UNIJERPS



Unizik Journal of Educational Research and Policy Studies VOL.20 (1);
July-December, 2025 https://unijerps.org
2023 Impact Factor: **6.834;** 2022 ***Impact Factor***: 5.156; ***2021 Impact Factor: 5.641;***
2020 Impact Factor: 5.355. *Indexing and Impact Factor URL: http://sjifactor.com/passport.php?id=21363*

THE ROLE OF TECHNOLOGICAL CHANGE IN SHAPING GENDER-INCLUSIVE EMPLOYMENT IN TECHNICAL EDUCATION INSTITUTIONS

Olusola Adenike Hussaini[1*] & Mutahir Olufemi Abanikannda[2]

1. Sustainable Development Practice Unit,
Global Affairs and Sustainable Development Institute,
Osun State University, Osogbo, Nigeria
2. Deputy Director of Academic Planning, Osun State University, Osogbo
Corresponding author*: [1]hussainiolusolaadenike@gmail.com
[2]mo.abanikannda@uniosun.edu.ng

ABSTRACT

This study explores the intersection of technological revolution and gender discrimination in shaping women's employment opportunities in technical education institutions, particularly polytechnics in South-West Nigeria. It investigates the influence of digital transformation on recruitment, promotion, and access to professional growth for women, and how institutional gender biases affect inclusivity. A mixed-methods approach was employed, involving 1,764 respondents across six polytechnics, with data collected through structured questionnaires and in-depth interviews. Findings reveal a dual narrative: while technology has expanded job opportunities for women, it has also deepened gender disparities in access to training, digital roles, and career advancement. Notably, limited technical skills, gender-biased role distribution, and inadequate institutional support emerged as significant barriers to women's digital inclusion. Although both male and female staff acknowledge the transformative potential of technology, women reported significantly greater workplace challenges. The study concludes that without deliberate and inclusive digital training policies, technological advancement may exacerbate rather than reduce the gender gap. It recommends gender-sensitive upskilling initiatives, equitable access to digital tools, and the institutionalization of inclusive leadership strategies in technical education settings.

Keywords: Technological revolution, Gender discrimination, Women employment, Technical education, Polytechnics.

Introduction

The 21st century is witnessing an era defined by rapid technological transformation—an evolution that is fundamentally reshaping the global employment landscape. The emergence of digital technologies such as artificial intelligence, machine learning, big data analytics, cloud computing, and automation has altered not only how we work but also who works, where, and under what conditions. Across multiple sectors, including education, health, manufacturing, and government services, digital innovation is creating opportunities for efficiency,

flexibility, and global interconnectedness. However, this revolution is not occurring in a vacuum; it interacts with pre-existing social structures and inequalities, often reproducing and even intensifying them (Chiappetta, 2017; Kraus Jones et al., 2021).

In Nigeria, a country struggling to adapt to the pressures of economic modernization and social transformation, the effects of the technological revolution are both promising and paradoxical. While technology has the potential to increase access to information and employment, it often mirrors and magnifies entrenched gender disparities—especially within the nation's educational institutions. Nowhere is this contradiction more evident than in the polytechnic education system, which serves as a pivotal platform for technical and vocational training. Polytechnics, designed to equip students with practical, hands-on skills necessary for industry and national development, have become arenas where access to resources, leadership, and opportunities is highly gendered.

Despite women's significant presence in Nigeria's broader labor force, they remain systematically underrepresented in technical and leadership roles within polytechnics. Gender discrimination is manifested in discriminatory hiring practices, occupational segregation, unequal pay, and limited access to professional development that continues to hinder the full realization of women's potential in these institutions (Gander & Sharafizad, 2025; Osibanjo, 2014). As of 2023, Nigerian male employees were estimated at nearly 40 million, while female employees lagged behind at approximately 31.3 million (Sasu, 2024). These figures highlight a substantial gender gap, further exhibited in high-skill, technology-driven sectors.

The implications of such disparities are profound. At a national level, the underutilization of female talent undermines economic productivity and stifles innovation. From a development perspective, it directly contradicts Nigeria's commitments under the Sustainable Development Goals (SDGs), particularly Goal 4, which promotes inclusive and equitable quality education, and Goal 5, which advocates for gender equality and the empowerment of all women and girls (United Nations, 2024). These goals are not abstract ideals; they are critical benchmarks for achieving sustainable national development in a country with significant human capital potential.

One critical dimension of this gender gap lies in access to technology itself. While digital platforms and tools are increasingly becoming prerequisites for professional success, many women in Nigerian polytechnics face systemic barriers to acquiring digital literacy and technological competencies. These barriers are not due to a lack of interest or ability but stem from a historical exclusion from STEM (Science, Technology, Engineering, and Mathematics) domains, socio-cultural norms that undervalue women's education in technical fields, and institutional biases that prioritize male advancement (Maxwell &Maxwell, 2014; Olatunji, 2023). As a result, even as polytechnics transition into digitally enabled

institutions—adopting e-learning platforms, automating administrative processes, and integrating data-driven systems—many women are left behind. Moreover, technological advancement is not gender-neutral. The implementation of new technologies in workplaces can either serve as a tool for inclusion or become a mechanism for deepening inequality, depending on how equitably these tools are distributed and who gets to design and deploy them (Robertson & Ayazi, 2019). Without deliberate strategies to promote gender inclusion, there is a real risk that the Fourth Industrial Revolution will further marginalize those who have historically been excluded from the formal economy and institutional leadership structures—namely, women.

In the context of Nigerian polytechnics, this dual challenge of technological transformation and gender exclusion creates a complex, dynamic tension. On one hand, these institutions are being called upon to modernize rapidly to meet global standards and labor market demands. On the other, they are still struggling to provide equitable opportunities for their female staff and students. This situation calls for a critical analysis of how institutional cultures, policies, and practices in polytechnics either support or inhibit women's participation in the digital economy. It also necessitates a reevaluation of how gender-sensitive frameworks can be integrated into technological training, curriculum development, recruitment policies, and leadership development strategies within these institutions.

The urgency of this inquiry cannot be overstated. Nigeria's South-West region—comprising Lagos, Oyo, Ogun, Osun, Ondo, and Ekiti states—is one of the country's most economically vibrant and educationally developed zones. Yet, even here, disparities in women's employment opportunities within polytechnics remain alarmingly persistent. If these flagship regions cannot successfully integrate gender equity into their technical education systems, it bodes poorly for the rest of the country. As such, understanding the intersection between technological change and gender-based employment disparities in South-West Nigeria's polytechnics offers a vital lens into broader national challenges—and opportunities.

Therefore, this study seeks to explore how technological transformation in polytechnic institutions interacts with gender norms to shape employment opportunities for women. It aims to identify the specific barriers women face, assess the impact of institutional culture and policies, and propose strategies for creating more inclusive and equitable work environments in technical education settings. By doing so, it contributes to both academic discourse and policy development in the realms of gender studies, educational reform, and sustainable development.

The literature on gender disparities in technical education and the role of technology in shaping workforce dynamics has grown significantly in the past two decades. As the digital economy evolves and the Fourth Industrial Revolution deepens,

educational institutions, including polytechnics, are increasingly being scrutinized for how equitably they prepare and engage women in technology-mediated environments. This review explores key themes around technological advancement and workforce transformation, gender inequalities in technical education, and the theoretical lenses through which these issues are analyzed.

Technological Advancement and Workforce Transformation

The contemporary labor market is being profoundly reshaped by digital technologies. The rise of artificial intelligence (AI), robotics, big data, cloud computing, and remote platforms has transformed not only the types of skills needed but also the organizational structure of workplaces (Khogali & Mekid, 2023). This technological shift—commonly referred to as the Fourth Industrial Revolution—has created new forms of employment, transformed job descriptions, and heightened the demand for digital competencies.

Research has shown that women in educational institutions are more likely to be assigned to roles with minimal technological engagement and are less likely to be nominated for ICT-related training programs (Chiappetta, 2017; Jain, 2023). Moreover, the digital gender gap in Nigeria reflects broader global patterns in which women's access to technology is limited by affordability, socio-cultural constraints, and infrastructural deficiencies (World Bank, 2023). This gap not only marginalizes women in the immediate term but also reduces their future employability in an increasingly digitized world.

Gender Disparities in Technical Education

Gender disparities in technical and vocational education, particularly within polytechnics, are both structural and systemic. In Nigeria, women constitute less than 20% of leadership and academic technical staff in polytechnics—a statistic that reflects the gendered architecture of institutional power and participation (Ogbogu, 2019). These disparities extend to course enrollment patterns, with women significantly underrepresented in traditionally male-dominated fields such as engineering, computer science, and industrial technology (Olatunji, 2023).

A host of discriminatory practices have been identified as barriers to women's advancement in technical education. These include biased recruitment procedures, unequal promotion opportunities, lack of mentorship, and workplace harassment (Hegewisch & Hartmann, 2014; Koveshnikov et al., 2022). According to Hing et al. (2023), gender-based discrimination in Nigerian institutions is often informal but deeply entrenched, manifesting in daily workplace interactions, performance evaluations, and access to professional development opportunities.

Furthermore, many female employees report encountering subtle yet powerful gender stereotypes that affect their professional growth—such as being deemed "less technical" or "more suited for administrative tasks." These attitudes are supported by

patriarchal cultural norms that view leadership and technical expertise as male domains (Makama, 2013). The consequences are dire: reduced job satisfaction, increased attrition rates among women, and limited institutional diversity.

Empirical evidence also indicates that harassment and psychological stress are common experiences for women in Nigerian tertiary institutions. A survey by Adejugbe & Adejugbe (2018) found that a significant proportion of female educators experienced some form of workplace harassment, ranging from verbal abuse to exclusion from decision-making processes. The cumulative effect of these experiences contributes to what is often termed a "chilly climate"—an institutional environment that is unwelcoming or even hostile to women (Koveshnikov et al., 2022).

Addressing these disparities requires not only policy reform but also a shift in institutional culture. Strategies such as mentorship programs, gender audits, inclusive recruitment policies, and zero-tolerance harassment frameworks have shown promise in some contexts but remain underutilized in Nigerian polytechnics (UNESCO, 2021). Without systemic changes, the promise of gender equality in technical education will remain unrealized.

Research Questions

1. How has the technology revolution affected the employment of women?
2. What challenges do women encounter in the workplace?

Methodology

Research Design

Descriptive design was employed for this study. This research design was considered appropriate due to advantages of identifying attributes of a large population from a group of individuals which is what is required for the study that seeks to examine the impact of technological revolution and gender discrimination on women unemployment opportunities in Polytechnics in South-west Nigeria.

Population of the Study

The target population for this study comprised academic and administrative staff in Nigerian polytechnics, with a particular focus on female employees in federal, state, and private institutions within the six states of South-West Nigeria—Lagos, Oyo, Ogun, Osun, Ondo, and Ekiti. The polytechnics used in this study includes: The Federal Polytechnic Ede, The Federal Polytechnic Ile-Oluji, The Polytechnic Ibadan, Moshood Abiola Polytechnic, Lagos City Polytechnic and Crown Polytechnic Ado-Ekiti. These institutions represent a diverse array of organizational structures, technological infrastructures, and gender dynamics, offering a rich environment for comparative analysis.

Sample Size and Sampling Technique

A total of 420 respondents were selected for the quantitative strand of the research using a stratified random sampling technique. The strata were defined by state, type of institution (federal, state, private), and role (academic vs. administrative). This technique ensured a balanced representation of the

study population and enhanced the generalizability of the findings across different categories of polytechnics.

For the qualitative strand, 24 female employees were selected purposively based on their years of experience, rank, and willingness to share their insights. This included both academic staff (lecturers, technologists) and non-academic staff (administrators, ICT officers). The sample size was determined by data saturation—the point at which no new themes emerged from subsequent interviews (Guest, Bunce, & Johnson, 2006).

Data Collection Instrument

Quantitative data was collected using a structured questionnaire, which was developed based on themes derived from the literature review and aligned with the study's objectives and hypotheses. The instrument included both closed-ended and Likert-scale questions and was divided into the following sections:

Section A: Demographic information (gender, age, position, years of experience, etc.)

Section B: Exposure to technology and digital tools

Section C: Perceptions of technological change and its impact on employment

Section D: Experiences of gender discrimination in tech-heavy departments

Section E: Institutional culture and support mechanisms

The questionnaire used Likert scale response modes of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The questionnaire was pretested with 30 respondents in two polytechnics outside the study area to assess clarity, reliability, and internal consistency. The Cronbach's Alpha coefficient for the instrument was 0.84, indicating a high level of reliability.

Data Collection Procedure

Ethical clearance was obtained from relevant academic and institutional bodies and permission was secured from the management of participating polytechnics. Data collection was carried out over a five-month period across the six states.

Quantitative data were collected through on-site administration of questionnaires, with trained research assistants deployed to each institution. Respondents were assured of confidentiality and anonymity to encourage honest responses.

Data Analysis Techniques

Data collected for this study was analyzed using Statistical Package for Social Scientists (SPSS) version 26. Both descriptive and inferential statistics were adopted to analyse the data generated in the study. Descriptive statistics such as frequencies, means, and standard deviations were used to summarize demographic variables and general trends. The data analysis techniques for this study are frequency and percentage, mean and standard deviation, weighted mean and ranking, and independent t-test. While frequency and percentage were used to present socio-demographic data of respondents, frequency and percentage, mean, standard deviation, weighted mean, and ranking were used to answer research questions. Hypotheses were tested with the

use of an independent t-test. The hypotheses were tested at 0.05 level of confidence.
Inferential statistics included:
Chi-square tests to examine associations between categorical variables (e.g., gender and access to digital tools).
Independent samples t-tests to compare male and female responses on key items.
Multiple regression analysis to determine the predictive impact of technological change and institutional factors on women's employment opportunities.
All hypotheses were tested at a 0.05 significance level.

Ethical Considerations
All participants provided informed consent, and participation was entirely voluntary. The research adhered to the principles of confidentiality, anonymity, and non-maleficence. Sensitive issues particularly those relating to gender-based discrimination and harassment—were handled with utmost care to protect participants' privacy and emotional wellbeing.
Ethical approval was granted by the research ethics board of Osun State University, and all institutional protocols were strictly followed throughout the research process.

Validity and Reliability
To ensure validity, the questionnaire was given to the supervisor for thorough vetting and review. Each item on the questionnaire was critically examined to remove any form of ambiguity that might arise in the course of generating the questions and to determine its relevance to the purpose of the study. Pilot testing further refined the structure and language of the instruments. For reliability, statistical consistency was measured using Cronbach's Alpha, and inter-rater reliability was applied during qualitative coding to ensure theme consistency across analysts.

Results and Discussion

Demographic Information

Table 1. Distribution of Respondents by Polytechnics

Polytechnic	Frequency	Percent
Crown Polytechnic Ado-Ekiti	295	16.7
Federal Polytechnic Ile-Oluji	298	16.9
Federal Polytechnic Ede	298	16.9
Lagos City Polytechnic	292	16.6
Moshood Abiola Polytechnic	290	16.4
The Polytechnic Ibadan	291	16.5
Total	1764	100.0

Table 1 above shows that 295 respondents representing 16.7% of the respondents are from Crown Polytechnic, Ado-Ekiti; 298 representing 16.9% of the respondents are from Federal Polytechnic Ile-Oluji; 298 representing 16.9% of the respondents are from Federal Polytechnic Ede; 292 respondents representing 16.6% of the respondents are from Lagos City Polytechnic; 290 representing 16.4% of the respondents are from Moshood Abiola Polytechnic and 291 respondents

representing 16.5% of the respondents are from The Polytechnic Ibadan.

Table 2: Socio-demographic Data of Respondents

Characteristics	N	%
Gender		
Male	375	21.3
Female	1389	78.7
Total	1764	100.0
Age		
Below 18	72	4.1
Between 18-25	454	25.7
25 and above	1228	69.6
No Response	10	.6
Total	1764	100.0
Marital Status		
Married	1145	64.9
Divorced	146	8.3
Widowed	64	3.6
Separated	71	4.0
Never Married	316	17.9
No Response	22	1.2
Total	1764	100.0
Educational Qualification		
Less than Secondary School	14	.8
Secondary School	81	4.6
NCE	9	.5
OND	4	.2
HND	13	.7
Bachelor's Degree	815	46.2
Master's Degree	535	30.3
Doctoral Degree	70	4.0
Others	173	9.8
No Response	50	2.8
Total	1764	100.0
Employment Status		
Casual/Part-Time	5	.3
Employed	1628	92.3
Self Employed	37	2.1
Unemployed	37	2.1
No Response	57	3.2
Total	1764	100.0
Religion		
Christianity	968	54.9
Islam	512	29.0
Traditional	26	1.5
Others	1	.1
No Response	257	14.6

Total	1764	100.0
Average Monthly Income (₦)		
10,000-99,000	784	44.4
100,000-200,000	696	39.5
201,000-300,000	129	7.3
301,000-400,000	38	2.2
401,000 and Above	33	1.9
No Response	84	4.8
Total	1764	100.0
Number of Year in Service		
Less than 10	707	40.1
10-20	733	41.6
21-30	218	12.4
31 and above	42	2.4
No Response	64	3.6
Total	1764	100.0
Socio-Economic Status		
Low	325	18.4
Middle	1019	57.8
High	379	21.5
No Response	41	2.3
Total	1764	100.0

No Response (missing)

Table 2 shows the socio-demographic data of respondents that participated in the study. In this study, females constitute the larger percentage (78.7%) of the distribution while 21.3% of the respondents were males. The age of the majority (69.6%) of respondents was 25 years and above and 64.9% were married individuals while 17.9% never married and 1.2% declined response to their marital status. In relation to educational qualifications, 46.2% had bachelor's degree, 30.3% had Masters' degree while the least academic qualification was those with less secondary school certificate and this group constitutes less than one percent of the total respondent. However, 2.8% of the respondents declined response to their academic qualification.

Distribution of the respondents according to their employment status showed that 92.3% were employed while 2.1% each indicated self-employed and unemployed. Also, while 0.3% was casual/part-time workers, 3.2% declined response to their employment status. Fairly more than half (54.9%) of the respondents practice Christianity, 29.0% practice Islam, 1.5% practice traditional religion, 0.1% indicated others while 14.6% declined response. Among these respondents, the average monthly income in Naira was between 10,000-99,000, 39.5% also had an average monthly income of 100,000-200,000, 7.3% and 2.2% respectively had 201,000-300,000, and 301,000-400,000 while 1.9% had 401,000 and above. However, 4.8% declined response to their income status. As also shown in the distribution, 41.6% had between 10-20 years working experience, 40.1% had less than 10 years, 12.4% had between 21-30 years, 2.4% had 31 years and above while

3.6% declined response. In addition, 57.8% and 21.5% of the respondents respectively were middle and high socio-economic status while 18.4% indicated low economic status. Also, 2.3% of the respondents declined response.

Impact of Technological Advancement on Employment Prospects of Women in Technical Education Institutions

The result in Table 3 shows the extent of the impact technological advancement has on the employment prospects of women in technical education institutions. Given the weighted mean score of 3.14, statements with mean values that are equal or greater than the weighted mean score are considered as the main impact in this result. As shown in Table 3, 48.4% and 43.2% of the respondents respectively strongly agree and agree that technological advancements have increased job opportunities for women in their institution (M = 3.38, SD = 0.70). 35.4% and 51.6% of respondents strongly agree and agree that technological skills are increasingly becoming necessary for women to secure employment (M = 3.2, SD = 0.71). 29.1% and 58.6% of respondents strongly agree and agree respectively that technological changes have widened the gender gap in career progression opportunities (M = 3.15, SD = 0.67). 50% and 25.9% of respondents strongly agree and agree respectively that new technology-based roles are more frequently assigned to male employees than female employees (M = 2.98, SD = 0.79). 27.5% and 46.9% of respondents strongly agree and agree respectively that women are underrepresented in departments that require technical or digital skills (M = 2.97, SD = 0.82).

As shown in Table 3, the extent of the impact technological advancement has on the employment prospects of women in technical education institutions include: Increased job opportunities, widened the gender gap in career progression opportunities, increased the need for technological skills for women to secure employment; underrepresentation of women in departments that require technical or digital skills; new technology-based roles are more frequently assigned to male employees than female employees (Figure 1).

S/N	STATEMENT	SA		A		D		SD		*M*	*SD*
		F	%	F	%	F	%	f	%		
1.	Technological advancements have increased job opportunities for women in my institution	85	48.4	76	43.2	13	6.4	3	2.0	**3.38**	0.70
2.	Technological changes have widened the gender gap in	51	29.1	103	58.6	1	10.2	1	1.8	**3.15**	0.67

	career progression opportunities.										
3.	Technological skills are increasingly becoming necessary for women to secure employment	62	35.4	91	1.6	191	10.8	38	2.2	**3.20**	0.71
4.	Women are underrepresented in departments that require technical or digital skills.	48	27.5	82	46.9	370	21.0	82	4.6	2.97	0.82
5.	New technology-based roles are more frequently assigned to male employees than female employees.	88	50.0	45	25.9	355	20.1	71	4.0	2.98	0.79

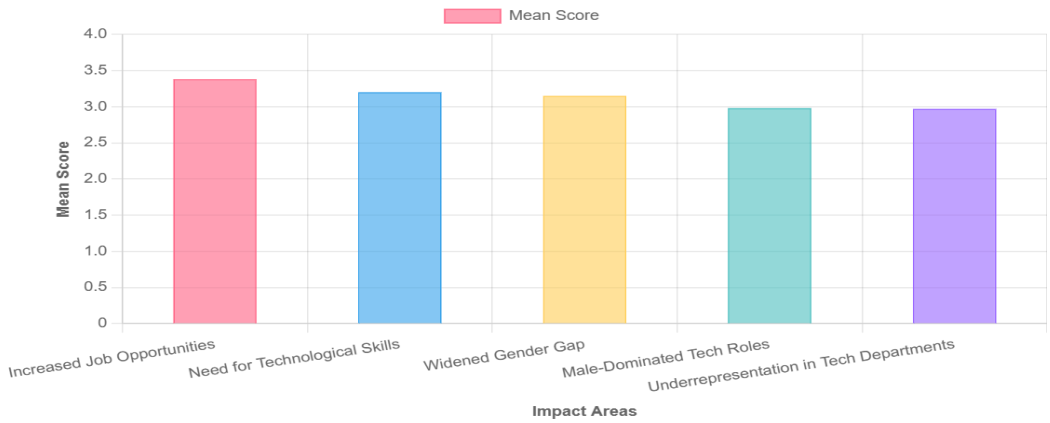


Figure 1: Impact of Technological Advancement on Employment Prospects of Women

in Technical Education Institutions

Challenges Women Encounter When Adapting to Technology-Driven Changes in Their Work Environment

The result in Table 4 reveals how technological revolution creates equal opportunities and motivation for increased women participation in workplace process.

Given the weighted mean score of 3.11, statements with mean values that are equal or greater than the weighted mean score are considered in this result. As shown in Table 4, the respondents ranked "Limited technical skills affect women's ability to take on higher roles'' first with mean of 3.21 and standard deviation of 0.66. Also, 33.4% and 54.8% of the respondents respectively strongly agree and agree with this statement. Ranked second was ''Gender bias exists in how access to tech-based tasks or tools is distributed'' (M = 3.14, SD = 0.69) and 30.5% and 54.5% of respondents strongly agree and agree respectively with this statement. ''Online education and training platforms are too complicated to navigate'' (M = 3.12, SD = 0.70) was ranked third and 28.6% and 56.3% of respondents strongly agree and agree respectively. Three statements that ranked third include: Women in my institute lack adequate access to training on new digital or technological tools (M = 3.12, SD = 0.69) with 28.5% of strongly agree and 57.3% agree; Online education and training platforms are too complicated to navigate (M = 3.12, SD = 0.70) with 28.6% of strongly agree and 56.3% agree; The fear of technology affects how some female colleagues engage with tech-related work (M = 3.12, SD = 0.68) with 27.6% of respondents that were strongly agree while 58.6% also agree with the statement.

As shown in Table 4, from the perspectives of the respondents, the challenges women encounter when adapting to technology-driven changes in their work environment includes: inadequate access to training on new digital or technological tools; limited technical skills affect women's ability to take on higher roles; complications in navigating online education and training platforms; existence of gender bias in the distribution of access to tech-based tasks or tools and the fear of technology that hinders female colleagues from engaging with tech-related work.

Table 4: Challenges Women Encounter When Adapting to Technology-Driven Changes in Their Work Environment

		SA		**A**		**D**		**SD**			
S/N	**STATEMENT**	F	%	F	%	f	%	f	%	***M***	***SD***
1.	Women in my institute lack adequate access to training on new digital or technological tools.	502	28.5	1010	57.3	212	12.0	40	2.3	**3.12**	0.69
2.	Limited technical skills affect women's ability to take on higher roles.	590	33.4	966	54.8	190	10.8	18	1.0	**3.21**	0.66
3.	Online education and training platforms are too complicated to navigate	505	28.6	994	56.3	229	13.0	36	2.0	**3.12**	0.70
4.	Gender bias exists in how access to tech-based tasks or tools is distributed.	538	30.5	961	54.5	238	13.5	27	1.5	**3.14**	0.69

5.	The fear of technology affects how some female colleagues engage with tech-related work.	486	27.6	103 4	58.6	21 1	12.0	33	1.9	**3.12**	0.68
	Weighted Mean									**3.11**	

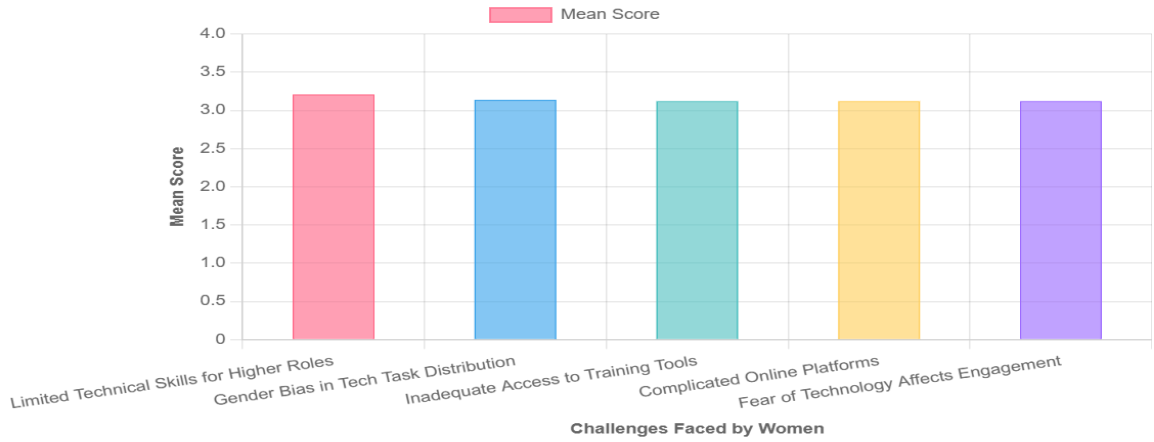


Figure 2: Challenges Women Encounter When Adapting to Technology-Driven Changes in Their Work Environment

Table 5: Gender Difference in Participants' Perception on Technological Revolution Creation of Equal Opportunities and Motivation for Increased Women Participation in Workplace Process.

	Male		**Female**			
Variable	*M*	*SD*	*M*	*SD*	t*(1762)*	*P*
Perception on technological revolution creation of equal opportunities and motivation for increased women participation in workplace process.	3.14	0.41	3.10	0.37	1.808	0.071

p > .05

Result in Table 5 shows an independent t-test conducted to explore gender difference in participants' perception on technological revolution creation of equal opportunities and motivation for increased women participation in workplace process. As shown in Table 5, a non-significant difference was observed in the participants' perception on technological revolution for male (M = 3.14, SD = 0.41) and female (M = 3.10, SD = 0.37), t(1762) = 1.808, p = .071 respondents. This therefore shows that there was no significant gender difference in participants' perception on technological revolution creation of equal opportunities and motivation for increased women participation in workplace process. In other words, male and female respondents

did not differ on the fact that technological revolution creates equal opportunities and motivation for increased women participation in workplace process.

Table 6: Gender Difference in Participants' Opinion on the Difficulties Women Face in the Workplace

Variable	Male		Female			
	M	*SD*	*M*	*SD*	t*(1762)*	*P*
Difficulties women face in the workplace	2.93	0.61	3.06	0.50	-4.199	.000

$p < .05$

Result in Table 6 shows an independent t-test conducted to explore gender difference in participants' opinion on the difficulties women face in the workplace. As shown in Table 6, a significant difference was observed in the participants' opinion on the difficulties women face in the workplace for male (M = 2.93, SD = 0.61) and female (M = 3.06, SD = 0.50), t(*1762*) = -4.199, p = .000 respondents. Female respondents rated the difficulties women face in the workplace significantly higher than their male counterparts and the difference in mean scores for the two groups was found statistically significant at 0.05 level of confidence. This therefore shows that there was a significant gender difference in participants' opinion on the difficulties women face in the workplace. This outcome suggests that women are confronted with significantly higher difficulties in the workplace than what their male counterparts could imagine.

Discussion of Findings

Demographic Representation of Respondents

The study sampled 1,764 staff members across six polytechnics in South-West Nigeria, with an evenly distributed institutional representation (Table 1). A significant majority of the respondents were female (78.7%), indicating a strong base for analyzing gendered experiences within technical education environments. Most respondents were 25 years and above (69.6%), and 92.3% were employed, with 76.5% holding at least a bachelor's degree and a significant number (30.3%) holding postgraduate degrees. These demographics reflect a well-informed population capable of assessing the impact of technological shifts in their institutions.

Impact of Technological Advancement on Women's Employment

In this study, respondents largely agreed that technological advancement has contributed positively to women's employment prospects in technical education (Table 3). Nearly 91.6% either agreed or strongly agreed that technological advancement has increased job

opportunities for women (M = 3.38, SD = 0.70). This finding aligns with Ahmad et al., (2024) study that revealed the positive relationship between female employment and the digital economy in both the short and long run. Their findings showed that digital economy growth leads to a considerable increase in female employment rates in developing countries. Wu, Y., Li, L., & Zheng (2024) also confirmed this in their study that revealed that digitization creates more employment opportunities for female workers and increases their employment share. However, the results also reveal contradictory undercurrents. Approximately 87.7% agreed that technological changes have widened the gender gap in career progression opportunities (M = 3.15, SD = 0.67), and 75.9% acknowledged that technology-based roles are more frequently assigned to male staff (M = 2.98, SD = 0.79). This suggests that while technology opens doors at the surface level, deep-rooted gendered structures continue to influence the allocation of high-level technical opportunities.

These findings are consistent with the argument by Brussevich, Dabla-Norris, & Khalid (2019) that automation disproportionately threatens women's jobs, which are often repetitive jobs. Unfortunately, even as women enter safer, higher-skilled job categories, they still lag behind in leadership and managerial roles as a result of gender bias deeply rooted in company culture.

Challenges Women Face in Adapting to Technological Change

This study reveals several challenges confronting women in adapting to technology-driven roles (Table 4). The highest-rated challenge was the perception that limited technical skills hinder women's ability to access higher roles (M = 3.21). This was followed by gender bias in access to digital tools and tasks (M = 3.14), and inadequate access to training (M = 3.12). These results echo the findings of (Omorogbe & Onojerena, 2018) emphasizes that while women may have formal educational qualifications, the absence of technology-sensitive training programs leave them underprepared for digitally evolving workspaces. Moreover, the fear of technology (M = 3.12) and the complexity of navigating online training platforms (M = 3.12) suggest that psychological and usability barriers further alienate women from full technological participation. However, Ahmed et al (2024) asserts that women who have an education are better equipped to take advantage of digital platforms for entrepreneurship, job growth, and skill advancement.

Perception of Gender Equality in Technological Transformation

This study revealed no significant gender difference in perception of technology's potential to promote equal opportunities (p = 0.071), indicating that both male and female respondents recognized the transformative potential of digital tools in promoting inclusivity (Table 5). However, Table 6 found a statistically significant difference (p < 0.001) in perceptions of workplace

difficulties, with female respondents rating these challenges more highly (M = 3.06) than their male counterparts (M = 2.93).

This finding suggests that men may underestimate the scope and impact of the barriers women face, a gap that can hinder policy design and institutional reform. This aligns with the work of Mazzuca, Moscatelli, Menegatti, & Rubini (2022) who argue that without intersectional insights, gender-inclusive reforms may fail to address underlying constraints.

Conclusion

This study has provided robust empirical evidence on the dual role of technological advancement in shaping gender-inclusive employment in technical education institutions in South-West Nigeria. While digital transformation has opened up employment opportunities for women, it has also exacerbated systemic disparities, especially in access to leadership, training, and technical roles.

The challenges faced by women are not only technical but also structural and psychological, highlighting the need for holistic institutional responses. Without intentional gender-sensitive interventions, technological progress may continue to mirror and magnify existing inequalities. Thus, polytechnics and other technical institutions must shift from merely adopting technology to consciously democratizing it for all genders.

Recommendations

To effectively address the gender gap in tech-based roles within technical education institutions, there is a critical need for inclusive, gender-responsive technology training programs targeted at female staff. Findings from this study reveal that limited access to digital skills and confidence in using technology significantly hinders women's progression into higher-level, tech-driven positions.

Institutions must therefore design and implement structured digital upskilling initiatives that not only offer technical knowledge but are also tailored to accommodate the unique learning needs, schedules, and existing competencies of female employees. These programs should include foundational ICT training, advanced software skills, and hands-on digital leadership modules.

In addition to curriculum design, institutional leadership should ensure equitable access to tech training opportunities by:

- Actively recruiting and nominating women for internal and external tech workshops,
- Providing mentorship and peer support systems to boost digital self-efficacy,
- Ensuring gender-balanced participation quotas in innovation and technology-related roles or units,
- Offering incentives and recognition for women who demonstrate excellence or improvement in tech engagement.

Equipping women with the digital competencies needed to thrive in evolving educational workplaces will bridge access gaps, dismantle long-standing gender

hierarchies, and create a pipeline of capable women ready to lead, innovate, and contribute meaningfully to institutional growth in the digital age.

REFERENCES

Aransi, W. O (2019) Students' Characteristics as Determinants of Academic Performance in Economics among Fatima High School in Irewole Local Government Area, Osun State, Nigeria: Theoretical Approach and Empirical Evidence. Contemporary Research in Education and English Language Teaching, 1(1): 25-35.

Aransi, W. O., Akinyooye, F. E., Odusanya, O. S. E., Sanni, K. T., & Babawale, O. K. (2025). Gender and Age as Determinants of Innovative Work Behaviour Among Public Non-Formal Education Employees in Southwestern Nigeria. Journal of Education, Learning, and Management, 2(1), 226-233.

Arowolo, G. A. (2025). Employment/workplace discrimination in Nigeria: Forms of employment discrimination and strategies for improvement. International Journal of Law, Policy and Social Review, 2025, 7(1), 39-47

Baiyere, A., Salmela, H., & Tapanainen, T. (2020). Digital transformation and the new logics of business process management. European Journal of Information Systems, 29 (3), 238–259. https://doi.org/10.1080/0960085X.2020.1718007

Bartsch, S., Weber, E., Buettgen, M., & Huber, A. (2021). Leadership matters in crisis-induced digital transformation: how to lead service employees effectively during the COVID-19 pandemic. Journal of Service Management, 32(1), 71–85. https://doi.org/ 10.1108/JOSM-05-2020-0160

Brussevich, M., Dabla-Norris, E., Kamunge, C., Karnane, P., Khalid, S. and Kochhar, K. (2018). Gender, technology, and the future of work. Staff Discussion Notes, 18(1). https://ideas.repec.org/p/imf/imfsdn/2018-007.html.

Caputo, F., Cillo, V., Candelo, E., & Liu, Y. (2019). Innovating through digital revolution: The role of soft skills and Big Data in increasing firm performance. Management Decision, 57(8), 2032–2051. https://doi.org/10.1108/MD-07-2018-0833

Ceipek, R., Hautz, J., De Massis, A., Matzler, K., & Ardito, L. (2021). Digital Transformation Through Exploratory and Exploitative Internet of Things Innovations: The Impact of Family Management and Technological Diversification. Journal of Product Innovation Management, 38(1), 142–165. https://doi.org/10.1111/ jpim.12551

Chanias, S., Myers, M. D., & Hess, T. (2019). Digital transformation strategy making in pre-digital organizations: The case of a financial services provider. Journal of Strategic Information Systems, 28(1), 17–33. https://doi.org/10.1016/j.jsis.2018.11.003

Chiappetta, M. (2017). The technostress: Definition, symptoms and risk prevention. Senses and Sciences, 4(1):358-361. DOI:10.14616/sands-2017-1-358361

Faik, I., Barrett, M., & Oborn, E. (2020). How information technology matters in societal change: an affordance-based institutional logics perspective. MIS Quarterly, 44(3), 1359–1390

Fritze, M. P., Eisingerich, A. B., & Benkenstein, M. (2019). Digital transformation and

possession attachment: examining the endowment effect for consumers' relationships with hedonic and utilitarian digital service technologies. Electronic Commerce Research, 19(2), 311–337. https://doi.org/10.1007/s10660-018-9309-8

Jain, A. (2023). Breaking barriers: How technology is empowering women in the workforce. Mint. https://www.livemint.com/news/india/how-technology-is-opening-various-routes-for-gender-equality-in-2023-11678172114057.html.

Kraus, S., Durst, S., Ferreira, J. J., Veiga, P., Kailer, N., & Weinmann, A. (2021). Digital transformation in business and management research: An overview of the current status quo. International Journal of Information Management, 63, 1-18.

Liu, S. (2024). Exploring gender disparities in education: Implications for policy and practice. Journal of Education, Humanities and Social Sciences, 39.386-390.

Makama, G. A. (2013). Patriarchy and gender inequality in Nigeria: The way forward. European Scientific Journal, 9(17). DOI: https://doi.org/10.19044/esj.2013.v9n17p%25p.

Maxwell, E. C., & Maxwell, E. M. (2014). Gender Differences in Digital Literacy Among Undergraduate Students of Faculty of Education, Kogi State University: Implications for E-Resources & Library Use. Advances in Social Sciences Research Journal, 1(7), 96–108. https://doi.org/10.14738/assrj.17.492.

Nwojiewho, D. D. I., & Deebom, M. T. (2017). Gender disparity towards students' enrollment in technical education in Rivers State: Causes, effects and strategies. International Journal of Research - Granthaalayah, 5(10), 1-10.

Rubenstein, A. L., Eberly, M. B., Lee, T. W., & Mitchell, T. R. (2018). Surveying the forest: a meta-analysis, moderator investigation, and future-oriented discussion of the antecedents of voluntary employee turnover. Personnel Psychology, 2018, 71(1), pp. 23–65.

Sanni, K. T., Aransi, W. O., and Arogundade A. O. (2024). Influence of Parental Involvement on Undergraduate Students' Career Choices in Science, Technology, Engineering and Mathematics (STEM) in Southwest, Nigeria, African Journal of Educational Management, Teaching and Entrepreneurship Studies, 11(1);161-173.

United Nations. (2018). Strategies for advancing women's economic empowerment in the context of the Sustainable Development Goals. Economic and Social Commission for Asia and the Pacific, ESCAP/CSD/2018/1. https://digitallibrary.un.org/record/3881984?v=pdf&ln=en.

World Bank. (2023). Gender and digital transformation in sub-Saharan Africa. Washington, DC: World Bank Group.