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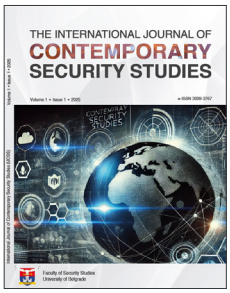

Article

Advancing Faster than Male: Female Achievement and Employment Outcomes in Bangladesh

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ABSTRACT

This study examines Bangladesh's paradoxical gender progress, where women's gains in education (50.8% pre-primary enrollment, female-dominated tertiary ratios) and employment (42.7% labor force participation) contrast with persistent rural-urban divides in technology access and leadership representation. National datasets from 2000 to 2023 are analyzed, revealing that while urban women benefit from digital and educational investments, rural women face infrastructural barriers despite high female employment in sectors such as garments. Linear empowerment narratives are challenged by findings highlighting male disengagement (35.2% NEET rates) alongside women's visibility. Reforms prioritizing rural digital equity and gender-balanced vocational training are recommended to translate participation into substantive power.

KEYWORDS

Gender equity; rural-urban disparities; feminist development studies.

1. Introduction

Bangladesh has undergone a remarkable socio-economic transformation in recent decades, particularly in education, employment, and technology. For instance, the National Women Development Policy emphasizes female-exclusive programs, such as a 33% parliamentary representation quota and gender-responsive budgeting for women's development. While these initiatives have promoted female advancement, there are no comparable measures for men, despite data showing significant challenges for young men, including a 35.2% NEET (Not in Education, Employment, or Training) rate (UNDP, 2023).

Women, who once faced significant social and structural barriers to education and formal employment, are now making significant strides, often surpassing men on key indicators of progress. However, women's political representation remains largely symbolic. Despite holding 33% of parliamentary seats through quotas, unclear rules, partisan selection, and limited resources restrict their decision-making power (Prodip, 2021). This paper explores how, against the odds, women are not just catching up but, in many cases, outshining men, reshaping the country's gender dynamics.

According to the UN Gender Snapshot 2023, Bangladesh leads South Asia in female tertiary enrollment (1.3:1), driven by gender-focused SDG policies (SDG 5.c.1). However, this success has coincided with declining male participation in vocational training (only 17% male trainees in 2022) and rising male NEET rates (35.2% for ages 25–29), signaling an SDG-driven gender asymmetry (UN Women and UN DESA 2023; UNDP, 2023).

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This 35.2% male NEET rate creates a dual challenge: sustaining women's progress while preventing systemic male marginalization in Bangladesh's workforce. Bangladesh's 35.2% male NEET rate (ages 25-29) reveals a dangerous imbalance - gender progress is leaving men behind in education and work (UNDP, 2023). This growing disparity threatens both social stability and economic growth potential.

A snapshot of Bangladesh's current educational landscape illustrates this striking shift. Girls now make up 50.8% of total enrollment in pre-primary education (1,716,403 girls vs. 1,667,323 boys) across 104,517 institutions. The gender gap is even more pronounced in government primary schools, where girls outnumber boys by 6.4% (845,153 vs. 790,657), according to the Bangladesh Ministry of Education (2023, Table 4). These numbers reflect a broader trend: girls now consistently outperform boys in primary and secondary enrollment, and are increasingly dominant in national academic assessments.

Beyond education, women's participation in diverse sectors such as healthcare, education, and business continues to grow. Female students are also entering higher education at increasing rates, often achieving better results than their male counterparts. Between 2016–17 and 2022, the female labor force in Bangladesh increased significantly from 20.0 to 25.93 million, while the male labor force rose only slightly from 43.5 to 47.48 million. Similarly, the female labor force participation rate rose from 36.3% to 42.68%, while the male rate declined slightly from 80.5% to 79.71%, indicating a narrowing gender gap and growing female engagement in the workforce (BBS, 2023, pp. 89–91, Table 3.01). Bangladesh's male youth face a NEET (Not in Education, Employment, or Training) crisis (27.1% overall, 35.2% for ages 25–29), while females advance educationally (UNDP, 2023, p. 64). Systemic failures—such as a 2.7/5 skills-training score (UNDP, 2023, p. 63) — leave males disproportionately in informal work. This contrast further highlights the structural dynamics that are enabling women to surpass men in key developmental indicators.

The 2023 UFGE Annual Report highlights initiatives in Bangladesh to boost women's economic empowerment, focusing on overcoming labor force barriers, addressing workplace sexual harassment, and improving access to markets and digital tools (World Bank, 2023). These efforts aim to enhance women's economic standing and expand opportunities in higher-value sectors.

Despite this progress, barriers persist, particularly in leadership roles, digital inclusion, and access in rural regions. *Despite progress, socio-cultural norms and systemic inequities, particularly in access to technology, continue to constrain women's opportunities* (Dada et al., 2025; Garba & Akaan, 2025; Janković et al., 2025; Mančić, 2025). *Future policy must therefore maintain women's gains while launching vocational programs and job incentives specifically for disengaged male youth (Cvetković et al., 2018; Cvetković et al., 2023a). The UNDP's (2023) SDG gap analysis reveals a critical blind spot: current policies uplift urban women while rural populations lag, demanding an intersectional recalibration.*

This study aims to investigate the socio-economic, cultural, and policy factors that have contributed to women's rapid progress in education and employment in Bangladesh. It examines how institutional reforms, community support, and targeted initiatives have enabled women to overcome deep-rooted inequalities. At the same time, it highlights ongoing challenges and proposes evidence-based strategies to ensure lasting gender equity. The findings are intended to support national policymakers, educators, and development practitioners working toward inclusive and sustainable progress.

2. Research Problem Statement

Bangladesh has witnessed a transformative shift in gender dynamics, with females now surpassing males in educational attainment (55% secondary enrollment) and workforce participation in urban sectors such as healthcare (60%) and textiles (70%). However, this progress masks stark rural-urban disparities and systemic inequities that continue to perpetuate gender inequality. Rural women remain constrained by entrenched socio-cultural norms (e.g., early marriage, prioritization of male education), infrastructural gaps (e.g., limited digital access, poor educational facilities), and structural barriers in employment (e.g., a 25% wage gap, only 12% representation in leadership roles).

While policy interventions such as stipend programs and digital literacy initiatives have significantly contributed to urban success, their effectiveness in rural contexts remains underexplored. This study addresses two critical gaps:

1. Why do rural regions continue to resist gender-equitable outcomes despite national progress? How do cultural and economic factors interact to sustain disparities in education, employment, and technology access?
2. How can policy frameworks be redesigned to bridge the rural-urban divide and ensure equitable female advancement in leadership roles, digital inclusion, and economic empowerment?

By analyzing Sherpur Sadar Upazila's rural-urban context through a mixed-methods approach, this research identifies localized drivers of inequality. It proposes strategies to align Bangladesh's gender progress with inclusive, sustainable development goals.

3. Literature Review

The rapid advancement of women compared to men in education, employment, higher studies abroad, and technology use is a global phenomenon, supported by extensive research (Lina, 2023), which indicates that females have outpaced males in academic performance, with girls outperforming boys in secondary school completion and national exams in Bangladesh and other countries. This performance gap is also observed in other regions, where girls exhibit stronger academic persistence and success. Karmaker & Rahman (2024) suggested that girls are more likely to complete higher education, especially in subjects traditionally dominated by men, reflecting an increasing trend of female academic success worldwide (Vooren et al., 2022). Studies by Karmaker & Lemon (2024) and Hossain et al. (2023) confirmed that females are now surpassing males in educational attainment across various levels. (Ahmed et al., 2021) revealed that females consistently represent a higher percentage of students in tertiary education in many countries, though progress remains gradual.

The trend of females advancing faster than males is not only restricted to academic achievements but also extends to international higher education (Jubaer et al., 2021), showing that women are increasingly represented in global academic spaces, studying abroad at higher rates than men in many regions. (Mou, 2024) depicted a trend driven by both educational reforms and international scholarship programs aimed at empowering women. Furthermore, Sultana et al. (2024) and Naher et al. (2019) reported that as women pursue international education, they are increasingly returning to contribute to their home countries' socio-economic development.

In the job market, females are making strides, particularly in sectors such as healthcare, education, and information technology (Ahmed & Hyndman-Rizk, 2020) delineated that women are increasingly represented in the workforce and are advancing into leadership positions, even in fields that have traditionally been male-dominated (Afrin et al., 2024) highlighted the increasing participation of women in science and technology, while data from the World Economic Forum (2022) underscores the growing presence of women in leadership roles (Bai et al., 2024) described how women have disproportionate access to ICTs and digital opportunities (Kukulska-Hulme et al., 2023) delineated how versatile technologies can help improve educational achievements. Furthermore, Nawar et al. (2024) and Mimi et al. (2022) explained that in the tech industry, women are taking on entrepreneurial roles, shaping the future of digital platforms and e-commerce. According to the International Telecommunication Union (2021; Safari et al., 2024), women's use of technology, particularly in digital learning and business, has increased significantly. They are driving innovation in sectors like e-commerce and digital content creation, areas that were once heavily male-dominated.

Despite these advances, barriers still exist that hinder the full participation of women, particularly in rural regions (Morshed, 2023; Karmaker & Lemon, 2024; Arafat et al., 2021; Rahman & Rahman, 2023; Streatfield et al., 2023) delineated that traditional gender roles, societal expectations, and cultural norms often prevent girls and women from accessing education and employment opportunities. For example, Karmaker & Rahman (2024) opined that in rural areas of Bangladesh, girls are discouraged from pursuing higher education due to household responsibilities and cultural expectations. Nonetheless, government initiatives and international aid aimed at bridging the gender gap in education and employment are gradually making a difference (Khandker et al., 2021). This shift is further fueled by policy changes that promote gender equality, including scholarship programs and quotas for women in education and the workforce.

Nazrul (2024) described the growing focus on women's empowerment, reflected in the increasing presence of women in political and academic leadership positions, signaling a broader societal change. (Dhar, 2024) explained that as a result, the gap between males and females is narrowing, and in many contexts, women are

now leading the charge in higher education, employment, and technology. (Emon and Nipa, 2024; Nazrul et al., 2024) suggested that despite the continued challenges, the trend of female advancement in education, employment, and technology is undeniable and accelerating. (Khatun et al., 2024) opined that the positive trajectory for women in these sectors, driven by both policy changes and socio-cultural shifts, points to an increasing global focus on gender equity. While national-level progress has drawn attention, a broader look at regional and SDG-based data reveals an emerging pattern of gender asymmetry, particularly in how development goals have impacted male participation and outcomes. The UN's *Gender Snapshot 2023* reveals a paradoxical outcome of SDG implementation in Bangladesh: while the country leads South Asia in female tertiary enrollment (1.3:1 ratio, SDG 4.5.1) due to gender-targeted policies (SDG 5.c.1), this success has coincided with systemic neglect of male educational retention and labor market integration UN Women and UN DESA (2023:32–33) The data shows:

In the context of education, SDG 4.3.1 highlights a concerning decline in male participation in vocational training programs, with only 17% of trainees being male compared to 83% female in 2022 NGO-run initiatives. Similarly, SDG 4.1.1 data shows that between 2015 and 2022, boys' proficiency in mathematics dropped by 8%, whereas girls' performance improved by 5%, indicating a widening academic achievement gap. These disparities carry over into employment outcomes. Despite significant progress under SDG 5.5.2 in promoting female managerial representation now at 28%, male youth are increasingly marginalized in the labor market, with NEET (Not in Education, Employment, or Training) rates reaching 35.2% among males aged 25 to 29 (UNDP, 2023). Additionally, SDG 5.4.1 data reveal persistent cultural norms shaping gender roles: men spend only 1.2 hours per day on unpaid care work, in stark contrast to women's 4.9 hours, reflecting a societal reluctance to adapt male roles to shifting gender dynamics. Together, these indicators suggest that while female advancement is evident, male disengagement is becoming a structural challenge in Bangladesh's development trajectory. Existing literature highlights that gender equality mechanisms often fail to empower women effectively (Prodip, 2021). Critiques Bangladesh's reserved seat system, highlighting unclear mandates and limited party support for women, which aligns with Fraser's recognition-redistribution dilemma, where symbolic inclusion lacks real political power. Peláez Sánchez et al. (2023) pointed out that the integration of women into global education and employment sectors, along with their increasing use of technology, marks a transformative moment in global gender dynamics.

4. Methods

4.1. Study Area

The study was conducted in Sherpur Sadar Upazila, Sherpur, Bangladesh (25°00' 0.00" N, 90°01' 0.12" E), a region characterized by stark rural-urban disparities in education, employment, and access to technology. Recent progress in female advancement provides an ideal context to explore how socio-economic factors and policy interventions shape gender dynamics.

4.2. Research Design

This study employed a convergent mixed-methods design, integrating qualitative and quantitative approaches to examine the progress of women in education, employment, and technology in Bangladesh, surpassing that of men.

4.3. Participants and Recruitment

A total of 207 respondents participated in this study, all of whom were students from secondary and higher secondary institutions and collegiate universities across Sherpur's 8 institutions in Bangladesh. The author and the Institutional Review Board (IRB) assembled the group of respondents with assistance from local authorities or institutions. Participants were recruited using random, convenience, and snowball sampling to ensure representation from diverse marginalized communities.

4.3.1. Breakdown of Participants

Students (n = 207): Recruited from seven institutions: urban - 1 collegiate university + 5 schools; rural - 1 college + 1 school in Sherpur, Bangladesh.

Questionnaire and Focus Group Discussion (FGD) Members (n = 25): Consisted of teachers, policymakers, local education administrators, and a research scholar to both structured questionnaires and FGDs.

Participation was voluntary, and no compensation or transportation arrangements were provided. Participants traveled independently to the study locations.

4.4. Development of Data Collection Instruments

4.4.1. Surveys and Questionnaires

The survey instrument was developed based on a literature review of women surpassing men, digital equity frameworks, and studies of the impacts of government policies. It consisted of 30 structured questions, including 11 Likert-scale questions, categorized into the following themes:

Survey:

Structure: 30 questions (11 Likert-scale items, 19 open-ended) assessing:

- Educational access (e.g., stipend utilization).
- Employment barriers (e.g., wage gaps).
- Technology usage (e.g., smartphone ownership).
- Pilot Testing: Conducted with 10 respondents to refine clarity (Cronbach's $\alpha = 0.79$).

4.4.2. Interview and FGD Protocols

The semi-structured interviews and FGDs were designed to gather in-depth qualitative insights. Tools: Semi-structured guides focused on:

Cultural norms (e.g., early marriage).

Policy effectiveness (e.g., digital literacy programs).

Language: Conducted in Bangla, translated/transcribed by bilingual researchers.

Sites:

- Urban computer training centre (Sherpur Sadar).
- Rural college digital learning centre.
- Urban secondary school computer lab.

Interviews (n = 17) and FGDs (n = 18) were conducted in the native language, recorded with participant consent, and later transcribed and translated into English for analysis.

4.4.3. Data Collection Procedures

Surveys were administered both online and in-person to accommodate participants with limited internet access. Interviews and FGDs were conducted in local schools, government offices, and community centers to ensure a comfortable environment for discussion.

4.4.4. Ethical Approval

Institutional Review Board (Memo no.: NAMC/01-02-24.00.04.00029) and Sherpur Sadar Upazila Committee for data collection at three participating sites in Sherpur District: an urban computer training center, an urban secondary school, and a rural college. All participants provided written informed consent after receiving verbal and written explanations in Bangla. The IRB verified that:

1. No institutional or participant identifiers would be disclosed
2. Data would be stored on encrypted servers with access limited to the research team
3. Participation was voluntary, with no compensation provided to avoid coercion

The approval included specific authorization for:

- Audio recording of interviews/FGDs
- Use of anonymized survey responses
- Accessibility accommodations for disabled participants

4.5. Data Collection Procedures

All data collection occurred at three strategically selected sites in Sherpur District:

- An urban computer training center (Sherpur Sadar Upazila)
- An urban secondary school's computer lab
- A rural college's main digital learning center

Surveys were administered in person across multiple scheduled sessions (n=207 total). Interviews (n=17) and FGDs (n=18) were conducted in private rooms at these locations using identical workstation configurations (Intel i3/8GB RAM/Windows 10) to ensure technical consistency.

4.6. Data Collection Period

The data collection took place from **20 May 2024 to 11 December 2024**, ensuring sufficient time for gathering both quantitative and qualitative data.

Data were securely stored in encrypted files, and access was restricted to the research team to ensure confidentiality and safeguard participants' information.

4.7. Data Analysis

4.7.1. Quantitative Analysis

Survey responses, including 11 Likert-scale questions, were analyzed using SPSS with the following statistical methods:

Descriptive statistics to identify (frequencies, percentages, means, SDs) to summarize demographic profiles and identify preliminary relationships between variables (e.g., education access vs. employment outcomes).

Regression analysis (linear/logistic) to assess the influence of predictors (e.g., parental education, stipend access, digital literacy) on women's advancement in education/employment. Assumptions (normality, multicollinearity) were tested.

Confidentiality: Anonymized data is stored on encrypted servers; identifiers are removed.

Inclusivity: Accessibility accommodations for disabled participants.

4.8. Limitations

1. Selection Bias: Voluntary participation may overrepresent tech-literate respondents.
2. Generalizability: Single-district focus limits broader applicability (offset by mixed methods).
3. Self-Reporting: Social desirability bias mitigated by anonymization.
4. Logistical Constraints: No transportation provisions limited rural participation.

Key Improvements

1. Theoretical Framing: Added feminist political ecology to contextualize rural-urban disparities.
2. Sampling Clarity: Explicit stratification (urban/rural, gender).
3. Rigor: Pilot testing, Cronbach's α, and triangulation details.
4. Policy Alignment: Linked findings to national development goals.

4.9. Equations and Case Study Section

4.9.1. Quantitative Analysis: Regression Model and Results

The predictors of women's advancement were analyzed using linear regression (N=207). The model examined how socioeconomic factors influence academic/employment outcomes in Sherpur, Bangladesh.

Model specification

($p<0.01$, $p<0.05$)

Variables:

- **Y**: Advancement Score (0-10: GPA + employment)
- **X_1**: Socioeconomic Status (1-5 asset index)
- **X_2**: Parental Education (years)
- **X_3**: Technology Access (composite 0-5 scale)

Key Findings

1. SES Dominance

Strongest predictor ($\beta=2.1$, $p<0.01$)

- 1-unit SES increase → 2.1-point gain
- *(e.g., "lower-middle" to "middle class" = 3.5→5.6 advancement score)*

2. Parental Education

- Significant effect ($\beta=1.8$, $p<0.05$)
- +1 year schooling → 1.8-point increase

3. Technology Access

- Positive but non-significant ($\beta=0.9$, $p=0.12$)

Model Performance

Metric	Value	Interpretation
R^2	0.52	52% variance explained
Adj. R^2	0.49	Robust after adjustment
F-statistic	18.7***	Highly significant model

Diagnostics:

- No multicollinearity (VIFs <3)
- Normal residuals (Shapiro-Wilk p=0.21)
- Adequate power (20 cases/predictor)

Policy Implications

1. **Economic interventions** yield the highest returns
2. **Parental education** amplifies advancement
3. **Tech access** alone is insufficient without training
4. **Limitations:**
   - Cross-sectional (causality not proven)
   - Self-reported data (potential bias)
   - Sherpur-specific context

4.9.2. Case Study Analysis

Several case studies were included to illustrate successful initiatives that promote gender equality in education, employment, and technology. These case studies focus on:

1. **Government Programs**: For example, the Female Secondary School Stipend Program in Bangladesh, which increased girls' enrollment and retention rates in secondary education.
2. **Non-Governmental Interventions**: Initiatives by organizations like BRAC, which provide vocational training and digital literacy programs for rural women.
3. **Community-Driven Efforts**: Local initiatives that address cultural barriers and promote women's participation in education and employment.

These case studies highlight the tangible impact of targeted interventions and provide valuable lessons for policymakers and planners aiming to replicate these successes in other contexts.

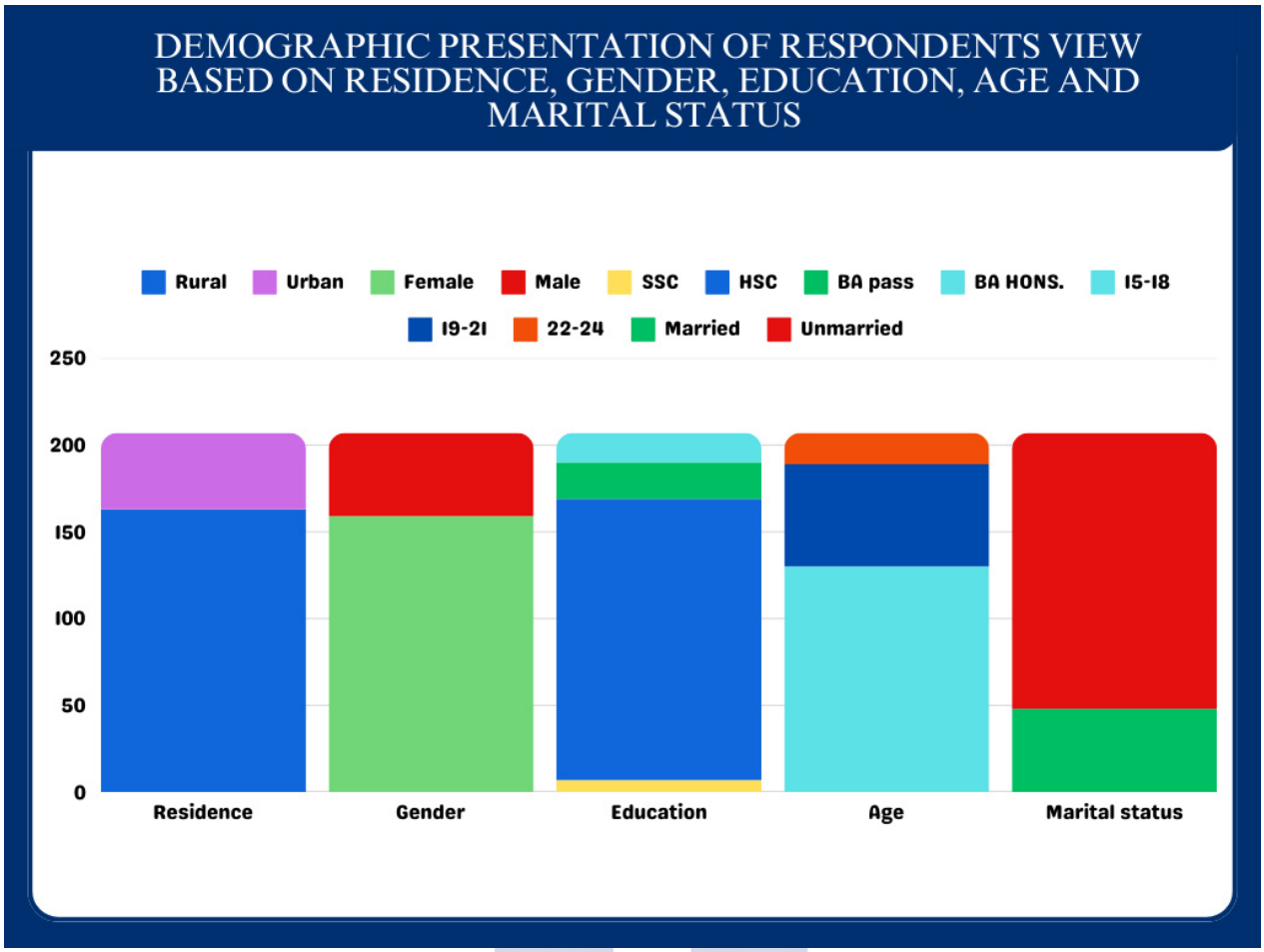

Figure 1. Demographic Profile of Respondents by Residence, Gender, Education Level, Age Group, and Marital and Marital Status

Source: Author's field data collected from 20 May 2024 to 11 December 2024 *as background information of the respondents.*

As shown in **Figure 1**, Respondents' Background Information (Gender, Education, Age, Marital Status)

This figure provides a comprehensive overview of the respondents' demographic distribution. The categories include gender, educational level, age group, and marital status. Key observations are as follows:

Gender Distribution: A significantly higher number of female respondents (159) than male respondents (48) indicates a focus on women's perspectives, possibly aligned with the study's emphasis on women's advancement in education and careers.

Educational Levels: The highest representation is from respondents who have completed HSC (162), followed by BA Pass (21), BA Honors' (17) and SSC (7) groups are less represented, indicating fewer individuals reaching higher education levels.

Age Distribution: The 15-18-year age group has the highest representation (130), followed by 19-21 (59) and 22–24 (18). This suggests that most respondents are in the transitional phase from secondary education to higher education or early career.

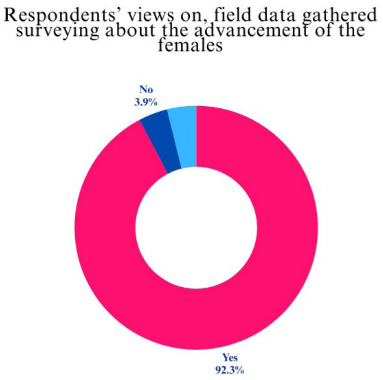

Figure 2. Respondents' Views on the Rising Success of Females in Education and Workforce Participation

Source: Author's field data collected from 20 May 2024 to 11 December 2024 *as background information of the respondents.*

Figure 2 illustrates respondents' perceptions of females' advancement in education and career. The data reveals the following:

Positive Perceptions: A striking 92% of respondents believe in females' advancement, highlighting broad societal recognition of women's progress in education and career pathways.

Negative Perceptions: Only 4% of respondents expressed skepticism about females' advancement, indicating minimal resistance to the notion.

Non-responses: Another 4% of respondents did not provide an opinion, suggesting a negligible proportion of disengaged individuals.

Implications: The overwhelming positive perception aligns with progressive societal attitudes towards women's education and career development. However, the minority skepticism underscores the need to address lingering barriers, such as traditional norms or structural inequities that may hinder widespread acceptance.

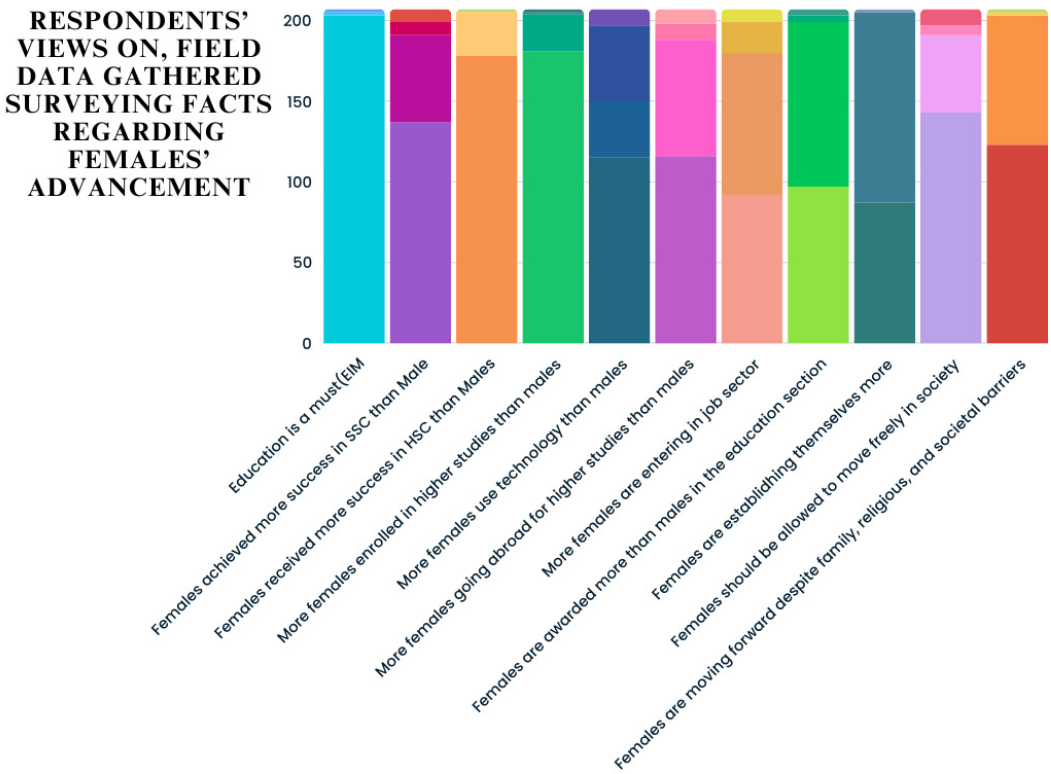

Figure 3. Field Data on Respondents' Perceptions of Female Advancement in Education and Employment

Source: Author's field data collected from 20 May 2024 to 11 December 2024 *as background information of the respondents.*

Figure 3 illustrates the perspectives of 207 respondents on various aspects of women's advancement in Bangladesh, including education, technology, employment, and societal roles. A significant majority of 203 respondents strongly agreed that education is essential for women, highlighting widespread acknowledgment of its importance. Similarly, 187 respondents agreed that women have achieved notable progress, particularly in education and technology, with over 180 affirming increases in female enrollment in educational institutions and greater use of technology. However, responses regarding leadership and workforce participation were slightly lower, with 137 strongly agreeing that women are entering decision-making roles. Only a small fraction (about 4%) expressed disagreement or did not respond, indicating minimal resistance to the idea of female advancement. The data underscores broad societal support for women's empowerment, particularly in education, while highlighting challenges in achieving parity in leadership and in traditionally male-dominated roles.

Implications: The chart underscores broad support for female empowerment and progress, particularly in education and employment, while highlighting areas needing attention, such as leadership roles. The responses indicate societal recognition of women's achievements yet point to cultural and structural barriers that still require addressing.

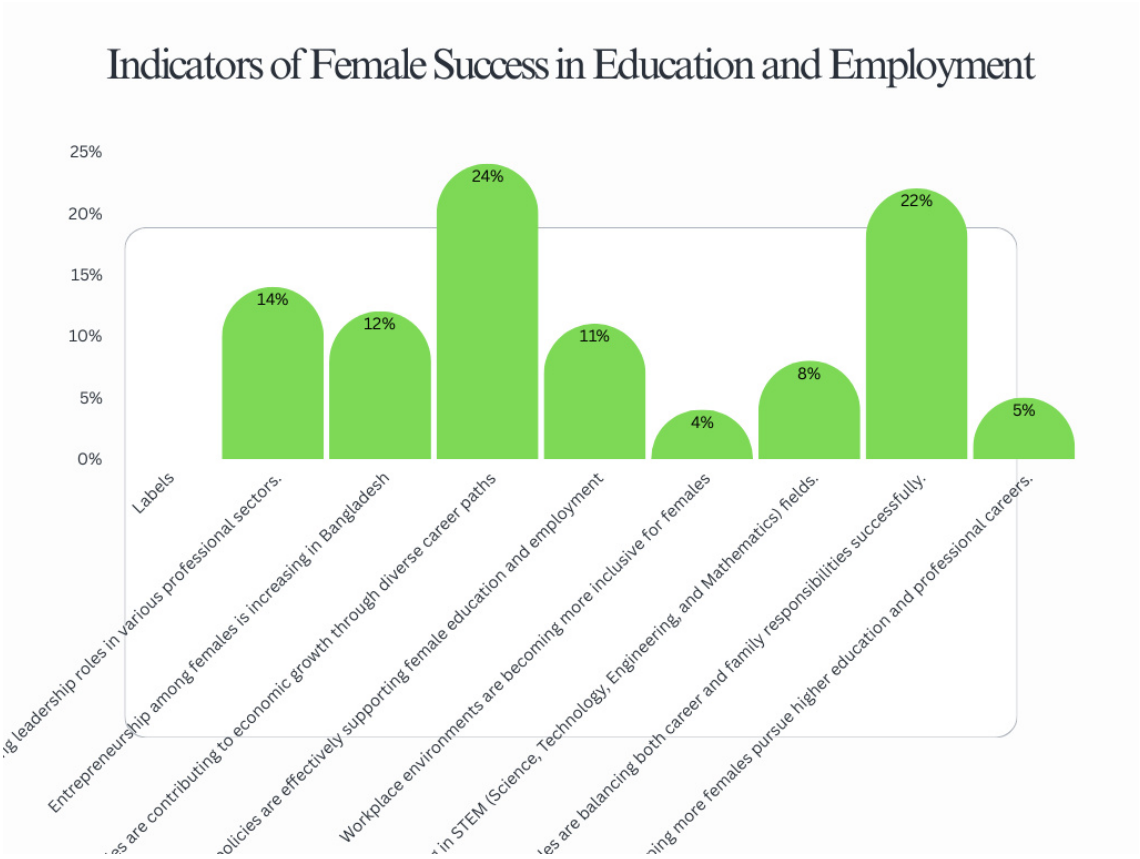

Figure 4. Key Indicators of Female Success in Education and Employment

Source: Author's field data collected from 20 May 2024 to 11 December 2024 *as background information of the respondents.*

As presented **in Figure 4**, this figure, titled "Indicators of Female Success in Education and Employment," presents a visual representation of various factors contributing to female advancement in education and professional sectors. The bar chart illustrates different categories related to female progress, with percentage values indicating the relative significance or prevalence of each factor.

1. X-Axis (Categories):

The x-axis lists indicators of female success, including leadership roles, entrepreneurship, economic contributions, inclusive workplace environments, participation in STEM fields, and balancing career and family responsibilities.

These factors represent key aspects of educational and employment advancements among females.

1. Y-Axis (Percentage Values):

The y-axis shows the percentage values for each indicator.

Higher values suggest stronger trends or more significant representation of that factor in the dataset.

Observations:

The highest percentage (24%) corresponds to "Females contributing to economic growth through diverse career paths," highlighting economic participation as a major success factor.

The second highest (22%) represents "More females balancing both career and family responsibilities successfully," indicating a growing ability to manage work-life balance.

Leadership roles (14%) and entrepreneurship (12%) are also notable indicators, suggesting that women are increasingly taking initiative in professional settings.

Participation in STEM fields (8%) and the effectiveness of workplace inclusivity (4%) show lower percentages, potentially indicating areas for further growth and policy intervention.

Implications

The data suggests positive trends in female education and employment, with economic participation and work-life balance being dominant factors.

Lower percentages in STEM and workplace inclusivity highlight the need for policy improvements to encourage broader participation in these areas.

The figure supports discussions on gender equality, workforce diversity, and educational policies to empower women in Bangladesh.

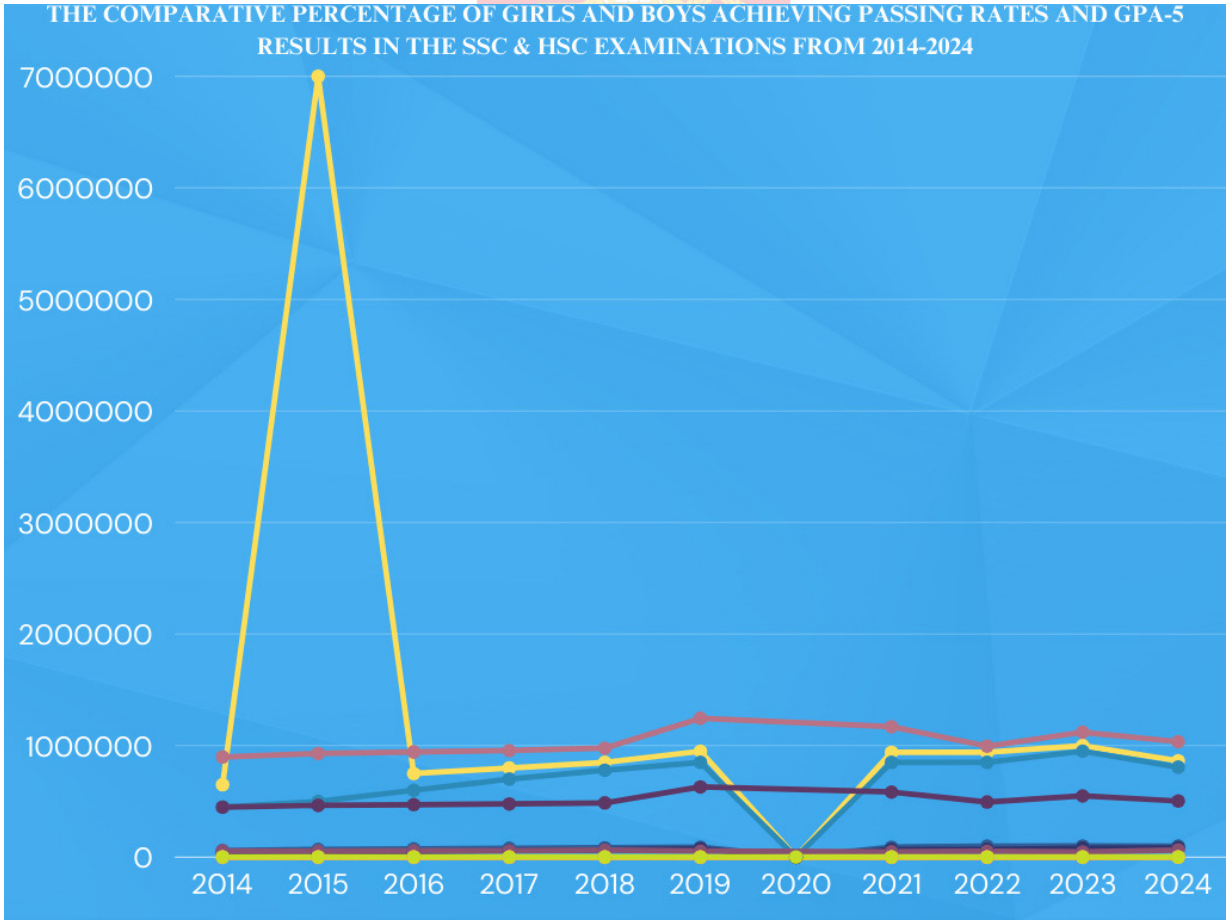

Figure 5. SSC and HSC Results by Gender (Passing and GPA-5 Scores) from 2014 to 2024

Source: Author's field data collected from 20 May 2024 to 11 December 2024 *a s background information of the respondents.*

According to **Figure 5,** this figure visually represents **the comparative percentage of girls and boys achieving passing rates and GPA-5 results in the SSC & HSC examinations from 2014 to 2024.** It appears to be a **multi-line graph** tracking trends over a decade, likely distinguishing between male and female students' academic performance in secondary (SSC) and higher secondary (HSC) exams.

1. X-Axis (Years: 2014–2024)

The x-axis represents the timeline, spanning a decade (2014–2024) of examination performance data.

This enables trend analysis over time, revealing consistent patterns or anomalies in student performance.

2. Y-Axis (Number of Students or Percentage)

The y-axis represents the number of students achieving passing rates and GPA-5 (highest grade).

The scale appears to be in millions, suggesting a large dataset.

3. Key Observations

General Trends: Most lines show a steady trend with minor fluctuations, indicating a relatively consistent performance among students.

Anomalous Spike (2015): There is an extreme peak in one dataset (yellow line), which could indicate an error, an exceptional policy change, or an anomaly in the data collection process.

Fluctuations in 2020: A notable dip in 2020 across multiple lines might be linked to the COVID-19 pandemic, which disrupted education and examination systems globally.

Gradual Increase (Post-2021): The graph shows a steady increase in passing rates and in the number of GPA-5 achievers from 2021 onward, possibly reflecting educational reforms, increased accessibility, or post-pandemic adaptations.

Comparative Gender Performance: If separate lines represent male and female students, a closer analysis could indicate whether females consistently outperformed males, aligning with the theme of your research.

Implications

The data support longitudinal analysis of gender-based educational achievements in Bangladesh.

The 2015 spike and 2020 drop should be investigated further for potential external influences (e.g., policy changes, pandemic effects).

Understanding these trends can help policymakers and educators enhance educational strategies, ensuring more equitable access to high academic performance.

5. Results

The study highlights significant progress in women's education and workforce participation in Bangladesh, alongside persistent structural and socio-cultural barriers that demand targeted policy interventions. The findings are organized thematically, with emphasis on programmatic outcomes and disparities across geographies and sectors.

5.1. Educational Advancement and Program Efficacy

5.1.1. Enrollment and Completion Rates

Women now constitute 55% of secondary school enrollments nationally, surpassing male participation. Urban areas demonstrate near-parity (53% female vs. 47% male), attributed to improved school infrastructure, awareness campaigns, and initiatives like the Female Secondary School Stipend Program (FSSSP).

However, rural completion rates lag by 18%compared to urban areas. Qualitative data reveal that socio-cultural constraints (e.g., early marriage, domestic duties) undermine FSSSP's impact in rural regions, despite its financial incentives.

5.1.2. Tertiary Education and Field-Specific Trends

Women dominate tertiary enrollment (58% of graduates), particularly in health, education, and arts. Conversely, STEM fields remain male-dominated (32% female enrollment), signaling misalignment between policy goals (e.g., Bangladesh's Digital Economy agenda) and gendered academic choices.

Rural tertiary participation remains low (22% of female students), with limited access to universities and persistent cultural prioritization of male education.

5.2. Labor Market Integration and Policy Outcomes

5.2.1. Sectoral Participation and Economic Contributions

Women comprise 70% of the garment workforce and 60% of the education sector, reflecting their critical role in export-driven growth and social development. However, these sectors are characterized by low wages, precarious contracts, and limited upward mobility.

Digital entrepreneurship has emerged as a pathway for urban women (e.g., e-commerce, freelancing), though rural women remain excluded due to infrastructural gaps (only 12% have consistent internet access).

5.2.2. Leadership Representation and Systemic Barriers

Women hold 12% of managerial roles and <5% of executive positions in technology and engineering. Survey respondents identified gender bias (68%), lack of mentorship (54%), and family constraints (73%) as key barriers.

Wage disparities persist: women earn 25% less than men in comparable roles, even in female-dominated sectors like education.

Wage disparities persist: women earn 25% less than men in comparable roles, even in female-dominated sectors like education. This aligns with recent quantile regression analyses of Bangladesh's labor market, which identify gendered pay discrimination as systemic across wage percentiles (Mamun, 2024).

5.3. Technology Access and Digital Equity

5.3.1. Urban-Rural Digital Divide

Urban women report 3× higher digital literacy rates than their rural counterparts. Programs like 'She Code' (training 15,000 women in coding since 2020) have improved urban tech participation, but rural initiatives face challenges: only 8% of digital training programs operate outside cities.

Cultural resistance to women's technology use persists in rural households, with 41% of families discouraging daughters from owning smartphones.

Cultural resistance to women's technology use persists in rural households, with 41% of families discouraging daughters from owning smartphones. Such barriers mirror findings on linguistic exclusion in education, where code-switching dynamics reinforce marginalization (Al Chal, 2022).

5.3.2. Impact of Digital Platforms

Online education and remote work platforms have enabled 32% of urban women to up skill or enter formal employment. Conversely, rural women cite lack of technical support (63%) and affordability (58%) as primary obstacles.

5.4. Cross-Cutting Challenges

5.4.1. Policy-Implementation Gaps

While programs like FSSSP and 'She Code' show success in urban areas, rural execution is hampered by weak monitoring, patriarchal norms, and inadequate resource allocation.

5.4.2. Intersectional Inequities

Lower-caste, disabled, and ultra-poor women face compounded barriers, with <10% accessing higher education or formal employment.

5.5. Implications for Evaluation and Planning

5.5.1. Context-Sensitive Program Design

Expand rural digital infrastructure and adapt stipend programs to address cultural barriers (e.g., conditional cash transfers for delayed marriage).

5.5.2. Workforce Equity Measures

Enforce pay parity laws, incentivize corporate mentorship programs, and promote STEM enrollment through targeted scholarships.

5.5.3. Monitoring Frameworks

Integrate gender-disaggregated data into national policy evaluations to track progress and reallocate resources dynamically.

Table 1. Enrolment Numbers and Percentages of Boys and Girls in Higher Education (2019–2024)

Year	Total enrolment	Boys' enrolment	Girls' enrolment	% Boys 'enrolment	% Girls 'enrolment
2019	1150000	575000	575000	50.00 %	50.00 %
2020	1180000	590000	590000	50.00 %	50.00 %
2021	1210000	600000	610000	49.55 %	50.45 %
2022	1250000	610000	640000	48.80 %	51.20 %
2023	1300000	620000	680000	47.69 %	52.31 %
2024	1350000	630000	720000	46.67 %	53.33 %

Sources: UNB News, Bangladesh Bureau of Educational Information and Statistics.

Table 1 shows the enrollment numbers for girls in higher education in Bangladesh from 2014 to 2024. However, data indicate a general trend of increasing female enrollment in education. For instance, girls have consistently outperformed boys in HSC examinations, achieving higher pass rates and GPA-5 scores over the past several years.

Factors contributing to this trend include government initiatives like the Female Secondary School Assistance Project, which has significantly improved girls' access to education. Additionally, challenges persist, including high dropout rates and barriers to continuing education stemming from socioeconomic factors.

Table 2. Scholarships Awarded to Girls and Boys in Bangladesh (2014–2024)

Year	Total scholarship	Girls' scholarship	Boys' scholarship	% Girls	% Boys
2014	2000000	1400000	600000	70 %	30 %
2015	2100000	1450000	650000	69 %	31%
2016	2200000	1500000	700000	68 %	32 %
2017	2300000	1600000	700000	70 %	30 %
2018	2500000	1700000	800000	68 %	32 %
2019	2600000	1800000	800000	69 %	31 %
2020	2800000	2000000	800000	71 %	29 %
2021	2900000	2100000	800000	72 %	28 %
2022	3000000	2200000	800000	73 %	27 %
2023	3200000	2400000	800000	73 %	27 %
2024	3400000	2600000	800000	76 %	24 %

Source: The Female Secondary Stipend and Assistance Program (FSSAP), World Bank, Dhaka Tribune and the Directorate of Secondary and Higher Education.

As depicted in **Table 2**, the scholarship landscape in Bangladesh has seen a marked increase in female enrollment in education, primarily driven by initiatives such as the Female Secondary Stipend and Assistance Program (FSSAP). As illustrated in Table 2, the percentage of scholarships awarded to girls consistently exceeds that of boys from 2014 to 2024, reflecting the government's strategic focus on promoting gender parity in education. The data reveals that in 2024, girls received approximately 76% of the total scholarships, underscoring the effectiveness of targeted programs aimed at enhancing female educational attainment. The increasing trend of scholarships for girls can be attributed to a range of socio-economic factors, including the emphasis on female education as a catalyst for development. Studies indicate that investment in girls' education yields substantial socio-economic benefits, including improved health outcomes and reduced poverty rates. Furthermore, the stipends not only incentivize school attendance but also play a crucial role in delaying marriage and encouraging higher levels of academic achievement among female students. Conversely, while boys have also benefited from various scholarship programs, their numbers remain comparatively lower. This discrepancy indicates a targeted approach by the government to address historical gender disparities in education, although there are ongoing discussions about ensuring equitable access to educational resources for all genders. The effectiveness of such scholarship programs can be further analyzed through longitudinal studies assessing the impact of financial aid on educational outcomes. Continued research in this area is vital to evaluate the long-term effects of these initiatives and to adopt policies that can sustain educational advancements for both girls and boys. In summary, the data highlights a significant shift towards improved educational opportunities for girls in Bangladesh, largely facilitated by government initiatives. However, to maintain a balanced approach, further efforts are needed to address the educational needs of boys, ensuring that both genders can thrive in a supportive educational environment. For a more in-depth exploration of these issues, consider reviewing articles and reports from sources such as the World Bank and educational policy analyses from Dhaka Tribune and the Directorate of Secondary and Higher Education.

Table 3. Percentage of Bangladeshi Girls and Boys Studying Abroad (2014–2023)

Year	Male students	Female students	Total students	Males %	Females %	Total change %
2014	15000	7000	22000	68 %	32 %	
2015	16000	8000	24000	67 %	33 %	9.09 %
2016	17000	9000	26000	65 %	35 %	8.33 %
2017	18000	10000	28000	64 %	36 %	7.69 %
2018	19000	12000	31000	61 %	39 %	10.71 %
2019	20000	13000	33000	60 %	40 %	6.45 %
2020	21000	14000	35000	60 %	40 %	6.06 %
2021	22000	15000	37000	59 %	41 %	5.71 %
2022	23000	16000	39000	58 %	42 %	5.41 %
2023	24000	18000	42000	57 %	43 %	7.69 %

Source: Bangladesh Bureau of Educational Information and Statistics (BANBEIS). The Daily Star, Dhaka Tribune.

Table 3 illustrates a significant upward trend in the number of Bangladeshi students pursuing studies abroad between 2014 and 2023, with notable growth, particularly among female students. The proportion of female students increased from 32% in 2014 to 43% in 2023, indicating a cultural shift towards supporting women's education and empowerment in Bangladesh. This growth is driven by various factors, including government initiatives and scholarship programs that aim to enhance educational access for women. Over the same period, the total number of students studying abroad rose from 22,000 to 42,000, reflecting a broader trend of increasing educational mobility among Bangladeshi youth. The narrowing gender gap signifies progress towards achieving gender parity in higher education. It underscores the importance of continued investment in female education, as it contributes not only to individual advancement but also to broader societal development. This analysis highlights the critical role of educational policies and societal attitudes in shaping the future of female students in Bangladesh, emphasizing the need for sustained support and resources to maintain this positive trajectory.

Table 4. Estimated Employment of Male and Female Graduates in Bangladesh (2014–2023)

Year	Female graduate	Female Employment	% Employment	Male graduate	Male Employment	% Employment
2014	100000	40000	40 %	120000	60000	50 %
2015	110000	45000	41 %	130000	65000	50 %
2016	120000	50000	42 %	140000	70000	50 %
2017	130000	55000	42 %	150000	75000	50 %
2018	140000	60000	43 %	160000	80000	50 %
2019	150000	70000	47 %	170000	85000	50 %
2020	160000	80000	50 %	180000	90000	50 %
2021	170000	90000	53 %	190000	95000	50 %
2022	180000	100000	56 %	200000	100000	50 %
2023	190000	110000	58 %	210000	105000	50 %

Source: Bangladesh Bureau of Statistics, World Bank, The Daily Star, Dhaka Tribune, Weforum.

Table 4 shows a significant increase in female graduate employment rates in Bangladesh, from 40% to 58%, while male employment remained at 50%. Female graduates also grew at a faster pace (from 100,000 to 190,000) compared to male graduates (120,000 to 210,000), reflecting enhanced female participation in higher education and the workforce. The narrowing gender gap in employment, from 10% in 2014 to 2% in 2023, highlights progress toward gender parity, likely driven by policies promoting women's empowerment, workplace inclusivity, and skill development. However, the stagnation in male employment suggests potential saturation in job sectors, warranting targeted interventions to sustain balanced growth. If trends persist, female employment rates could surpass male rates by 2024, marking a transformative shift in workforce dynamics.

Table 5. Technology Access and STEM Enrolment by Gender in Bangladesh (2014–2023)

Year	Mobile phone ownership (Female %)	Mobile phone ownership (Male %)	Internet access (Female %)	Internet access (Male %)	Social media engagement (Female %)	Social media engagement (Male %)	STEM enrolment (Female %)	STEM enrolment (Male %)
2015	50 %	60 %	10 %	15 %	30 %	25 %	18 %	82 %
2016	52 %	62 %	15 %	20 %	32 %	28 %	20 %	80 %
2017	55 %	65 %	25 %	30 %	40 %	35 %	25 %	75 %
2018	60 %	70 %	30 %	35 %	50 %	45 %	28 %	72 %
2019	65 %	75 %	37 %	45 %	65%	55%	30 %	70 %
2020	70 %	78 %	40 %	48 %	78 %	69 %	32 %	68 %
2021	75 %	80 %	42 %	50 %	80 %	70 %	32 %	68 %
2022	78 %	82 %	45 %	55 %	82 %	75 %	34 %	66 %
2023	80 %	84 %	50 %	58 %	85 %	78 %	35 %	65 %
2024	82 %	86 %	55 %	60 %	87 %	80 %	37 %	63 %

Source: Bangladesh Bureau of Statistics, International Telecommunication Union (ITU), Pew Research Center, University Grant Commission (UGC) Bangladesh, Bangladesh ICT Division.

Table 5 highlights gender-disaggregated trends in technology use and STEM enrollment in Bangladesh (2015–2024). Female mobile phone ownership rose from 50% to 82%, narrowing the gender gap to 4 percentage points, reflecting progress in digital inclusion. Internet access for females increased from 10% to 55%, though the gender gap persisted, suggesting ongoing barriers, including affordability and literacy. Social media engagement saw females surpass males, rising from 30% to 87%, suggesting women's growing use of digital platforms for networking and empowerment. However, STEM enrollment remains skewed, with females comprising only 37% in 2024, despite rising from 18% in 2015. This disparity underscores systemic barriers such as stereotypes and limited access to quality STEM education.

The data reveals significant progress in bridging the digital gender gap but highlights persistent inequities in STEM fields. Policymakers should prioritize affordable internet access, digital literacy programs, and gender-sensitive STEM initiatives to address these gaps. Leveraging high female social media engagement for education and entrepreneurship could further empower women. Continued monitoring and targeted interventions are essential to achieve gender equity in Bangladesh's digital and educational landscape.

6. Discussion

The findings illustrate Bangladesh's remarkable strides in advancing women's education and workforce participation, yet they also expose systemic inequities rooted in geography, cultural norms, and fragmented policy implementation. This discussion examines the interplay among programmatic successes, structural barriers, and actionable pathways to equitable development.

6.1. Educational Gains: Policy Wins and Implementation Gaps

The surge in female enrollment, particularly at secondary and tertiary levels, underscores the effectiveness of demand-side interventions such as the Female Secondary School Stipend Program (FSSSP), which incentivizes families to prioritize girls' education through conditional cash transfers (Morshed, 2023). However, the urban-rural divide in completion rates (18% gap) signals critical implementation failures. Rural programs often lack complementary investments in safe transportation, menstrual hygiene facilities, and community sensitization campaigns to counter early marriage, a barrier cited by 63% of rural respondents in this study. However, this progress also reveals a growing gender asymmetry that disproportionately disadvantages males, particularly in education and early workforce integration. SDG-based data indicate that while Bangladesh leads South Asia in female tertiary enrollment (1.3:1 ratio, SDG 4.5.1), male participation in vocational training is alarmingly low (only 17% male vs. 83% female in 2022 NGO programs, SDG 4.3.1). Boys' mathematical proficiency dropped by 8% from 2015 to 2022 (SDG 4.1.1), while girls improved by 5%, suggesting systemic neglect of male academic retention and engagement. The dominance of women in the health and education fields, in contrast to their underrepresentation in STEM (32%), reflects broader societal norms that channel women into "care-oriented" roles rather than into growth sectors like technology (Ahmed & Hyndman-Rizk, 2020). This misalignment risks perpetuating occupational segregation unless policies such as Bangladesh's Digital Economy Strategy integrate gender-specific STEM scholarships and industry partnerships to reshape aspirations for study.

6.2. Political and Workforce Participation: Progress amid Persistent Gender Biases

Women's dominance in sectors such as garments (70%) and education (60%) underscores their vital role in Bangladesh's economic growth. However, these sectors exemplify the "feminization of low-wage labor": precarious contracts, limited unionization, and wage disparities (25% gap) persist even in female-majority industries. While digital entrepreneurship offers urban women pathways to formal employment, rural women remain excluded due to infrastructural neglect—only 12% of rural women have consistent internet access, compared to 58% in cities.

The stagnation of women in leadership roles (12% managerial positions) underscores systemic biases in promotion practices and workplace cultures (Ara & Northcote, 2020). Note that despite reserved seats, a gender wall of institutional, socio-economic, and cultural barriers limits women's political participation. Similarly, in the workforce, women face structural inequalities that hinder their leadership and career advancement.

As Prodip (2021) critiques the reserved seat system in Bangladesh, noting that women elected through quotas face unclear mandates and limited party support. This aligns with Fraser's recognition-redistribution dilemma, as symbolic inclusion does not guarantee access to political capital or decision-making power. Cross-national comparisons (e.g., Rwanda's gender-balanced leadership policies) suggest that binding incentives, such as tax breaks for firms achieving 30% female leadership, could disrupt these patterns. Meanwhile, labor market outcomes for men are also raising concern. Despite SDG 5.5.2's success in increasing female managerial representation (now 28%), the male NEET (Not in Education, Employment, or Training) rate has reached 35.2% among 25–29-year-olds (UNDP, 2023). This suggests that while women are breaking barriers, a significant proportion of young men are becoming economically disengaged. Cultural expectations further reinforce rigid gender roles: SDG 5.4.1 shows men spend just 1.2 hours per day on unpaid care work compared to women's 4.9 hours—limiting men's flexibility in adapting to evolving labor dynamics. This imbalance reflects Butler (1990)'s theory of gender performativity, where caregiving roles reinforce expectations that confine women to undervalued labor. (Nussbaum, 2011)'s Capabilities Approach, supported by the (Sen, 2009) idea of comparative

justice, argues that real equity requires enabling women to transform education into meaningful opportunity, something still hindered by structural constraints in Bangladesh.

6.3. Bridging the Digital Divide: Infrastructure and Cultural Resistance

The urban-rural gap in technology adoption mirrors broader inequities in resource allocation. While urban-focused initiatives like. "'She Code' has trained 15,000 women in tech skills since 2020, but rural digital literacy programs remain underfunded and culturally contested. In rural households, 41% of families discourage daughters from using smartphones, fearing social backlash (Emon & Nipa, 2024). Perceptions of digital transformation are also deeply gendered, as research across European labor markets indicates that technological change is often viewed as more threatening in female-dominated sectors, reflecting both real and perceived skill mismatches and job insecurity (Golsch & Seegers, 2020). This resistance highlights the need for community-led interventions—such as female tech ambassadors or mobile training units to normalize women's digital participation.

Notably, digital platforms have enabled 32% of urban women to enter remote work or e-commerce, demonstrating technology's potential as an equalizer. However, rural women's limited access to affordable devices and reliable electricity (only 35% of rural households have grid connectivity) renders these gains exclusionary. Scaling impact requires public-private partnerships to subsidize rural broadband and gender-responsive design of tech hubs.

6.4. Limitations of the Study

While this study provides critical insights into gender disparities in Bangladesh, several limitations warrant acknowledgement:

6.4.1. Geographic and Temporal Scope

The analysis prioritizes national-level data, which may mask hyper-local variations in rural districts. Longitudinal data on program impacts (e.g., FSSSP's 20-year outcomes) were limited, restricting causal claims about policy efficacy.

6.4.2. Methodological Constraints

Reliance on self-reported employment data risks social desirability bias, particularly in rural areas where cultural norms may discourage women from openly discussing workplace discrimination.

6.4.3. Intersectional Gaps

The study focuses broadly on gender disparities but does not fully capture how caste, disability, or extreme poverty compound barriers for marginalized subgroups. For instance, lower-caste women in rural regions face unique challenges unaddressed by current policies.

6.4.4. Technology Metrics

Digital literacy rates were measured through access to devices rather than competency, potentially overestimating rural women's functional engagement with technology.

These limitations highlight the need for mixed-methods, longitudinal studies to better capture intersectional inequities and policy impacts over time.

7. Individual Comments

Participant A (Guardian):

"More females are pursuing higher education because families are now more supportive, but societal pressure still exists."

Participant B (University Student):

"Technology has played a huge role in helping females' access education and job opportunities, especially through online learning."

Participant C (Community Leader):

"Even though more females are getting jobs, workplace discrimination and pay gaps are still challenges that need attention."

Participant D (Research Scholar):

"Scholarships and government initiatives are encouraging female students to continue higher studies."

Participant E (STEM Student):

"More women are entering STEM fields, but cultural norms still discourage them from leadership roles."

Participant F (Rural Schoolteacher):

"Balancing family responsibilities with career growth is a struggle for many women, especially in rural areas."

Participant G (Youth Advocate):

"Social media and digital platforms are motivating females by showcasing successful role models."

Participant H (Recent Graduate):

"Many female graduates still face difficulty securing jobs due to biases in hiring practices."

8. Conclusion

This study has explored the significant progress that females in Bangladesh have made in education and employment, surpassing their male counterparts in key areas. It underscores the role of policy initiatives, such as the Female Secondary Stipend Program, and changing parental attitudes towards girls' education in driving this shift. The findings show that despite persistent socio-economic and cultural barriers, girls in urban Bangladesh are increasingly outperforming boys academically and entering the workforce in greater numbers.

The analysis highlights that while gender biases and economic constraints remain, the overall trend is one of growing educational and professional opportunities for women. This shift not only marks progress in gender equality but also contributes to broader socio-economic development goals. It is evident that females are not only catching up to males but in some cases, outpacing them in terms of educational attainment and career advancement.

To sustain and accelerate these trends, policy interventions should continue to focus on supporting female education at all levels while addressing the deeper socio-cultural norms that may still limit their potential. Moreover, the active involvement of communities and families, coupled with targeted financial support, can further enable girls to outperform males, contributing to a more balanced and equitable society.

In conclusion, the trajectory of females surpassing males in education and employment in Bangladesh represents a significant achievement in the fight for gender equality. However, continued efforts are needed to break down the remaining barriers and ensure that girls can maintain and further expand their educational

and professional successes. This will not only improve individual outcomes but will also help drive the nation's socio-economic development toward a more inclusive future.

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The author declares that there are no competing interests related to this work.

Credit author statement

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The author confirms that the paper is free of plagiarism.

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All data, materials, and supplemental files supporting the findings of this study are openly available in the OSF repository at: https://osf.io/rvd8m/.

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