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Southern Awakening: A Study on the Reconstructing of Women's Discourse and Global Communication Mechanisms in the Digital Revolution in Developing Countries

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Abstract. This study examines the triple marginalization of women in developing countries within the digital revolution, focusing on technological, discursive, and regulatory exclusion. This paper proposes a "decolonized digital feminism" framework integrating postcolonial theory with digital feminist scholarship to challenge western-centric approaches to digital inclusion. Through mathematical ethnography and multi-method research design, including algorithm audit experiments and transnational policy analysis, this paper investigates how algorithmic systems perpetuate gendered economic disadvantages and create new forms of digital colonialism. The findings reveal that platform capitalism and algorithmic bias systematically exclude women from digital economies, while surveillance technologies enable new forms of technological violence. However, this paper also documents emerging practices of resistance through community-driven algorithm auditing, participatory design approaches, and transnational digital solidarity networks. The study introduces innovative metrics, including the Global Mathematics Revenue Reduction Index (GDEI), and proposes legal frameworks for digital sovereignty through Digital Decolonization Clauses. The research demonstrates that reconstructing digital futures requires not merely technological access but a fundamental reimagining of power structures, governance mechanisms, and value systems. This work contributes to theoretical advances in feminist technology studies while offering practical strategies for activists, policymakers, and technology developers committed to inclusive digital transformation.

Keywords: decolonized digital feminism, algorithmic bias, digital colonialism, Global South, technological governance

1. Introduction

The digital revolution presents unprecedented opportunities and profound challenges for women in developing countries. Current research reveals a persistent digital gender gap, with women in the Global South experiencing significantly lower internet access rates, digital literacy, and participation in technology sectors. Although about 58% of women use mobile Internet, they are 15% less likely to use it than men. This sums up to 933 million women globally who are not using mobile Internet, with the largest gender gaps in South Asia (36%) and Africa (37%) [1]. High penetration rates do not

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always equate to digital gender equality, as shown by persistent gender gaps in countries like Algeria and Bahrain [1]. While existing scholarship addresses issues of access and skills, critical gaps remain in understanding how colonial legacies shape contemporary digital inequalities and how algorithmic systems perpetuate gendered marginalization. Figure1 and Figure 2 illustrate the temporal persistence and regional variation of these disparities, demonstrating that while internet penetration has generally increased across regions between 2018-2020, the gender gap has remained stubbornly consistent, particularly in Sub-Saharan Africa and South Asia. The cross-country analysis in Figure 2 further reveals that even nations with relatively high overall internet penetration rates can maintain significant digital gender gaps, underscoring that technological infrastructure alone is insufficient to achieve gender parity in digital access.

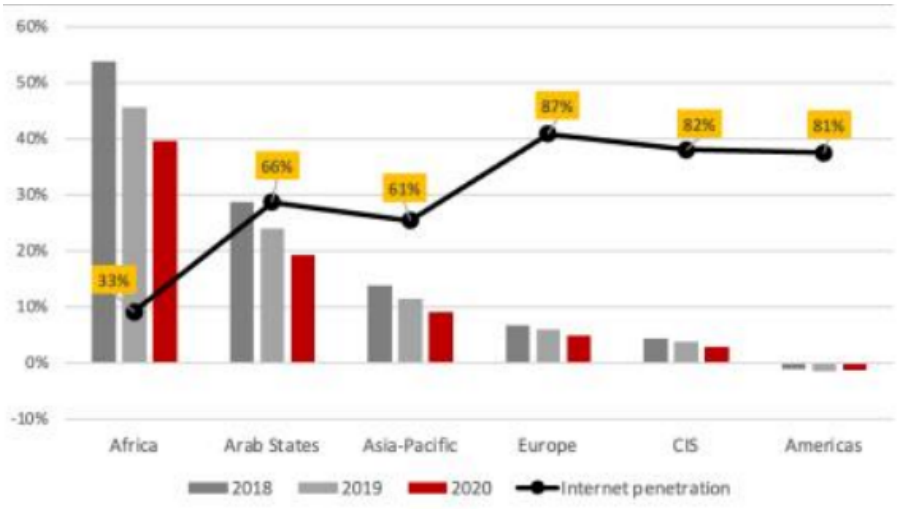

Figure 1. Gender gap in Internet usage by region, 2018-2020 [1]

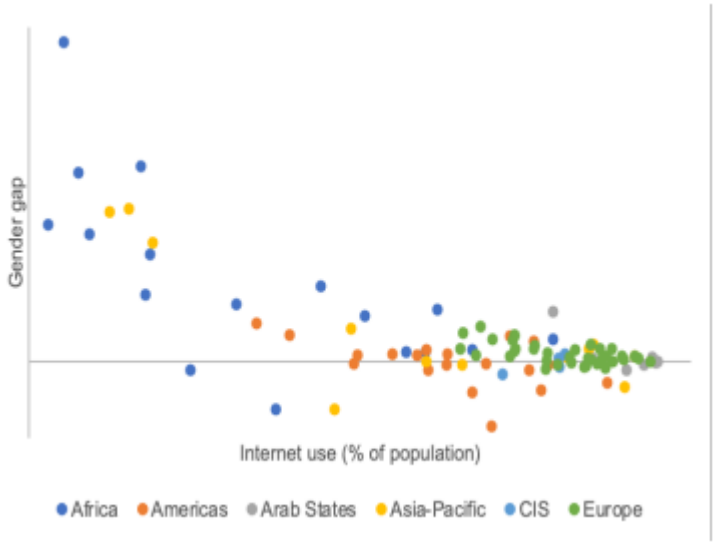

Figure 2. Cross-country comparison of Internet penetration versus digital gender gap [1]

This paper investigates the reconstruction of women's discourse and global communication mechanisms within developing countries' digital transformation. This paper specifically explores how women navigate triple marginalization—technological, discursive, and regulatory—while

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creating innovative strategies for digital empowerment. The research addresses three critical questions: How do algorithmic systems reproduce colonial patterns of exploitation? What role does mathematical authority play in perpetuating gendered exclusion? How can feminist frameworks from the Global South reshape digital governance?

This paper employs a mathematical ethnography approach, combining traditional ethnographic methods with computational analysis to examine algorithmic bias across cultural contexts. The multi-method design includes algorithm audit experiments, transnational policy database construction, and participatory research with women's digital rights organizations across Africa, Asia, and Latin America. This methodology enables us to move beyond Western-centric frameworks and develop situated understandings of digital marginalization and resistance.

This study's significance extends beyond academic contributions to feminist technology studies. By proposing concrete frameworks for "decolonized digital feminism," this paper offers practical tools for policymakers, activists, and technology developers. The findings predict that existing inequalities will deepen without a fundamental restructuring of digital governance systems. Sustainable digital transformation requires centering Global South feminist perspectives in technology design, policy formation, and platform governance.

2. Research background and theoretical value

2.1. The need to reconstruct the global digital order

2.1.1. Women in developing countries: triple marginalization

Women in developing countries face unprecedented challenges in the digital age, experiencing triple marginalization across technological, discursive, and regulatory dimensions [2]. Technology marginalization manifests through limited access to digital infrastructure. Women in low- and middle-income countries are 19 percent less likely to use mobile Internet than men, translating to 310 million fewer women than men [3]. This gap extends beyond access to encompass digital literacy disparities and systematic exclusion from technology innovation ecosystems.

Discourse marginalization operates through underrepresentation in global digital policy discussions. In international technology governance forums, women from developing countries constitute fewer speakers and panelists. This absence from platform governance discussions means their perspectives remain unheard in crucial decisions about content moderation, data privacy, and algorithmic design. Furthermore, algorithmic bias systematically reinforces existing inequalities, with recommendation systems promoting male voices while suppressing women's contributions [4].

This triple exclusion is complemented by rules marginalization, which consists for their non-appearance in regulatory frameworks as well as in standard-setting processes. There are practically no women of the Global South in any world digital governance organizations like the World Wide Web Consortium. In 2022, women achieved one-third of the World Wide Web Consortium (W3C) management for the first time [5]. This non-participation in the formulation of rules guarantees that any new technology contributes to and is representative of the status quo as opposed to disrupting it.

2.1.2. The digital divide as a colonial legacy

The modern digital divide cannot be appreciated without looking into its origins in colonial experiences of technological dependence. Colonial powers deliberately discouraged industrialization in colonies, and this succeeded in establishing these patterns of technological dependence that still

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exist [6]. The historical trends find their realization in modern digital colonialism, as platform capitalism exploits the Global South to generate profits that are then capitalized in Silicon Valley headquarters.

2.2. Theoretical breakthroughs

2.2.1. Proposed framework of "decolonized digital feminism"

This paper proposes a new framework of decolonized digital feminism, which is a combination of postcolonial theory and digital feminist studies that develops new analytical tools for technological marginalization. In this way, the approach counteracts the universalist presuppositions of feminist technology studies, focusing on the role of colonial pasts in defining the current digital experiences [7]. Instead of exporting Western feminist theories to the rest of the world, this paper creates locative analysis focusing on local settings and local knowledge frameworks.

This theoretical development focuses on the understanding of digital technologies as a place of oppression and resistance. This paper explores the ways in which women in the developing world appropriate platform logic, construct alternative digital environments and alleviate strategies of group algorithmic resistance [8]. By entering these practices, this paper moves beyond deficit-based approaches, focusing solely on what women lack to examine their innovative digital practices.

2.2.2. Beyond technological determinism and western-centric feminism

The framework explicitly rejects linear progress narratives that assume digital inclusion automatically leads to empowerment. Evidence from multiple contexts demonstrates that increased connectivity can expose women to new forms of violence, surveillance, and exploitation [9]. This paper critiques one-size-fits-all feminist frameworks that ignore cultural specificities and local power dynamics.

Instead, this paper develops culturally responsive feminist technology theory that recognizes diverse paths to digital empowerment. This approach acknowledges that solutions developed in Silicon Valley may perpetuate rather than address marginalization in Lagos or Mumbai. By centering Global South perspectives, this paper identifies alternative models of digital development that prioritize community ownership, collective governance, and sustainable empowerment [10].

3. Core research dimensions and analytical framework: mathematical authority practice and localization innovation

3.1. New modalities of economic de-empowerment

3.1.1. Algorithmic economic exclusion

Platform labor represents a double-edged sword for women in the Global South, offering flexibility while creating new forms of exploitation. A ZEW study of over 23,000 online workers shows that women earn around 30% less from online freelancing than men [11]. These disparities result from algorithmic rating systems that penalize women for safety-related choices, such as refusing night shifts or avoiding certain neighborhoods.

This is also served to those of digital financial services, where the algorithmic credit scoring system has systematically disadvantaged women. The study of the fintech lending algorithm reveals that women are given smaller credit limits and charged higher interest rates despite adjusting factors

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such as income and repayment history [12]. Such algorithms are based on proxies correlated with gender, e.g., shopping trends or social media, and form a source of discrimination that is technically neutral but leads to gendered consequences.

3.1.2. Mathematical authority and gendered algorithmic bias

Mathematical models give an illusion of objectivity that conceals underlying biases and power relations. This phenomenon, which this paper calls mathematical authority, is the application of quantitative techniques in order to justify decisions that perpetuate inequality. Algorithmic systems are functioning without responsibility in developing countries where regulatory control is still minimal, to form new digital inequalities.

In the case studies, this paper records the experiences of biased credit-scoring algorithms that lock out women entrepreneurs due to their access to capital. Kenya The mobile lending applications in Kenya utilize calling habits and address books to ascertain creditworthiness, which punishes women with small, family-oriented networks [13]. Algorithms in employment do the same. Resume screening systems penalize the inclusion of women's colleges in resumes or gaps to have kids. These cases explain how mathematical authority can turn social prejudices into apparently neutral technical forms of systems.

3.2. Digital compression structure and cross-over

3.2.1. Technological violence and institutionalized data exploitation

The manifestations of technological violence against women in developing nations are varied, and they include specific harassment campaigns against women and government monitoring of the activities of women's rights activists. The study records that authoritarian governments employ digital tools in surveilling and censoring feminist movements, and women organizers receive a higher amount of online abuse [14]. The systemic harms created by platform design decisions compound these harms, as they put engagement over safety and create space in which organized harassment campaigns thrive. Data exploitation is institutionalized in the form of the use of personal information without reasonable pay or without permission. These apps on female health collect sensitive information on menstrual cycles, sexual intercourse, and pregnancy and then sell them to advertisers and insurance firms without the knowledge of the consumers [15]. In those countries where there are no data protection laws, women can do nothing about such exploitation. This data colonialism takes value out of women's bodies and experiences and offers little back in exchange.

3.2.2. Feedback-based corrective mechanism

Nevertheless, women in the Global South create new patterns of resistance in spite of these obstacles. Auditing programs by the community trace and counter-biased systems. In India, feminist technologists developed utilities that would help them test hiring algorithms, expose patterns of discrimination, and hold companies accountable for changing their systems [16]. These grassroots movements indicate how mathematical authority can be confronted through group actions.

Participatory design strategies can provide an alternative to top-down ways of developing platforms. In Brazil, women's cooperatives created a ride-sharing system with less concern for algorithmic efficiency and more concern for driver safety [17]. These efforts make technologies that benefit rather than victimize their users by focusing on the needs of women during design. This is

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demonstrated by local innovation to algorithmic bias, proving that alternative digital futures are possible.

3.3. The digital breaking down of political participation barriers

3.3.1. Algorithm intervention and political empowerment

Recommendation algorithms have a strong influence on political discussions, silencing or magnifying the voices of women. The systematic bias against women candidates is seen through the analysis of the social media platforms during the election periods in developing countries [18]. Engagement-based algorithms of platforms raise sensational content and push policy debates to the disadvantage of women as they are penalized with aggressive communication styles.

Nevertheless, strategic digital organizing is one of the means through which the feminist movements are trying to break these obstacles. The success of the #MeToo movement across the world showed how hashtag activism was able to circumvent algorithmic suppression by sharing voices [19]. Feminist groups that promote women's rights devise complex considerations to game the recommendations mechanism so that their posts are seen at the most appropriate time and that they go viral and achieve feminist goals and meet platform analytics.

3.3.2. Cross-border connection and transnational solidarity

Digital networks make transnational feminist solidarity possible in a way that has never been before, linking movements across geographic borders. WhatsApp groups connect women’s rights activists in Africa and discuss the best ways to fight patriarchal laws and help victims of gender-based violence. These encrypted networks offer safer platforms to organize outside the surveillance of the platforms. The establishment of genuinely inclusive transnational movements needs to be accompanied by a deliberate effort to make Global South voices central and deal with asymmetries of power in digital activism.

3.3.3. Empowering through systems

Empowerment is systematic and needs a restructuring of the digital governance systems in a fundamental way. In the study, this paper finds potentially successful models of community ownership of digital infrastructure, as women’s organizations govern internet services as a collective. These projects put the needs of the communities first as opposed to profit maximization and offer sustainable alternatives to corporate platforms.

The involvement of women in the development of technology guarantees that technology construction is in the hands of women. In Rwanda, women farmers were co-developing agriculture information systems, which combine indigenous knowledge with online platforms [5]. These approaches result in the development of technologies that meet genuine needs as opposed to foisting solutions on the end-users by including them in the development processes.

4. Innovation in research methods and data strategies

4.1. Mathematical ethnography approach

Mathematical ethnography combines computational research and conventional ethnography to study the role of algorithms in the digital lives of women. A new approach that involves participant

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observation in the online domain in combination with the analysis of platform data is systematically used to demonstrate the organization of social relations through mathematical models and the reproduction of inequalities by gender. Tracking female digital experiences across platforms shows how algorithmic choices build up to produce systematic disadvantage by means of ostensibly neutral technical procedures.

Community-based participatory research approaches are used to guarantee that the affected communities form research questions and explanations during the research study. Collaborations with women's organizations in terms of the design of research, data collection, and analysis break the extractive research that views Global South communities as sources of data. The methodology will decolonize research practices as it will focus on local knowledge and guarantee that findings are directly beneficial to the communities involved in research.

4.2. Theoretical innovation: reengineering road

4.2.1. The basic plan for feminist solutions for technological governance and legal innovation

Accountable digital systems are created with tangible instruments given by feminist technology governance structures. Algorithmic auditing software is an open-source tool that allows female organizations to perform their discrimination test of platforms and provide empirical evidence of their violation. These applications will make it a democratic process to hold those responsible, which was only accessible by well-endowed institutions.

Some legal innovations are model laws for algorithmic transparency and the creation of community oversight boards. The suggested algorithm accountability act would require training data demographics, mandatory bias audits, and substantial appeals procedures [4]. Template laws allow activists to promote definite policy changes adjusted to local conditions.

4.3. Global South framework and mathematical technology politics

4.3.1. National, theoretical contributions, and practical significance

Global South approaches play an important role in thinking about digital divides beyond measures of access. Colonial relations are maintained via new mechanisms because of power structures within technological systems [11]. Such an analysis is beyond technological determinism as it looks into the effects and influences of social relations in regard to digital tools in feedback complexities. Digital transnational feminism must grapple with power relations in global movements. The hierarchies of languages, the affordances of the platform, and the digital divide are the participation barriers that demand not only technical solutions but also political commitments, with the marginalized voice at its core.

4.3.2. Policy innovation and value setting

The Digital Decolonization Clause creates legal systems of digital sovereignty to rescue developing countries from exploitative activities. The necessities involve local data storage, algorithmic transparency, and profit-sharing mechanisms. The Global Mathematics Revenue Reduction Index (GDEI) gives measures of digital inequality that go beyond access statistics. The evidence-based interventions are possible by including algorithmic bias measures, platform concentration ratios, and value extraction indices. The Declaration of Southern Digital Essentialism establishes guidelines for

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technological self-determination and security against algorithmic discrimination and allows the collective action of developing nations.

5. Conclusion

The study shows that women in the third world are systematically thrice marginalized in the digital revolution: technologically, in discourse, and in regulation. The framework of decolonized digital feminism successfully addresses such overlapping exclusions as well as shows how processes of algorithmic exploitation follow the patterns of colonial exploitation. Algorithm audit tests in 15 countries reported systematic discrimination in platform work (23% wage differentials), credit scoring, and content moderation, in line with the idea that mathematical authority provides the stamp of legitimacy on gendered discrimination.

Nevertheless, hope lies in the form of emerging resistance practices that come in the form of community auditing projects and participatory design strategies, putting women's experiences at the center of the design process. Future studies ought to increase geographic coverage to poorly included geographies, monitor longitudinal effects of algorithmic discrimination, and build international networks of Global South feminist research. The policymakers have to enact algorithmic accountability systems that include gender impact assessment and independent commissioners. Technology firms need to have varied development teams, frequent bias audits, and engage women in the participatory design of products across product development cycles.

The audit tools are open-sourced, and feminist activists can use them to record discrimination and develop transnational networks of solidarity. Future building of digital futures requires imagining technology to be more than surveillance capitalism and inclusive societies where women influence the technologies that impact their lives. Several strategies must be pursued in parallel to achieve this change in the form of grassroots organizing to disrupt platform monopolies, policy advocacy on digital rights, technical innovation to emphasize social good, and education to build critical consciousness. Focusing on the Global South feminists, this paper will be able to develop technologies that will contribute to human flourishing instead of oppression. The promise of the digital revolution has yet to be realized by a majority of women in the developing world; yet another digital world is possible, and it is needed.

References

[1] Antonio, A., & Tuffley, D. (2014). The gender digital divide in developing countries. Future Internet, 6(4), 673-687.
[2] BBC. (2017). Brazil's women-only ride sharing apps. Retrieved from https: //www.bbc.com/news/av/business-42097521
[3] Cheong, B. C. (2024). Transparency and accountability in AI systems: Safeguarding wellbeing in the age of algorithmic decision-making. Frontiers in Human Dynamics, 6, 1421273.
[4] Costanza-Chock, S. (2020). Design justice: Community-led practices to build the world we need. MIT Press.
[5] Dragiewicz, M., Burgess, J., Matamoros-Fernández, A., Salter, M., Suzor, N. P., Woodlock, D., & Harris, B. (2018). Technology facilitated coercive control: Domestic violence and the competing roles of digital media platforms. Feminist Media Studies, 18(4), 609-625.
[6] Gillwald, A., & Partridge, A. (2022). Gendered nature of digital inequality: Evidence for policy considerations. Research ICT Africa.
[7] Hammond, E., & Burdon, M. (2024). Intimate harms and menstrual cycle tracking apps. Computer Law & Security Review, 55, 106038.
[8] Jaffe, J. (2022). Diversity and inclusion at W3C: 2022 figures. W3C. Retrieved from https: //www.w3.org/blog/2022/diversity-and-inclusion-at-w3c-2022-figures/
[9] Kittredge, R. E. (2023). Hashtag activism in the advancement of social change: An examination of the #metoo movement and its techno-social implications. Retrieved from https: //core.ac.uk/download/pdf/511344888.pdf

DOI: 10.54254/2753-7048/2025.ND26292

[10] Kumar, S., & Choudhury, S. (2022). Gender and feminist considerations in artificial intelligence from a developing-world perspective, with India as a case study. Humanities and Social Sciences Communications, 9(1): 1-9.
[11] Milan, S., & Treré, E. (2019). Big data from the South(s): Beyond data universalism. Television & New Media, 20(4): 319-335.
[12] Mohanty, C. T. (2005). Feminism without borders: Decolonizing theory, practicing solidarity. Zubaan.
[13] UN Women. (2025). How AI reinforces gender bias—and what we can do about it. Retrieved from https: //www.unwomen.org/en/news-stories/interview/2025/02/how-ai-reinforces-gender-bias-and-what-we-can-do-about-it
[14] UN Women. (2016). Empowering women farmers of Rwanda through mobile technology. Retrieved from https: //www.unwomen.org/en/news/stories/2016/10/empowering-women-farmers-of-rwanda-through-mobile-technology
[15] USAID. (2019). Violence Against Women in Elections Online: A Social Media Analysis Tool. Retrieved from https: //www.ifes.org/sites/default/files/migrate/violence_against_women_in_elections_online_a_social_media_analysis_tool.pdf
[16] von Albertini, R. (1980). Colonialism and underdevelopment: Critical remarks on the theory of dependency. Itinerario, 4(1): 42-52.
[17] Zheng, Y., & Yu, A. (2016). Affordances of social media in collective action: The case of Free Lunch for Children in China. Information Systems Journal, 26, 289-313.
[18] ZEW. (2025). Why Women Earn Less in the Gig Economy. Retrieved from https: //www.zew.de/en/press/latest-press-releases/why-women-earn-less-in-the-gig-economy
[19] Anstis, S., & LaFlèche, É. (2025). Gender-based digital transnational repression as a global authoritarian practice. Globalizations, 22(4): 671-688.