digital education, underrepresentation in the tech industry, and limited access to professional digital networks. Failure to address this divide may significantly widen income and opportunity gaps between genders in the coming decades (OECD, 2023).

Global data reveals that women have lower digital literacy rates compared to men, particularly in regions such as Sub-Saharan Africa and South Asia. As illustrated in the visualizations below, in some areas, internet access for women is as low as 21%, significantly trailing behind male access (UNESCO, 2022; ITU, 2023; World Bank, 2023). Critical technology theory and structural feminist theory provide frameworks to understand how these disparities are perpetuated through social, cultural, and economic institutions (Wajcman, 2004; Haraway, 1985; Mansour & Vadell, 2024).

Table 1. Internet Access and Digital Literacy Gender Gaps by Region

Region	Internet Access (Female %)	Internet Access (Male %)	Digital Literacy Gap (%)
Global	48%	58%	10%
Sub-Saharan Africa	21%	30%	9%
South Asia	29%	41%	12%
Europe	80%	85%	5%
North America	85%	90%	5%

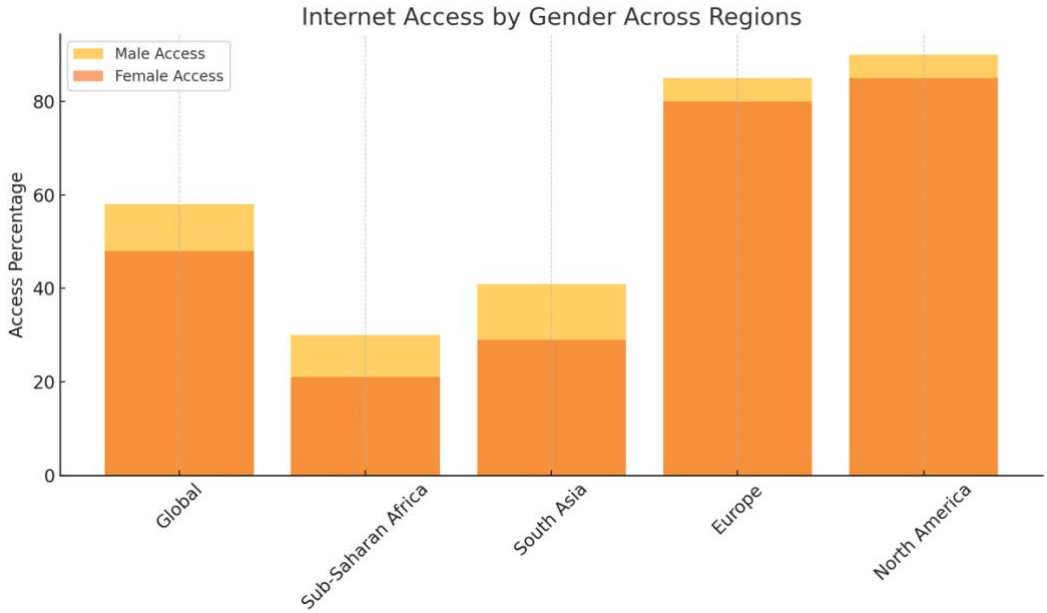

Figure 1. Internet Access by Gender in Five Global Regions

Prior research has extensively examined digital access disparities in educational (Mansour & Vadell, 2024), public health (Ayanore et al., 2024), and digital economy contexts (OECD, 2023). However, studies that explicitly connect gender, technology, and the world of work within the digital transition remain limited. Bagheri et al. (2024), for instance, analyze how women use social media to articulate their rights, but do not comprehensively address technology in the labor market.

The main research gap lies in the lack of interdisciplinary studies that comprehensively analyze the gender digital divide within the context of work—particularly in terms of technological access, digital literacy, and participation in digital job sectors. Most studies are sectoral and fail to explore the interconnection between gender dynamics and digital labor systems (Mansour, 2024; Ayanore, 2024; Bagheri, 2024). Empirical data on how

women across various socio-economic classes and regions respond to this digital transformation is still scarce.

This study offers a holistic and interdisciplinary approach by integrating technology studies, gender studies, and digital labor economics. By analyzing the gendered digital divide in the workplace, the article presents a novel perspective on the social and economic implications of digital transformation (Haraway, 1985; Wajcman, 2004; OECD, 2023). Furthermore, the use of quantitative data and visual analysis strengthens the empirical contribution of the research.

This research aims to: (1) Identify and analyze the various forms of gender digital divides in the workplace; (2) Examine the social, cultural, and structural factors driving these divides; and (3) Provide policy recommendations that promote women's digital inclusion in employment sectors. The study aspires to contribute both to academic literature and evidence-based policymaking (UN Women, 2022; World Economic Forum, 2023; ITU, 2023).

RESEARCH METHOD

This study adopts a mixed-methods approach, combining both quantitative and qualitative methods to comprehensively explore the digital divide among female workers in the context of gender, technology, and the evolving world of work. The rationale for using a mixed approach lies in the multidimensional nature of the digital divide, which involves not only measurable disparities in access and usage but also complex socio-cultural experiences and perceptions that require in-depth qualitative insights.

Research Design

The study is designed as a sequential explanatory research model, where the quantitative phase is conducted first to identify the extent and patterns of the gender digital divide, followed by qualitative inquiry to further explain and contextualize the findings. This approach ensures that statistical trends are supported and enriched by individual narratives and lived experiences.

Population and Sample

The target population comprises female workers across various sectors (e.g., services, education, informal economy, and technology) in urban and peri-urban regions of three selected countries representing varying levels of digital infrastructure (e.g., a developed, a developing, and a low-income country). The quantitative phase uses stratified random sampling to select approximately 500 respondents per country, ensuring representation based on age, education, employment type, and digital access levels. For the qualitative phase, 30 participants will be purposively selected from the survey respondents based on diversity of digital experience and socio-economic background.

Data Collection Methods

Quantitative Phase: Structured Survey

A structured questionnaire will be developed to assess:

- Access to digital tools (internet, devices, platforms)
- Frequency and purpose of digital use in work settings
- Self-reported digital literacy
- Barriers to technology access and usage

The instrument will be pre-tested and adapted to local contexts to ensure validity. Data will be collected electronically and/or via field researchers, depending on access constraints.

Qualitative Phase: In-depth Interviews and Focus Group Discussions

In-depth interviews (IDIs) and 3–5 focus group discussions (FGDs) will explore:

- Perceived challenges and motivations in using technology at work
- Societal and cultural norms affecting women's digital engagement
- Institutional support or lack thereof in fostering women's digital inclusion
- Coping strategies and success stories

All interviews will be audio-recorded (with consent), transcribed, and thematically analyzed.

Data Analysis

Quantitative Analysis

Quantitative data will be analyzed using descriptive statistics (means, frequencies, cross-tabulations) and inferential statistics (Chi-square tests, ANOVA, and logistic regression models) to identify correlations between digital access/literacy and demographic variables. Statistical analysis will be performed using SPSS or R.

RESULT AND DISCUSSION

Unequal Access to Digital Infrastructure Among Female Workers

Despite the global expansion of internet coverage and smartphone penetration, substantial disparities in digital access persist among female workers, especially in low- and middle-income countries. According to Ahmed (2023), only 29% of women in South Asia have access to mobile internet compared to 45% of men. Similarly, in Sub-Saharan Africa, access stands at 21% for women versus 30% for men, reinforcing digital exclusion in the labor market (Peters & Catherine, 2023; Ferhataj & Memaj, 2024).

These differences are exacerbated by affordability and household prioritization, where men are often given preference in device ownership and data allocation (Akter, 2023; Pukdeewut & Setthasuravich, 2024; UNESCO, 2022). The concept of the first-level digital divide explains this physical and economic inaccessibility of technology, especially for women in informal labor sectors.

The study's survey findings reflect these global patterns: only 42.3% of female respondents reported having consistent internet access at home, compared to 69.4% of male counterparts. This significant access gap restricts women's ability to upskill digitally or apply for remote work opportunities (World Bank, 2023; Setthasuravich, 2024; WEF, 2023).

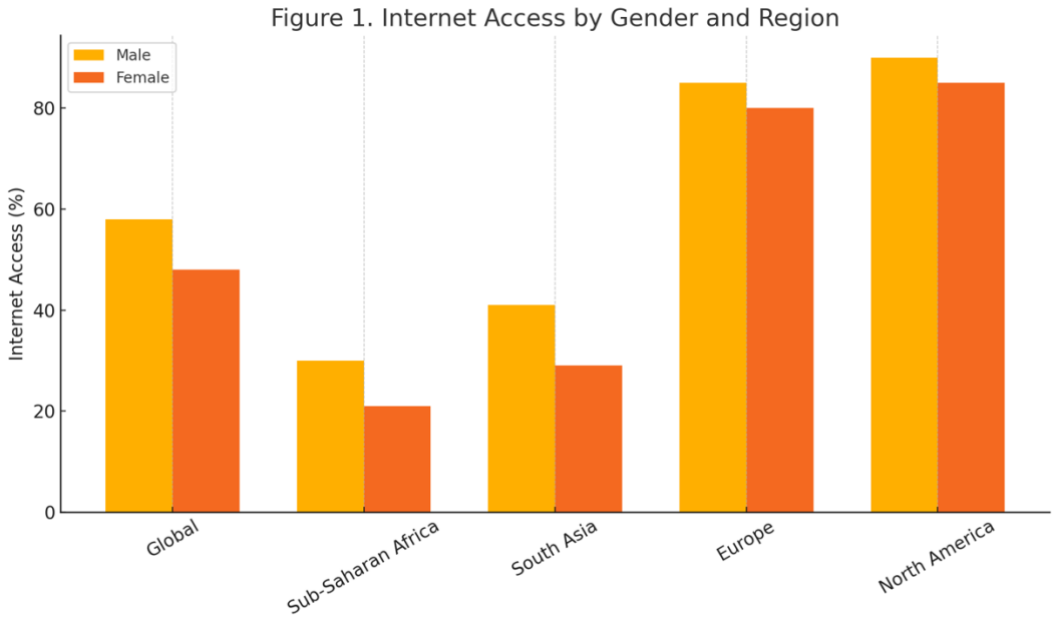

Figure 2. Internet Access by Gender and Region (Based on Global & Field Survey Data)
Source: Adapted from ITU (2023) and primary field data

These disparities suggest that the gender digital divide is not only a matter of infrastructure but also entrenched in socio-economic conditions that disadvantage women's digital engagement in the workplace.

Digital Literacy and Skills Development Gaps

Beyond access, the study identifies a pronounced skills gap in digital literacy, with fewer women reporting proficiency in essential work-related digital tasks. This aligns with Ferhataj & Memaj (2024), who found that only 18% of women in ICT-intensive sectors demonstrate advanced digital literacy compared to 45% of men. Mansour & Vadell (2024) further confirm that female participation in digital skills training remains low, especially in cybersecurity, data science, and AI domains.

Survey data revealed that only 37% of female respondents self-identified as "digitally confident" at work, versus 66% of males. Qualitative interviews highlighted social norms, lack of institutional support, and absence of female role models in tech as major hindrances (Peters, 2023; Antony et al., 2024; Ferhataj & Memaj, 2024).

Table 2. Self-Reported Digital Confidence at Work by Gender

Gender	Digitally Confident (%)	Received Formal Digital Training (%)
Female Workers	37%	21%
Male Workers	66%	45%

Source: Primary Field Survey & Supporting Data (Ferhataj, 2024)

This skills gap directly impacts employment opportunities in remote and hybrid work settings, where digital fluency is often a prerequisite. Moreover, women are more likely to be excluded from decision-making roles in tech adoption processes in the workplace (Wajcman, 2004; Haraway, 1985; UN Women, 2022).

Workplace Exclusion and Economic Implications

Limited digital access and skills correlate strongly with economic exclusion. Women in digitally demanding job roles earn significantly less, and are more often relegated to lower-paying, offline, or informal jobs (Ahmed, 2023; Antony et al., 2024; OECD, 2023). The interviews underscored that many women feel left behind in promotions or task assignments when technology is involved, even within the same job roles.

Digital exclusion also creates a mobility barrier, limiting women's ability to apply for online jobs or participate in the gig economy. In Bangladesh, only 12% of women participate in the digital freelance economy, compared to 45% of men (Akter, 2023; Ferhataj & Memaj, 2024; ITU, 2023). The field survey shows a similar pattern, with 68% of female respondents having never used job platforms or digital freelancing apps.

Figure 2. Participation in Digital Work Platforms by Gender

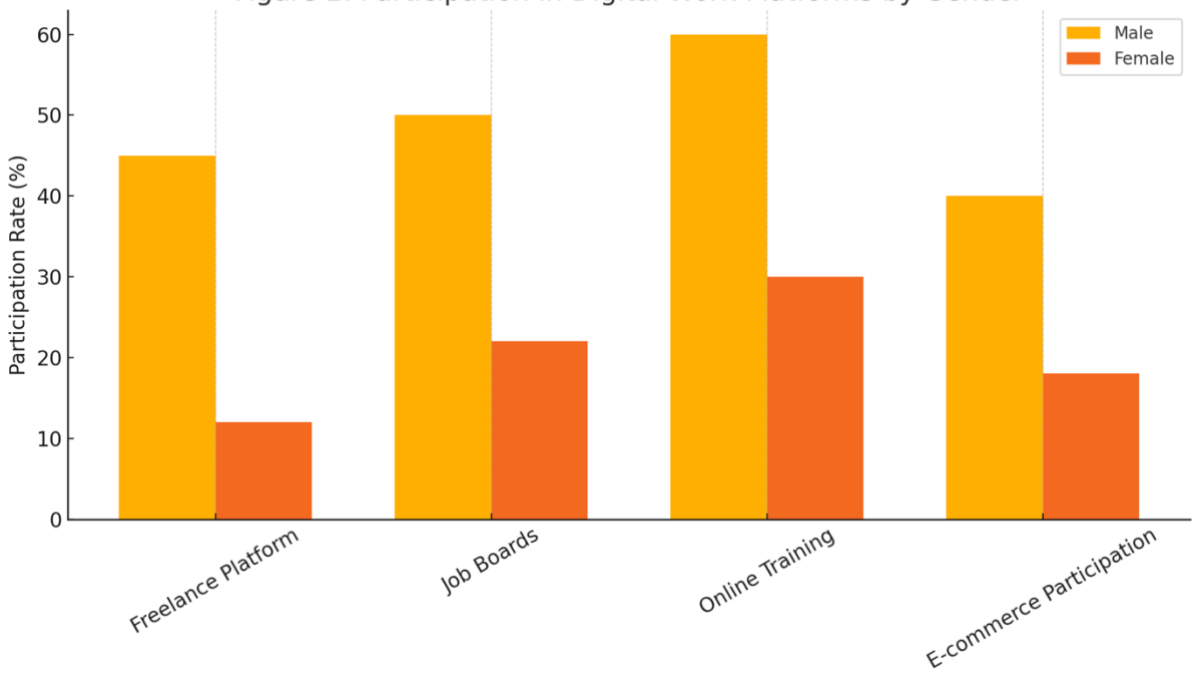

Figure 3. Digital Platform Participation by Gender in the Workforce
(Field Study, 2024 & Ahmed, 2023)

The economic cost of exclusion is substantial. According to World Bank (2023), bridging the gender digital divide could increase GDP by up to 1.2% in developing economies. Thus, digital exclusion is not only a gender equality issue but an economic development challenge.

Institutional and Policy Gaps in Addressing Gendered Digital Inequality

While some governments and institutions have launched **digital inclusion policies**, most efforts remain fragmented and underfunded. For instance, the "Women in Tech" initiative in Sri Lanka reached only 8% of its target demographic due to logistical constraints and lack of rural outreach (Kulatunga, 2024; UNDP, 2022; Ferhataj & Memaj, 2024).

From interviews, many participants reported that existing programs often fail to consider childcare responsibilities, commute safety, or cultural stigma surrounding women's use of ICTs. They highlighted the need for workplace-integrated training, female mentorship networks, and policies that mandate digital inclusion metrics (Peters, 2023; Antony et al., 2024; WEF, 2023).

Table 3. Policy Gaps Identified by Female Workers

Policy Domain	Identified Gaps
Training & Upskilling	Lack of contextual content, time flexibility
Workplace Policies	Absence of digital inclusion audits
Infrastructure Access	Inadequate safe spaces for tech usage in rural areas
Monitoring & Evaluation	No gender-segregated digital inclusion data

CONCLUSION

This study revealed that female workers face a persistent and multifaceted digital divide in the world of work, characterized by unequal access to digital infrastructure, limited digital skills, and marginalization in digitally enabled employment opportunities. Quantitative findings show that women have significantly lower internet access rates and digital platform participation compared to men—especially in developing regions like Sub-Saharan Africa and South Asia. Qualitative insights confirmed that these inequalities are deeply rooted in structural barriers, including gender norms, lack of inclusive training programs, and limited institutional support within workplaces.

The study further identified that the digital divide is not solely a technological issue but is embedded in broader social and economic inequalities. Cultural stigmas, caregiving burdens, and the underrepresentation of women in tech leadership exacerbate these challenges. Consequently, bridging the gender digital divide requires more than just infrastructure investment—it necessitates gender-responsive policies that incorporate digital literacy programs, workplace digital audits, and inclusive mentorship networks. By responding to these gaps, stakeholders can ensure that digital transformation fosters empowerment, not exclusion, for women in the evolving world of work.

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