BRIDGING THE GENDER DIGITAL DIVIDE IN EDUCATION AND EMPLOYMENT

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1.1 ABSTRACT:

The gender digital divide remains a persistent barrier to achieving equality in education and employment across the globe. Despite progress in women's empowerment, disparities in access to digital tools, internet connectivity, and digital literacy continue to marginalize women, particularly in rural regions. The issue is not limited to access alone but extends to effective usage, participation in science, technology, engineering, mathematics (STEM) fields, and digital employment opportunities. In India, women's access to the internet, mobile devices, and AI-driven platforms remains significantly lower than men's, with rural women facing the sharpest barriers due to affordability, infrastructural gaps, and entrenched gender stereotypes. So, the gender digital divide is not simply about ownership of devices, it is about meaningful access and use. Women often remain confined to limited digital functions, while men explore wider applications including professional and financial uses. This divide translates directly into unequal opportunities in education and employment.

The constitutional provisions related to education and equality in India cover not only physical spaces but also the digital environment. Article 21A guarantees the right to free and compulsory education, which now includes access to digital resources as a vital part of effective learning, especially highlighted during events like the COVID-19 pandemic. Likewise, Article 16 assures equality of opportunity in public employment, a sphere increasingly reliant on digital skills and literacy. These constitutional rights therefore extend into the digital domain, recognizing that access to digital infrastructure is essential for true equality in education and employment.

National Family Health Survey data (2019–21) and other studies reveal stark inequalities. Gaps have severe implications for education, as girls often cannot participate in online learning or competitive exams, and for employment, as 90% of jobs today involve digital skills. Initiatives like BharatNet, Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA), Study Webs of Active Learning for Young Aspiring Minds (SWAYAM), and state-led programs have improved digital literacy, but progress remains uneven. Bridging this divide is essential to achieving Sustainable Development Goal 5 (gender equality) and unlocking women's

potential in India's economy. This research emphasizes the need to focus on rural women, who remain largely excluded from digital participation, while the United Nations (UN) Gender Equality Acceleration Plan calls for eliminating digital exclusion. The Group of Twenty (G20) has also urged member states to strengthen digital infrastructure and provide women with lifelong digital training. In India, however, despite progress, gaps persist because rural women lack autonomy, infrastructure, and financial capacity.

1.2 Introduction:

The digital era has transformed how people learn, work, and communicate across the world. Yet, this technological progress has not benefited all sections of society equally. A gap remains between men and women in accessing and using digital technologies, known as the gender digital divide. It refers to the disparity between men and women in digital access, internet use, education, and participation in the technology-driven economy. Understanding this divide is vital for achieving gender equality and promoting inclusive development[1]. The gender digital divide has gradually evolved. Initially, it was understood mainly as a gap in physical access to devices or the internet. Over time, scholars and policymakers recognized that access alone does not ensure empowerment. The divide extends to digital literacy, confidence, safety, and opportunities to benefit from technology. Socio-economic factors such as income, education, occupation, caste, and geography further deepen the divide. In many rural and low-income settings, women are far less likely to own smartphones, have stable internet connections, or use digital banking and e-learning platforms. [2]This has long-term effects on their educational and employment prospects, reinforcing social and economic inequalities.

In the global context, organizations like the International Telecommunication Union (ITU) and the World Bank note that women continue to lag behind men in terms of internet usage and digital skills. Although internet access has expanded worldwide, progress for women is slower, particularly in developing nations. Africa and South Asia show the widest gaps due to social restrictions, affordability barriers, and limited network infrastructure. Even in industrialized regions, where access rates are higher, gender disparities persist in areas such as leadership in technology sectors and representation in digital entrepreneurship.

In India, the gender digital divide is more visible and complex. According to the National

[1] United Nations, *E-Government Survey 2022: The Future of Digital Government* (United Nations 2022).
[2] GSMA, *The Mobile Gender Gap Report 2023* (GSMA 2023).

Family Health Survey (NFHS-5), the proportion of women who use the internet is significantly lower than that of men. Factors such as patriarchal norms, income disparities, and safety concerns affect women's digital participation. Initiatives like the Digital India Programme, Beti Bachao Beti Padhao, and the Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) have been introduced to improve digital literacy and inclusion. However, these programmes often face challenges in ensuring that women benefit equally from digital transformation. Strengthening gender-responsive policies, local digital training programs, and community awareness campaigns can ensure that digital growth becomes inclusive and equitable. Digital inclusion plays a crucial role in promoting education and employment. Access to digital tools enables women and girls to pursue online learning, gain new skills, and explore professional opportunities. Digital technologies also support women's entrepreneurship, remote work, and access to financial services such as digital payments and online marketplaces. Without narrowing the divide, women risk being excluded from the digital economy, which could widen social and economic inequality.

Bridging the gender digital divide is directly linked to the Sustainable Development Goals (SDGs), especially SDG 5 on Gender Equality and SDG 4 on Quality Education. Digital equity enables access to quality learning resources while promoting equality and empowerment.[3] Therefore, closing this divide is not only a technological challenge but a human rights and social justice imperative. It is central to building inclusive societies where both men and women can contribute effectively to the knowledge economy.

1.3 Review of Literature:

The gender digital divide in India is not only about whether women have access to phones or the internet but also about how they are able to use technology. Scholars such as Hilbert (2011) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) note that real inclusion depends on developing digital skills, being able to use technology for education or work, and participating in the digital economy. Reports by the Organisation for Economic Co-operation and Development (OECD) and United Nations (UN) Women point out that when women are excluded from technology, it widens existing social and economic inequalities. Global frameworks like Sustainable Development Goal 5 (SDG 5) and the United Nations

[3] United Nations, *Transforming Our World: The 2030 Agenda for Sustainable Development* (UN 2015).

Gender Equality Acceleration Plan also underline the importance of improving women's access to Information and Communication Technologies (ICTs) as a way to promote gender equality.

Scholars such as Hilbert (2011) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) emphasize that the gender digital divide in India goes beyond access to phones or internet connectivity and involves the ability to use technology effectively. They argue that real inclusion requires the development of digital skills, enabling women to use technology for education, work, and participation in the digital economy. Reports by the Organisation for Economic Co-operation and Development (OECD) and United Nations (UN) Women further highlight that when women remain excluded from digital technologies, it deepens existing social and economic inequalities.

Global frameworks such as Sustainable Development Goal 5 (SDG 5) and the United Nations Gender Equality Acceleration Plan also underline that improving women's access to Information and Communication Technologies (ICTs) is essential for achieving gender equality. These frameworks encourage nations like India to integrate digital inclusion into their equality and development agendas.

Recent surveys, including the National Family Health Survey (NFHS-5, 2019–21), the Global System for Mobile Communications Association (GSMA) Mobile Gender Gap Report (2023), and Internet and Mobile Association of India (IAMAI) studies, reveal that only about one-third of women in India use mobile internet compared to over half of men. Rural women face sharper disadvantages because of the high cost of digital devices, weak connectivity, and restrictive socio-cultural norms within families and communities. The Organisation for Economic Co-operation and Development (OECD) link this digital gap to the low participation of women in Science, Technology, Engineering, and Mathematics (STEM) education and technology-related employment.

Kabeer (2019) and Mukherjee (2021) observe that rural women often use mobile phones only for basic purposes like calling, messaging, or shopping, with limited access to online learning, coding, or Artificial Intelligence (AI) tools. Studies by the Global System for Mobile Communications Association (GSMA) and the Comprehensive Modular Survey: Telecom 2025 reaffirm that owning a device is insufficient; awareness, literacy, and individual autonomy are crucial for meaningful digital participation.

The problem becomes more evident in education and employment. During the COVID-19 pandemic, unequal access to digital devices caused a significant gap in learning; in Maharashtra, only 6.9% of girls had access to devices compared to 93.1% of boys. The Organisation for Economic Co-operation and Development (OECD), Group of Twenty (G20), and Think Twenty (T20) studies state that more than 90% of new jobs now require digital skills, showing how exclusion restricts women's economic opportunities.

Despite initiatives such as Bharat Broadband Network Limited (BharatNet), Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA), Study Webs of Active Learning for Young Aspiring Minds (SWAYAM), and Information and Communication Technology at Schools (ICT@Schools), women's participation in digital spaces remains limited. Researchers including Lalit Anjana (2023), Samudra (2022), Nath and Barah (2017), and Peláez-Sánchez et al. (2023) conclude that deep-rooted social norms, stereotypes, and structural inequalities continue to hinder women's full digital empowerment. They emphasize that India requires not only gender-sensitive but also community-based and sustainable Information and Communication Technology (ICT) policies to ensure genuine digital inclusion and equal participation for women in the digital economy.

1.5 Scope

This study focuses on understanding the gender digital divide in India, with special attention to rural women and its impact on education and employment. It goes beyond the question of access to devices or internet connectivity and examines how social, cultural, and economic factors influence women's ability to use digital tools meaningfully. The research explores issues such as affordability, lack of digital skills, limited autonomy, and restrictive social norms that prevent women from benefiting fully from technology. It also studies how unequal digital access affects women's learning opportunities, participation in online education, and chances in the job market.

The study evaluates the effectiveness of government programs such as Bharat Broadband Network Limited (BharatNet), Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA), and Study Webs of Active Learning for Young Aspiring Minds (SWAYAM) in promoting digital inclusion. It links these efforts to constitutional guarantees under Article 14 (Right to Equality), Article 16 (Equality of Opportunity in Public Employment), and Article 21A (Right to Education) of the Constitution of India. The research also refers to global

frameworks like Sustainable Development Goal 5 (SDG 5: Gender Equality) and the United Nations (UN) Gender Equality Acceleration Plan, highlighting the need for inclusive policies to empower women in India's digital economy.

1.6 Research Objectives

1.6.1 To identify the main social, cultural, and economic factors that cause the gender digital divide in education and employment, especially in rural areas.

1.6.2 To study how limited access to digital tools and internet connectivity affects women's learning, skill development, and job opportunities.

1.6.3 To evaluate the effectiveness of government policies and programs in promoting digital inclusion and suggest ways to improve women's digital participation.

1.7 Statement of Problem

The problem this study addresses is the wide gender gap in digital access and usage in India, especially among rural women. While many policies aim to promote digital inclusion, women still face barriers due to social norms, lack of education, poor infrastructure, and limited financial means. This divide affects their ability to learn, find jobs, and participate in the digital economy. Even though urban women are gradually improving their digital skills, rural women remain left behind. This study is to determine why these disparities continue to exist and how effective policies can truly bridge this digital divide.

1.8 Hypothesis:

Hypothesis 1: The gender digital divide in India is not merely a question of access to devices or internet connectivity but is rooted Socio-cultural norms, affordability, and limited digital skill development mainly contribute to the gender digital divide in India, especially among rural women.

Hypothesis 2: Urban women are gradually improving their engagement with digital technologies, rural women remain excluded due to lack of infrastructure, financial independence, and social restrictions. Effective implementation of existing digital inclusion policies can bridge the gender digital divide and improve women's education, employment,

and participation in the digital economy.

1.9 ***Research Questions*****:**

1.9.1 What are the key socio-economic and cultural factors contributing to the digital gender divide in education and employment, particularly in rural India?

1.9.2 How does limited access to digital tools and internet connectivity affect women's participation in online education, competitive examinations, and employment opportunities?

1.9.3 Whether policy interventions, technological initiatives, and strategies can effectively bridge the digital gender divide and promote women's digital empowerment?

1.10 Methodology:

This study employs a mixed-methods research design to explore how the gender digital divide affects women's participation in education and employment in India, especially in rural areas. The methodology combines statistical data analysis with policy and case study evaluation to understand patterns of access, usage, and empowerment in the digital sphere.

Quantitative Method:

Secondary data has been collected from national and international surveys such as the National Family Health Survey (2019–21), Comprehensive Modular Survey: Telecom 2025, GSMA Mobile Gender Gap Report (2023), and OECD (2018). These datasets provide measurable insights into mobile phone ownership, internet usage, and digital literacy levels among men and women across urban and rural India.

Qualitative Method:

The qualitative aspect is based on case studies of digital literacy and inclusion programs such as Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA), ICT@Schools, BharatNet, and various state-led initiatives. It also includes a review of scholarly works and policy briefs from the UN, G20, and T20 to assess the effectiveness of these initiatives and

understand the social and cultural barriers that limit women's access and use of digital technologies.

2. UNDERSTANDING THE GENDER DIGITAL DIVIDE

The gender digital divide is not only about owning or using technology. It is also shaped by social, economic, and cultural factors that affect women's ability to participate in the digital world. These barriers often stop women and girls from using technology freely or gaining from digital opportunities.

2.1 Patriarchal Norms and Gender Roles

One of the main reasons for the gender digital divide is patriarchy, a system where men hold more power and control in families and society. In many places, using technology like mobile phones, computers, or the internet is still seen as a "male" domain. [4]Women are often expected to focus on household work, childcare, and family responsibilities rather than learning digital skills.

Because of these traditional ideas, women may feel less confident or motivated to explore technology. In some families, even if a smartphone or internet connection is available, women must ask for permission to use it. Their mobility and decision-making power are limited, which reduces their independence and access to digital tools.

Another big barrier is inequality in education and income. Many women from poor families cannot afford digital devices or internet services. In rural India, many girls leave school early due to poverty, early marriage, or household duties. [5]As a result, they miss the chance to learn basic reading, writing, and digital skills needed in the modern world. Without proper education, using digital platforms can be confusing or intimidating. Women with limited digital literacy often cannot access online classes, job portals, or financial services. This keeps them excluded from many opportunities that technology can offer.

2.2 Safety, Social Stigma and rural-urban divide

Safety concerns and social stigma are also major barriers to women's digital participation.

[4] N Hafkin and S Huyer, *Women and Gender in ICT Statistics and Indicators for Development* (United Nations, 2007).
[5] M Hilbert, 'Digital Gender Divide or Technologically Empowered Women in Developing Countries?' (2011)

Many women face online harassment, bullying, or abuse on social media and messaging apps.This creates fear and discourages them from being active online. Families also worry that internet use may expose women to harmful or inappropriate content. These fears often result in families limiting or controlling women's access to phones and the internet. The absence of strong privacy and security protections makes it harder for women to feel safe in digital spaces. Creating safer online environments is essential to increase women's confidence in using technology.

The rural-urban divide makes the problem even bigger. Cities usually have better internet services, higher income levels, and more education facilities that support women's digital literacy.Rural areas, on the other hand, struggle with poor network connections, lack of awareness, and traditional beliefs that discourage women from using technology. In northern Indian states like Uttar Pradesh and Bihar, women's internet use is still very low. Many depend on male relatives for digital access. In contrast, southern states such as Kerala and Tamil Nadu have better education systems and more gender-friendly policies. This has helped more women in these states use digital tools for learning and employment.[6]

These social, economic, and cultural barriers show that digital inclusion for women requires more than just giving out devices or improving internet connections. Real progress depends on changing social attitudes, increasing female education, ensuring online safety, and making digital access affordable. Programs to promote women's digital skills should work closely with local communities to address patriarchal beliefs and social stigma. Creating safe and supportive digital environments can help women participate confidently. When women have equal access to technology, it becomes a strong tool for education, empowerment, and inclusive growth. During COVID-19, digital use increased a lot in India, with more people shopping, using tele-health, and making online payments. However, the digital divide between men and women grew wider. Indian women are less likely to own a mobile phone or use mobile internet compared to men. For example, in 2020, only 25% of women owned smartphones, while 41% of men did. Many women in rural areas or from poorer families still lack easy access to digital devices due to social norms, high costs, and safety concerns. Women also face restrictions from male family members, limiting their online activities. During the pandemic, many girls and

[6] NFHS-5, *National Family Health Survey (2019–21)*, Ministry of Health and Family Welfare, Government of India.

women missed out on online classes or government aid because they didn't have internet access or digital skills. [7]

3. DIGITAL ACCESS AND MEANINGFUL USE

The gender digital divide is not only about whether women have access to digital devices or the internet. It is also about how effectively they can use these tools to improve their lives. Having a mobile phone or internet connection does not automatically mean that a woman is digitally included. True inclusion happens when she can use technology in a meaningful, confident, and independent way for education, work, and personal growth.[8] Access means the physical availability of devices such as smartphones, computers, or internet connections. Affordability refers to whether a person can pay for these devices, data plans, and maintenance costs. However, actual use goes beyond both—it is about how people interact with technology in their daily lives. For example, even if a family owns a smartphone, women may not be allowed to use it freely or may not know how to use it effectively. In many rural households, one phone is shared among several family members, and men often control when and how it is used. Thus, access does not always mean freedom or skill to use digital tools.

3.1 Empirical study: rural smart phone usage and Gender gaps

Questionnaire and responses:

To understand the gender digital divide in my local area, I conducted a small household survey in my village focusing on smartphone usage, internet access, and awareness of Artificial Intelligence (AI). The survey covered both men and women from different age and education groups.

1. Do you (personally) own or have regular access to a mobile phone or smartphone?

Almost every household reported having at least one mobile phone, showing that access to devices is no longer a major issue. However, individual ownership varied — while men and younger people generally had personal phones, many women and elderly respondents relied on a shared family phone. This indicates that while mobile penetration is high, individual access

[7] M Nikore, 'India's Gendered Digital Divide: How the Absence of Digital Access Is Leaving Women Behind' (Observer Research Foundation, 22 August 2021)
[8] Jan van Dijk, *The Digital Divide* (Polity Press 2020)

and control remain unequal.

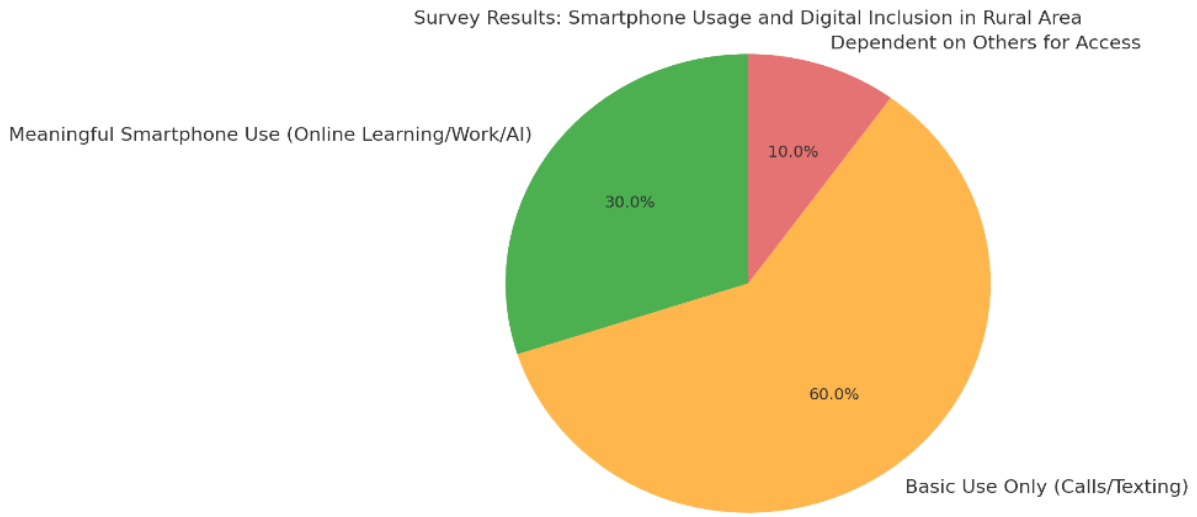
2. Do you use a smartphone for meaningful activities, such as online learning, job-related tasks, accessing government services, or using AI tools (like ChatGPT, Google Assistant, or educational apps)?

Only around 30% of respondents said they used smartphones for meaningful digital activities. This group mainly consisted of younger individuals, students, and those with at least secondary education who were familiar with the internet and basic AI tools. The remaining 70% used their phones primarily for calls or texting, showing that digital access does not automatically lead to digital empowerment.

3. Do you need to ask a family member (husband or elder male) to use the phone or access the internet?

Among women participants, about 10% admitted that they still need permission or assistance from male family members to use a smartphone or go online. This reflects how social norms and gender roles continue to influence technology use, even when physical access exists.

The findings show that while almost every household owns at least one mobile phone, only about 30 percent of respondents use smartphones in a meaningful way: such as for online learning, employment-related work, or accessing government services. This group mostly included younger individuals and students who had some digital literacy and exposure to AI tools like ChatGPT, Google Assistant, or educational apps. However, the majority of people around 70 percent use phones only for basic purposes such as making calls or sending text messages. Many respondents, especially women and elderly men, lacked awareness about internet connectivity, Wi-Fi, or online applications. About 10 percent of the women said they still depend on their husbands to access or use a mobile phone, highlighting ongoing gender-based restrictions. The survey reflects a significant gap between access and meaningful use of technology. It shows that true digital inclusion in rural areas requires not just devices, but also digital literacy, autonomy, and awareness



The Global System for Mobile Communications Association (GSMA) talk about "meaningful connectivity." This concept means more than just being online, it involves having a reliable internet connection, owning a personal device, and having the skills and confidence to use it productively. True digital inclusion gives women digital autonomy, meaning the ability to use technology on their own terms, without needing permission or facing control from others. For instance, a woman who can independently use her smartphone to learn online, apply for jobs, or manage her finances has achieved digital autonomy.

In many parts of India, however, women still lack this autonomy. Social rules often limit their use of technology. In rural households, men or elders may act as "gatekeepers" who control women's access to devices and online activities. Some families believe that internet use may lead women to "bad influences" or unwanted attention, which makes them restrict or monitor women's digital behavior. This kind of control takes away women's independence and prevents them from exploring opportunities that digital platforms offer.

3.2 Skill Gaps

Even when women can use mobile phones or computers, there is a big difference between basic use and productive use. Basic use means simple activities like making calls or sending messages, while productive use involves using technology for education, online learning, digital payments, or accessing e-governance services. Many women, especially in rural areas, are stuck at the basic level because of low digital literacy and lack of proper training. Without these skills, they cannot take full advantage of the digital economy. For example, the GSMA's *State of Mobile Internet Connectivity Report (2023)* shows that women in low- and middle-

income countries are 19% less likely than men to use mobile internet. This gap widens when looking at advanced uses such as online learning or mobile banking. Education plays a key role in bridging this gap, women who are educated are more likely to use the internet in meaningful ways that benefit their personal and professional lives.[9]

4. DIGITAL GENDER DIVIDE IN EDUCATION

The gender digital divide has a strong impact on education, especially in developing countries like India. Education today depends heavily on technology—students use smartphones, computers, and the internet for learning. However, when many girls and women cannot access these tools, it creates serious inequalities. The COVID-19 pandemic made this problem worse, showing how technology can both connect and exclude learners.

When schools shut down during the pandemic, classes moved online. But not everyone could join. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), millions of students, especially girls, were left out of digital learning. Many families did not have enough smartphones or stable internet connections[10]. In households with one device, it was usually given to the male child, while girls were asked to help with housework. This showed how social norms and technology access combined to keep girls behind. A report by the United Nations International Children's Emergency Fund (UNICEF) (2020) also found that girls were more likely to drop out of school during this period. Without proper access to online education, many lost touch with studies and did not return when schools reopened. For them, the pandemic was not just a temporary pause but a long-term setback in learning and digital skills.[11]

4.1 Access to Devices, Connectivity, and Digital Classrooms

Access to digital education depends on three main factors: devices, internet connectivity, and the ability to use online platforms. In rural areas, even when smartphones are available, poor signal strength or lack of electricity makes online classes difficult. Many families share one device, forcing students to take turns. Girls are often the last to get access because their education is seen as less important. According to India's *National Sample Survey (2021)*, fewer

[9] GSMA, *State of Mobile Internet Connectivity Report 2023* (GSMA Intelligence 2023).
[10] UNESCO, *When Schools Shut: Gendered Impacts of COVID-19 School Closures* (UNESCO 2021).
[11] UNICEF, *COVID-19 and Girls' Education: What Works for Recovery* (UNICEF 2020).

than half of rural households had internet access, and only a small percentage of women could use it independently. Schools and teachers also faced challenges in creating effective online classes. Many teachers lacked digital training, making it harder to engage students virtually.[12]

Another important aspect of the gender digital divide is the low participation of girls in Science, Technology, Engineering, and Mathematics (STEM) fields. These subjects are the foundation of careers in Artificial Intelligence (AI), coding, and data science—areas that shape the future job market. But due to stereotypes that "science and technology are for boys," girls often avoid or are discouraged from studying STEM subjects. Even those who are interested face challenges such as lack of female role models, limited resources, and fewer opportunities for digital skill development. As a result, women remain underrepresented in technology-related education and careers. The Organisation for Economic Co-operation and Development (OECD) emphasizes that future education systems must encourage gender balance in digital and technical fields.

Digital teaching methods, or "digital pedagogy," also have gendered effects. Boys tend to receive more support to explore online learning, while girls face doubts about their ability to handle technology. In some conservative communities, parents fear that internet exposure might "spoil" girls, limiting their learning opportunities. Teachers may also unconsciously favor male students in technology-based subjects, deepening the gap.

4.2 Case Study: Maharashtra (only 6.9% of girls had digital access during pandemic)

The situation in Maharashtra clearly shows the extent of this problem. During the pandemic, a study found that only 6.9% of girls in the state had access to digital learning tools. Most girls relied on shared phones or borrowed devices, and many had to drop out temporarily. The lack of access to devices and the internet not only affected their studies but also their confidence in using digital tools later on.[13]

5. GENDER DIGITAL GAP IN EMPLOYMENT

The digital economy is creating new opportunities for work and innovation, but women

[12] National Sample Survey, *Education and ICT Access in India* (Ministry of Statistics and Programme Implementation, Government of India 2021).
[13] Preeti Tate, 'Maharashtra: Only half of students in state have access to online learning, finds survey' *The Indian Express* (Mumbai, 25 May 2023)

continue to face several barriers that limit their participation. One major issue is the gender gap in digital skills. Many women, especially in rural areas, do not have access to proper training or education in technology. Even when they have internet access, they often lack the knowledge to use digital tools for learning or earning purposes. According to the International Labour Organization (ILO, 2020), this skill divide starts early, as fewer girls are encouraged to study science, technology, engineering, and mathematics (STEM) subjects. As a result, women are underrepresented in digital jobs such as coding, software development, and data analytics. The lack of exposure to such skills during education leads to fewer job opportunities in technology-driven sectors later in life.[14] Another challenge is algorithmic bias in AI-based recruitment systems. Many companies now use artificial intelligence to screen candidates, but these systems can unintentionally favor men because they are trained on biased data. At the same time, women who do work in the technology sector often face barriers in career advancement, unequal pay, and limited leadership opportunities. They are more likely to work in support roles rather than in decision-making or technical positions.

5.1 Women in the Gig and IT/ITES Sectors

Despite these challenges, digital platforms and remote work opportunities are helping women enter the workforce in new ways. The gig economy, which includes freelance, contract, and platform-based work like online tutoring, content writing, and delivery services — offers flexibility that suits many women, especially those balancing family responsibilities. However, gig work often lacks job security, health benefits, and stable income. In India's IT and IT-enabled Services (ITES) sector, there has been noticeable progress in including women. Many large IT firms now actively hire women in coding, software support, and customer service roles. Work-from-home options have further increased women's participation, allowing them to manage both work and household duties. Yet, the number of women in senior management or technical leadership remains low.[15]

The World Bank (2021**)** highlights that promoting digital jobs for youth and women is essential for inclusive growth. Training programs, digital literacy workshops, and targeted policies can help women build the necessary skills to thrive in the digital economy. Encouraging girls to take up STEM education, addressing algorithmic bias, and creating safe, inclusive workspaces

[14] International Labour Organization (ILO) (2020). *Women and the Future of Work in the Digital Economy.*
[15] Anand Nandkumar and Ankita Sharma, "Women's Inclusion in the Gig Economy: An Unfulfilled Promise" (Srini Raju Centre for IT and the Networked Economy, Indian School of Business, 2024)

are key steps toward bridging this employment divide.[16]

6. Constitutional Basis for Promoting Digital Equality in India

The Indian Constitution provides a strong foundation for promoting digital equality through its Fundamental Rights and Directive Principles of State Policy. Article 14 ensures *equality before the law* and *equal protection of laws*, meaning that every citizen must have equal access to opportunities, including those in the digital sphere[17]. Article 15 prohibits discrimination on the basis of sex, which extends to ensuring that women are not excluded from access to digital resources and opportunities. Article 16 guarantees equality of opportunity in matters of employment, which today includes access to digital jobs, online training, and technological upskilling.[18]

Further, Article 21A recognizes the *right to education* as a fundamental right[19]. In the digital era, this right can be interpreted to include access to online learning platforms, digital tools, and internet connectivity. The Supreme Court in *Mohini Jain v. State of Karnataka* [20]and *Unni Krishnan, J.P. v. State of Andhra Pradesh* [21]emphasized that the right to education forms an integral part of the *right to life and dignity* under Article 21. These interpretations show that education today must also ensure digital inclusion.

7. GOVERNMENT AND GLOBAL INITIATIVES FOR DIGITAL INCLUSION

Digital inclusion has become a key goal for both the Indian government and international organizations. Many programs aim to make technology accessible and useful for everyone, especially women and rural communities. These initiatives help bridge the gap between those who have access to digital tools and those who do not, promoting equality in education and employment.

7.1 National Programs

BHARATNET:

Expanding rural broadband: BharatNet is one of India's biggest projects to connect rural

[16] World Bank (2021). *Digital Jobs for Youth and Women: A Pathway to Inclusive Growth.*
[17] *Constitution of India*, art 14.
[18] *Constitution of India*, art 15.
[19] *Constitution of India*, art 21A.
[20] *Mohini Jain v. State of Karnataka*, 1992 SCC OnLine SC 366 : (1992)
[21] *Unni Krishnan, J.P. v. State of Andhra Pradesh*, 1993 SCC OnLine SC 42 : (1993)

areas with high-speed internet. It aims to provide broadband access to every Gram Panchayat in the country. This project helps schools, health centres, and local offices go online, making digital services available to people in villages who were earlier left out.[22]

PMGDISHA (Pradhan Mantri Gramin Digital Saksharta Abhiyan)

PMGDISHA focuses on digital literacy. It trains rural citizens, especially women and the elderly, to use computers, smartphones, and the internet for everyday needs. The program has helped millions of people learn basic digital skills like online payments, using apps, and accessing government services.[23]

SWAYAM and ICT@Schools

SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds) is an online learning platform that offers free courses from school to university level. It allows students, especially those from remote areas, to access quality education[24]. Similarly, ICT@Schools is a government initiative to integrate digital tools in classrooms and train teachers to use technology effectively.

7.2 Global and Comparative Frameworks

UN Women's Gender Equality Acceleration Plan

UN Women promotes digital equality as part of its Gender Equality Acceleration Plan. It encourages countries to close the gender gap in internet access, digital education, and leadership in technology sectors. The plan highlights the need for safe online spaces and equal opportunities for women in the digital economy.[25]

OECD and UNESCO Global Frameworks

Both OECD and UNESCO have created frameworks that guide countries on inclusive digital growth. They recommend improving women's digital skills, increasing access to

[22] BharatNet: Ministry of Electronics and Information Technology, *BharatNet Project Overview*
[23] Ministry of Electronics and Information Technology, *PMGDISHA: Pradhan Mantri Gramin Digital Saksharta Abhiyan (2022)*
[24] Ministry of Human Resource Development, *SWAYAM Portal* (Government of India, 2023).
[25] UN Women, *Gender Equality Acceleration Plan 2022–2025* (UN Women, 2022).

affordable internet, and promoting gender-sensitive digital policies. These frameworks also stress that education systems must adapt to teach future-ready digital skills.[26][27]

G20 and T20 Recommendations

The G20 and its think tank, T20, emphasize the importance of women's participation in the digital economy. Their reports call for greater investment in digital infrastructure, digital literacy for girls, and equal opportunities in STEM and technology-based employment. [28][29]India, as part of these groups, has adopted several of these recommendations into national programs like Digital India and PMGDISHA.

8. CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

The gender digital divide is still a big problem in India and around the world. Many women, especially in villages, do not get the same chance as men to use digital tools like smartphones, the internet, and online platforms. Even if they have access to a phone, they often do not know how to use it for learning or work. The problem is not only about access but also about awareness, skills, and confidence. Social rules, lack of money, and low education levels stop women from becoming digitally independent.

Government programs such as Digital India, PMGDISHA, SWAYAM, and BharatNet have helped increase digital access, but not everyone benefits equally. Many rural women still depend on men to use phones or go online. International bodies like UN Women, UNESCO, and OECD also say that true equality means giving women both access and the skills to use digital tools safely and effectively.

The study confirms both hypotheses. The gender digital divide in India is not just about access to technology but is mainly caused by social norms, low income, and lack of digital skills, especially among rural women. Even when devices are available, many women cannot use them effectively due to limited education and autonomy.

[26] OECD, *Digital Economy Outlook* (2020).
[27] UNESCO, *A Global Framework for Digital Literacy* (2021).
[28] T20 India, *Bridging the Gender Digital Divide for Inclusive Growth* (2023).
[29] G20, *Policy Recommendations for Women's Digital Empowerment* (2021).

It also finds that while urban women are improving in digital use, rural women still face exclusion because of poor infrastructure and social barriers. Government programs like BharatNet, PMGDISHA, and SWAYAM have helped, but progress is uneven. The study concludes that empowering women through affordable access, digital training, and awareness is essential to achieve true equality in education and employment.

8.2 Recommendations:

- Start simple digital training programs in villages to teach women how to use smartphones, the internet, and online services safely.
- Include digital skills, coding, and internet safety lessons in school curriculums to prepare girls for future jobs.
- Offer subsidies or low-cost data plans and devices for poor families so women can stay connected.
- Enforce strict laws and conduct awareness campaigns to protect women from online harassment and privacy violations.
- Encourage women to join fields like information technology (IT), artificial intelligence (AI), and e-commerce.
- Build local digital learning centres in every village where women can learn and practice with help from trainers.
- Track and report how many women benefit from government digital schemes to ensure equal impact.

Bridging the gender digital divide is about equality, and empowerment, not just technology. When women become digitally skilled, they can study better, earn more, and support their families. Equal digital access for women will help build a stronger, and more inclusive India.

BIBLIOGRAPHY:

Primary Sources

Legislation and Policy Frameworks

• The Constitution of India, Arts 14, 15, 16 and 21A.

• National Education Policy 2020 (India).

• Digital India Programme, Ministry of Electronics and Information Technology (India, 2015).

• Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA), Ministry of Electronics and Information Technology, Government of India.

• BharatNet Initiative, Ministry of Electronics and Information Technology, Government of India.

• ICT@Schools Programme, Ministry of Education, Government of India.

• Study Webs of Active Learning for Young Aspiring Minds (SWAYAM), Government of India.

• United Nations Sustainable Development Goals (SDGs), adopted 25 September 2015, UNGA Resolution A/RES/70/1.

• UNESCO Recommendation on Open Educational Resources (Paris, 2019).

Cases

• Mohini Jain v State of Karnataka AIR 1992 SC 1858.

• Unni Krishnan, J P v State of Andhra Pradesh (1993) 1 SCC 645.

Secondary Sources

Books and Reports

• Hilbert M, Digital Gender Divide or Technologically Empowered Women in Developing

Countries? (Women's Studies International Forum, 2011).

• Kabeer N, Digital Access and Empowerment of Women in Rural India (2019).

• Mukherjee A, Women's Digital Empowerment and Barriers to Effective Use in India (2021).

• Lalit A, Gender Digital Divide in India: Socio-Cultural Factors Impacting Women's Digital Use (2023).

• Samudra A, Gendering the Digital Divide in India (2022).

• Nath M and Barah P, Digital India and Women: Bridging the Digital Gender Divide (2017).

• Peláez-Sánchez J and others, Social Barriers and Gender Stereotypes in Digital Inclusion (2023).

• Parihar N, Gender Equality and ICT Access: Legal Pathways to Empowerment (Oxford University Press, 2023).

Government Reports and National Surveys

• Ministry of Health and Family Welfare, Government of India, National Family Health Survey (NFHS-5), 2019–21.

• Telecom Regulatory Authority of India (TRAI), Comprehensive Modular Survey: Telecom 2025 (TRAI 2025).

• Ministry of Electronics & Information Technology, Government of India, Digital India Programme: Annual Report 2023.

• Ministry of Electronics & Information Technology, Government of India, Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) Progress Report 2022.

• Ministry of Education, Government of India, SWAYAM Annual Report 2022.

• Ministry of Education, Government of India, ICT@Schools Program.

• Department of Telecommunications, BharatNet Project: Status Report 2023 (Government of

India, 2023).

• Government of India, National Sample Survey Report on Education and Digital Access 2021 (Ministry of Statistics and Programme Implementation, 2021).

International and Policy Sources

• Organisation for Economic Co-operation and Development (OECD), Bridging the Digital Gender Divide: Include, Upskill, Innovate (OECD Publishing, 2018).

• Organisation for Economic Co-operation and Development (OECD), Employment and Digital Skills (OECD, 2018).

• Organisation for Economic Co-operation and Development (OECD), Digital Skills and Employment in Science, Technology, Engineering, and Mathematics (STEM) (OECD, 2018).

• United Nations Educational, Scientific and Cultural Organization (UNESCO), Gender Equality and Women's Empowerment (Sustainable Development Goals, n.d.).

• United Nations (UN) Women, Gender Equality Acceleration Plan: Digital Inclusion and Leadership (UN Women, 2021).

• International Labour Organization (ILO), Digital Labour Platforms and the Future of Work (ILO, 2020).

• World Bank, Promoting Digital Jobs for Youth and Women in India (World Bank, Washington DC, 2021).

• Global System for Mobile Communications Association (GSMA), Mobile Gender Gap Report 2023 (GSMA, 2023).

• Internet and Mobile Association of India (IAMAI), Consumer Usage and Broadband Experience (ICUBE) Studies (IAMAI, 2025).

• Save the Children, Disproportionate Impact of COVID-19 on India's Girls (Save the Children International, 4 March 2021).

• Group of Twenty (G20), Digital Skills for Inclusive Growth: Policy Brief (G20, 2022).

• International Telecommunication Union (ITU), Measuring Digital Development: Facts and Figures 2022 (ITU Publications, Geneva, 2022).

• Think20 (T20), Policy Brief on Gender Equality in the Digital Age (T20 India, 2023).

• UNICEF, COVID-19 and Digital Learning: Global Lessons for Inclusion (UNICEF, 2020).

Newspaper and Media Reports

• The Hindu, 'Women Still Lag Behind in Digital Access, Says NFHS-5 Data' (New Delhi, 20 February 2022).

• The Indian Express, 'Digital Divide Deepens Gender Gap in Rural Jobs' (Mumbai, 14 March 2023).

• The Times of India, 'India's Rural Women Struggle for Digital Inclusion' (New Delhi, 6 August 2023).