Beyond the Device: Bridging India's Digital Gender Divide

Nelofer Laskar
Department of Social Work
St. Xavier's University, Kolkata

1. Abstract

This study examines the nature and persistence of India's digital gender divide through access to mobile technology. Using secondary data from the GSMA Mobile Gender Gap Reports, the research quantifies gender disparities across multiple stages of mobile internet access and identifies key barriers hindering women's digital empowerment.

The findings reveal a "leaky pipeline" of inclusion, where women progressively drop off from mobile ownership to awareness, adoption, and daily use of mobile internet. Among reported barriers, literacy emerges as the most persistent and gendered constraint which affects women towards accessing mobile digital ownership and content. Findings also reveal sudden reduced gender gaps across several indicators in the year 2020, which was coincidentally the Covid-19 lockdown period. However, these gains towards reducing digital divide proved largely unsustainable in the subsequent years, indicating that crisis-induced access does not translate into long-term digital empowerment without structural support.

The study demonstrates that access to devices and connectivity alone does not ensure digital empowerment. Instead, structural inequalities related to education, income, and gender norms continue to shape women's digital capabilities and outcomes. This study argues for a shift from access-centric digital inclusion strategies toward gender-responsive digital empowerment interventions.

Keywords: digital empowerment, digital divide, digital inclusion, mobile gender gap, mobile internet adoption

2. Background

In today's digital era, access to digital tools and resources can mean the difference between inclusion and exclusion. From economic opportunities to social participation, it opens doors to new possibilities. Digital applications facilitate in acquiring the skills an individual needs to thrive in a digital economy, promotes social inclusion, and enhances civic engagement. In short, digital empowerment is the need of the hour to ensure that everyone gets opportunity to participate in the contemporary digital world.

Digital empowerment refers to equipping people with the tools, skills, and knowledge needed to effectively engage with digital technologies. It involves providing access to the internet, devices, and digital services while ensuring that people can use these resources to their fullest potential. Mobile technology is frequently viewed as a great equaliser in terms of digital empowerment because it lowers barriers to access and participation in the digital world. Mobile phones are far cheaper and more widely available than computers. UN reports claim basic smartphones and mobile networks enable people from low-income and/or remote communities to access digitalisation (United Nations, 2019). Intuitively, mobile devices and mobile internet are the preliminary means to access communication, digital services, and information.

For a sustainable future, the policies, states, and initiatives aim to narrow the divide between those who have access to digital tools and those who do not, thereby creating a more inclusive and equitable society. The World Economic Forum report on gender digital divide (2024) states that digitally empowering around 60 crores girls

has the potential to lift the global GDP by ₹1.17 trillion to ₹1.63 trillion in just three years. A significant share is held in empowering girls from South Asia – almost a quarter (World Economic Forum, 2024). They claim that improving access to digital tools and skills for girls and women enables stronger participation in the workforce, which in turn increases the overall income of a household, access to better health outcomes, and improves the overall quality of life for women and their families (Ommundsen, 2024).

In this paper, I will refer to the digital divide as persistent gap between women and men in access to mobile technology. I especially intend to focus upon ownership and access to appropriate mobile devices, internet, digital skills, and the ability to use online services and rights safely. Reducing the digital divide and empowering women and girls in using mobile content will lead to ensuring that they have equal access to digital tools, skills, and safe online spaces so they can participate fully in education, work, innovation, and decision-making for sustainable development. This further increases social stability for better sustainability towards overall development.

India is home to the largest digital expansion projects ever undertaken, reconfiguring the density and race of social and material life in relation to the citizen, technology, and the state at an unprecedented scale. Because of the sheer size and diversity of the Indian population, there is a need to cater to it. Therefore, the digital transformation in India is not only a digital transformation in nature, but also the focus has been on an inclusive form of digitalisation, with access and empowerment at its centre. In this, the idea that mobile and digital technologies can overcome old societal and economic divides is at the centre of this transformation. From this perspective, *UMANG*, *Digilocker* and *Aadhar* represents the kind of public service innovations through digital infrastructure that enables access to create opportunities for transformation by using the immense flexibility of software to overcome barriers of geography, cost, or bureaucracy for over a billion people, many of whom have never held formal identification, bank accounts, or interacted with government services (Srinivasan et al., 2025).

In terms of economic development, mobile technology enables mobile banking, digital payments, online marketplaces, and digital entrepreneurship, allowing individuals to start businesses, manage finances, and access new income opportunities. The 2025 mobile gender gap report published by Global System for Mobile Communications Association (GSMA) states that women micro-entrepreneurs from LMICs such as India make a huge contribution to household income along with local and state economies. Mobile phones and services have enabled them towards this contribution (GSMA, 2015). There are 76% men and 67% women micro-entrepreneurs in India in 2024 who have benefited from mobile internet for their business (GSMA, 2015).

One of the important digital empowerment initiatives, UPI (Unified Payments Interface) has already started revolutionising digital payments in India (Srinivasan et al., 2025). UPI allows instant, low-cost, interoperable transactions directly between bank accounts using mobile phones. Its rapid adoption has made India a global leader in real-time digital payments, accelerating financial inclusion, supporting small businesses, and reducing reliance on cash (Times of India, 2025). What makes UPI remarkable is not just its scale, but its accessibility to ordinary citizens, including those in rural and informal sectors.

Digital empowerment through mobile internet initiatives has also been initiated in other aspects of citizens' lives in India, making phone digitalisation an indispensable part of people's everyday life. Digital learning platforms such as DIKSHA, SWAYAM, and various private education apps deliver lessons, training, and certifications through mobile devices, expanding and redefining the education sector (Banerjee & Biswas, 2025). Learners are more empowered by this initiative as they can learn at their own pace, regardless of location, supporting lifelong learning and employability.

However, the digital empowerment initiatives mentioned are implemented on the assumption that people have ownership of devices to access the internet, especially mobile phones (for payment apps), and have access to

or have adopted mobile internet plans. Under schemes such as *Pradhan Mantri Jan Dhan Yojana* (PMJDY), beneficiaries from economically weaker sections are encouraged to link bank accounts with mobile numbers. This linkage has increased the practical necessity of owning a mobile phone to receive alerts, subsidies, and digital payments, thereby promoting adoption. *Direct Benefit Transfer* (DBT) is another welfare scheme of the government which depends on mobile phones used for authentication to access and transfer benefits such as LPG subsidies, pensions, and scholarships to beneficiaries' bank accounts.

The initiatives mentioned just compel people to own a mobile. Owning mobile and internet services is not enough to digitally empower. It rather exacerbates the already existing social gap, especially in terms of gender. According to the GSMA Mobile Gender Gap Report 2019, in India, while 61% of the population owned a mobile phone, ownership was significantly skewed by gender —79% among men compared to just 43% among women, reflecting a 36% gender gap. Although more recent data from the 2024 GSMA survey shows notable progress, with the gap narrowing to 16%, as mobile phone ownership increased to 84% for men and 71% for women. However, the ownership ratio is still low for women in comparison to other LMICs, where women's ownership of mobile phones is reaching 80% (GSMA, 2025).

A sustainable digital empowerment does not rely on ownership of phones, but also on the continued accessibility of mobile internet and awareness about the digital empowerment initiatives. Understanding the gendered barriers experienced in each step is essential to address the gender digital divide and facilitating equal access to digitalisation, leading towards sustainable implementation of digital empowerment. Initiatives like *BharatNet* strive to improve mobile and internet connectivity in rural and marginalized communities, making digital empowerment more viable. *Internet Saathi*, a program implemented in partnership with private organisations, encourage women in rural areas to use mobile phones and understand their benefits, addressing both access and social barriers.

There are multiple stages of mobile phone digital empowerment: Phone ownership (with internet-access enabled) → Mobile internet awareness → Mobile internet access/adoption → regular access to a mobile phone to complete tasks. Gender disparity in any one of these stages can lead to the collapse of digital empowerment overall. In the absence of gender-mainstreaming surveys and policies across the stages of phone ownership to daily access of mobile internet, the digital empowerment initiatives may instead strengthen the structural barriers, because of already existing gaps like economic dependency and literacy barriers. This study examines the scale of the gender digital divide across each stage and its implications for women's empowerment toward a sustainable future. My objectives in this study are:

i) Quantify and identify gender disparity across stages of mobile internet use.
ii) Examine barriers in towards mobile digital empowerment.

3. Study Approach

Secondary data analysis has been conducted using the Mobile Gender Gap report published by GSMA from 2020 to the latest, 2025. Global System for Mobile Communications Association (from here on, GSMA) is a global organisation aiming to identify, develop and implement innovations and inclusive business models in relation to mobile ownership and usage across Global South Low-and Middle- Income Countries (LMICs). Their annual *Mobile Gender Gap* reports explore the data on mobile gender gaps, the key barriers preventing women's equal access to and use of mobile, and the recommendations to overcome these barriers. I have chosen reports from the past 6 years as my time frame, that is the data are from the years 2019-2024. Within these reports, I aim to identify gender digital disparity in India in terms of mobile ownership, mobile internet use, and top barriers to accessing the digital platform using mobile phones.

To determine the various degrees of empowerment in accessing mobile internet, I have chosen to map the gendered distribution of mobile ownership, awareness about mobile internet, mobile internet adoption, and

mobile phones used daily for at least one task. I am measuring the gender disparity using the variable 'gender gap', which equals the difference between male mobile phone owners/users and female mobile phone owners/users divided by male mobile phone owners/users. I will be further exploring the disparity in ownership of mobiles, but looking into the distribution of handset ownership by the types of phones, based on the accessibility of the internet in these handsets.

$$Gender\ Gap = \frac{Male\ respondents - Female\ respondents}{Male\ respondents}$$

Among barriers, I chose to investigate key factors respondent with mobile internet awareness consider as barriers towards their digital accessibility. I selected looking into trends where respondent consider handset affordability and low literacy level as key barriers. I am measuring the gender disparity using the variable *barrier gap*, which equals to the difference between female respondents and male respondents divided by female respondents.

4. Findings

Along the past six years, the gender gap in mobile ownership and mobile internet adoption has remained relatively unchanged. While mobile ownership among men has gradually increased over the years, female mobile ownership has seen rises and falls. This has rather led to an increase in the gender gap in the latest report. The significant decrease in the gender gap in owning a mobile was observed in the year 2020, where it decreased from 20% to 15% (see *Figure 1)*. In the subsequent years, there is small increase in ownership among males and females. However, the gender gap has spiked from 12% to 16% in 2024, where mobile ownership among females has also dropped to 71%.

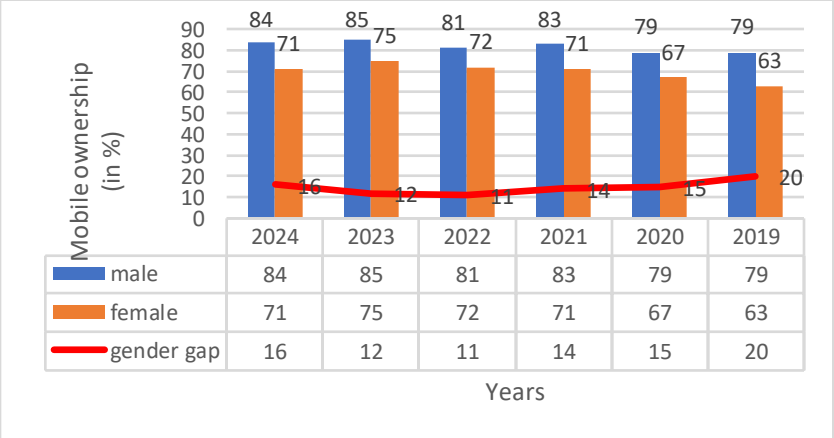


Figure 1: Trend of ownership of mobile across years

There is a significant gender gap reduction in mobile internet awareness along the years, starting from 30% in 2019 to 16% in 2024 (see *Figure 2*). There are some cases of an increase in the gender gap, with the year 2021 having a significant spike, from 23% to 27% (see *Figure 2*). In the latest year (2024), there has been more increase in awareness about mobile internet among females in comparison to males, further reducing the gender gap.

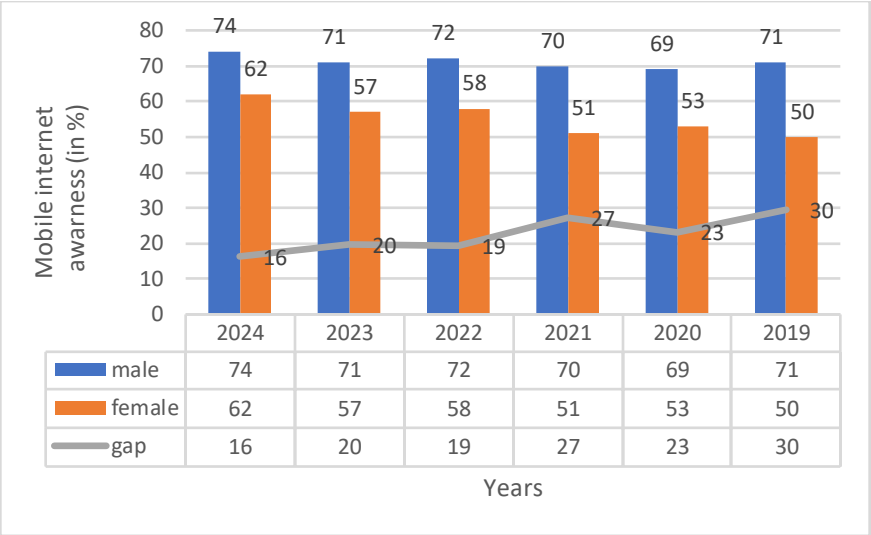


Figure 2: Trend of awareness about mobile internet

Considering the trend in mobile internet adoption, there is a small but steady rise in the male percentage, however, the growth is stagnant in the female percentage, further exacerbating the gender gap. The gender gap in mobile internet adoption reduced significantly in the year 2020, from 50% to 33% (see *Figure 3*). Mobile internet adoption among females has also jumped from 21% to 30%, in comparison to males (42% to 41%). This is quite similar to the trend in mobile ownership, where necessity might have led women to adopt mobile internet. The gender gap, however, increased in the subsequent year to 41%, as there was increase in mobile internet adoption among men, but no changes in females. The year 2023 has also seen a notable drop in the gender gap, though it is not as stark as it was for the year 2020. In the recent year data (2024), there is a slight increase in the gender gap as the increase in mobile internet adoption among females is relatively slower than that of males.

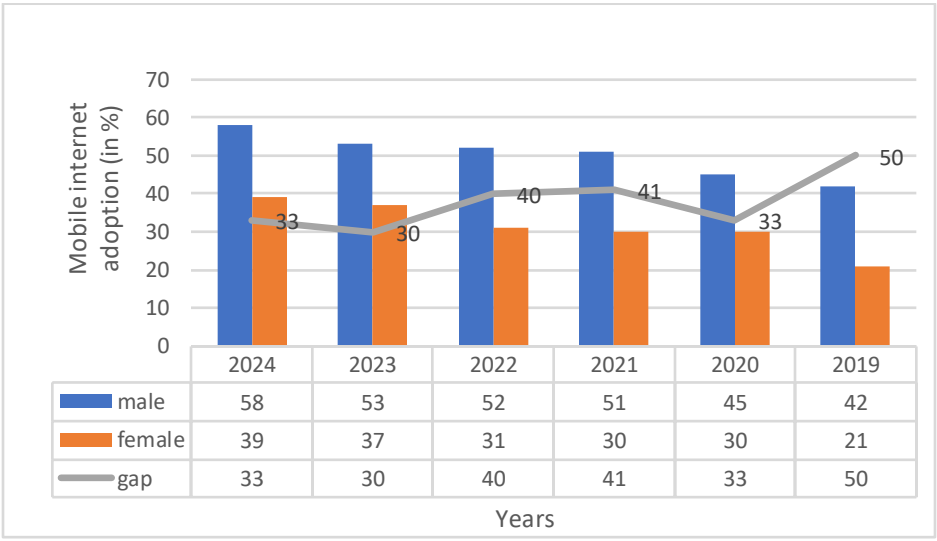
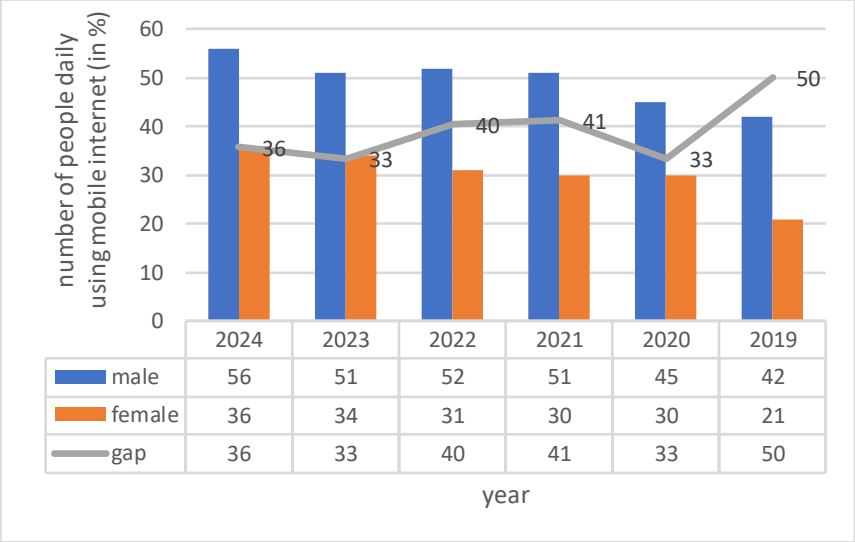


Figure 3: Trend of mobile internet adoption across the years

The trend of daily usage of mobile internet follows a similar pattern to the trend of mobile internet adoption. Daily usage refers to people conducting at least one task on internet mobile phone daily. There is a significant reduction in gender gap in the year 2020, dropping to 33% from 50% (see *Figure 4*). The gap, however, immediately increased in the subsequent year to 41%.

The latest year also shows a small increase in the gender gap, as the increase in daily usage of mobile internet among female is relatively slower than that of male (see *Figure 4*). The gender disparity in mobile internet users who do not own an internet-enabled phone is significantly high. There are 16% women who use mobile internet but do not own a mobile phone, in comparison to 6% men. This reflects that women have to access

internet using other's phone. GSMA (2025) report states that sharing a phone restricts borrowers from fully benefiting from life-improving services and developing digital literacy skills. Using a shared device does not allow women the privacy in using digital services, thus discouraging them in using mobile overall and digital apps overall. Phone borrowing also makes it difficult for service providers to deliver accurate, user-specific information. By contrast, having personal access to mobile internet enables individuals to go online privately and conveniently, use services more frequently, and engage with a wider range of tools that better support their everyday needs.



	2024	2023	2022	2021	2020	2019
male	56	51	52	51	45	42
female	36	34	31	30	30	21
gap	36	33	40	41	33	50

Figure 4: Trend of male and female for daily usage of mobile internet

The comparison of the trends across six years show that the gender gap in mobile ownership is significantly smaller compared to mobile internet awareness, mobile internet adoption and daily use of mobile internet. Mobile internet awareness among female also steadily increases across 2019-2024, leading to further reduction in gender gap. However, the same pattern does not reflect in terms of mobile internet adoption or in daily use of mobile internet to accomplish tasks. There is significant rise and drop across the years, with a stark decrease in gender gap in the year 2020, which are marred by lockdown. This brings to understanding the barriers in adopting mobile internet for regular use even after having the awareness and ownership of mobile phones.

Before that, I would like to undermine what type of mobile device does men and women in India owned across the years. The kind of mobile device someone owns plays a significant role in shaping their internet use. Smartphone owners are far more likely to be aware of mobile internet, to start using it, and to engage with it frequently and for a wide range of activities. The latest report. GSMA 2025 report shows that there is a relatively high percentage of women smartphone owners who are not using mobile internet (13%). Among them, 66% of the women are not even aware of it despite owning a smartphone. By contrast, about 9% of male smartphone owners in India do not use mobile internet, despite the fact that most are aware of it (GSMA, 2025). *Figure 5a, 5b*, and *5c* shows the distribution of men and women based on the type of phone they own – basic phone with only basic calling and texting services (no internet), feature phones, which are internet enabled but lacks the same functionality as that of smartphones, and smartphones.

In comparison to men, the charts show that women have more ownership to basic and feature phones than smartphone (see Figure 5a and Figure 5c). This leads to more gender gap in smartphone ownership than that of basic and feature phones, where the gender gap in inversed. According to the latest report (2024), almost quarter of women in India have only basic or feature phone, which limits their use of digital features. This is comparable to 36% of women owning smartphone in 2024. The gender gap in ownership for the latest year has rather increased from 31% to 38%.

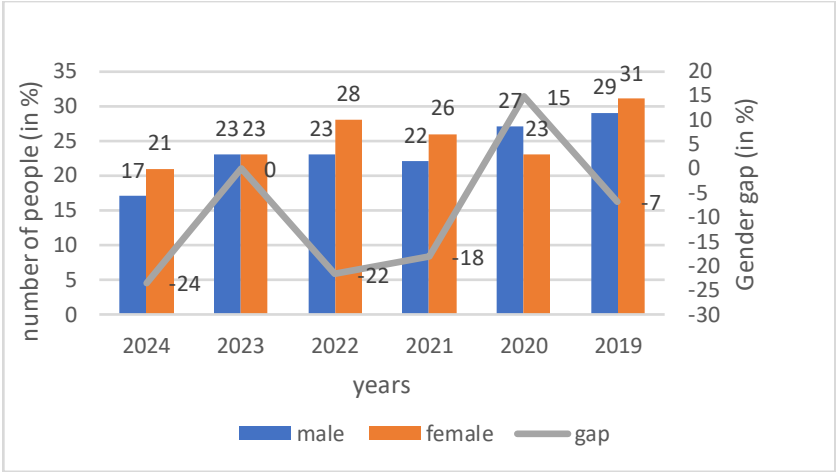


Figure 5a: trend of ownership of basic phone across the years

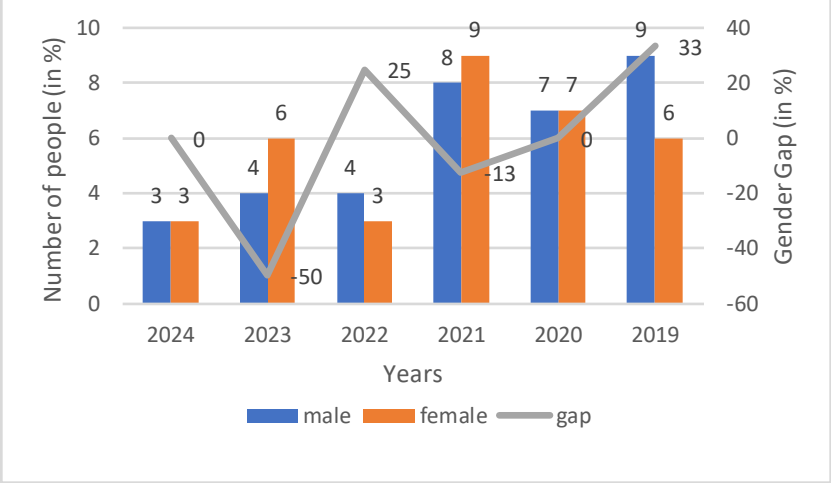


Figure 5b: trend of ownership of feature phone across the years

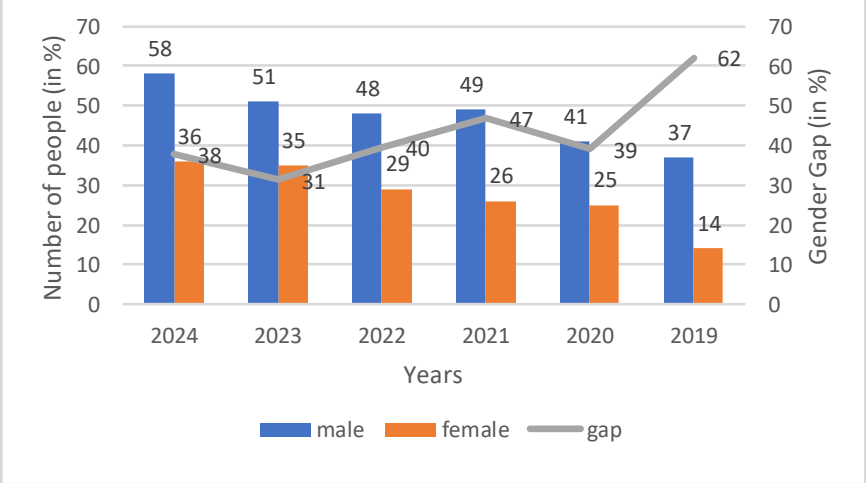


Figure 5c: Trend of ownership of smart phone across the years

Next, I will be looking into two key barriers which respondents (especially women) have stated to be hindering their digital access even with awareness about digitalisation. To determine the significance of the barriers in relation to gender, I am using a variable dubbed as *barrier gap*, which equals to the difference between female respondents and male respondents divided by female respondents.

There has been a steady decrease in female respondents who considered handset cost as key barrier, from 26% in 2019 to 8% in 2024 (see *Figure 6*). The barrier gap to gender even inversed for the years 2020 and 2021, as

there is sharp decline in female respondents considering affordability as key barrier, in comparison to males. However, the recent years have seen the barrier gap to gender to be increasing as more female respondents have claimed handset cost to be the key barrier. The barrier gap is still significant at 2024.

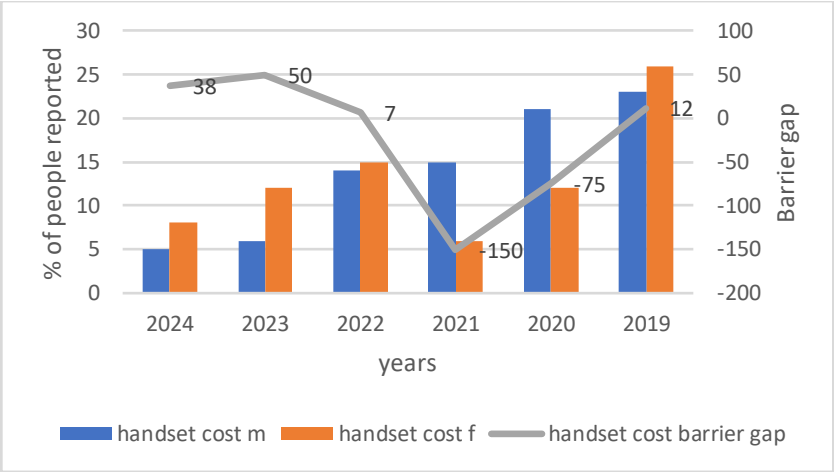


Figure 6: Trend of people who considers handset cost as barrier across the years

The reports across 2019-2024 reflects that literacy skill has been a persistent key issue for female respondents in adopting and using digital facilities. Issue with literacy skill has been the highest reported barrier in accessing mobile internet in 2024 at 21% (see *Figure 7*). This has also been the highest across the years since 2019 and is significantly high in comparison to 12% men reporting literacy skill as barrier. The highest barrier gap among the gender has been in the year 2021 at 63%, where 6% and 16% male and female respectively have reported issue with literacy skill as main barrier (see *Figure 7*). Among the 15 global south LMICs, India ranks 5th highest where women reported difficulty with reading and/or writing as key barrier in mobile internet adoption (GSMA, 2025).

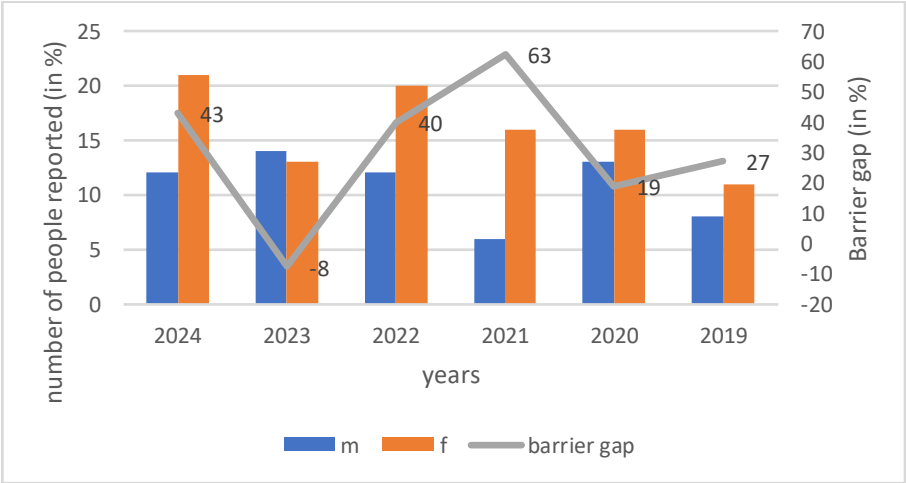


Figure 7: trend of people who consider literacy as key barrier towards using mobile internet

5. **Discussions**

The quantification of mobile digital access across different stages overall shows positive trend among men and women mobile internet users across the years. This reflects the success of the digital initiatives in India. However, closer examination of these trends as shown in the findings highlights gender disparity persisting, or at times increasing after a sudden decrease. Below I have identified three significant observations to understand the gendered skewness of digital accessibility.

5.1. The leaky pipeline of inclusion: Discrepancy in mobile ownership vs mobile internet use

Digital inclusion and empowerment are not a binary division of having access to devices and the internet. It is rather a spectrum where women drop off at sequential stages from having ownership of a mobile to having regular access to a mobile to conduct tasks. The findings reveal that there are four stages of exclusion of women.

The first stage is of mobile ownership. This is the most visible and a preliminary stage, as one needs to have access to or ownership of a device to be able to access the internet. Owning a mobile phone is generally preferred over sharing or borrowing one, since shared devices often lack the privacy needed for certain mobile services, especially for women users who might be anxious over lack of privacy or information leak. Borrowed phones also limit service providers' ability to deliver accurate and personalised information to the intended user. The findings show a comparatively high percentage of men and women own mobiles, and have the least gender gap. In 2024, 71% women have mobile ownership, and there was 16 % gender gap (see *Figure 1*). However, the findings are skewed with respect to the distribution of the type of phone owned. Gender gap in ownership of smart phone is higher than that of ownership of basic phones, reflecting that in comparison to men, more women tend to own basic phones which are not internet-enabled. This hampers the overall process of digitally empowering women.

The next stage towards digital empowerment is awareness towards mobile internet. The findings show that there are fewer women aware of the internet than women who have phones. This reflects the case of leaky pipeline. Even though it is a similar case for men, the slightly wider but comparable gender gap percentage does imply that the case of the leaky pipeline is slightly skewed towards women.

Concerning the third stage, the percentage of mobile internet adoption (39%) is nearly parallel with female smartphone ownership (36%) in 2024 (see *Figure 3*). As such, the narrative of empowerment must move beyond simply viewing any phone as an agent of access to asking, "whose phone?" The smartphone divide persists, suggesting that limited economic resources, socially constructed ideas about technology's usefulness, and intra-household resource allocation arrangements all work to favour men in their access to more advanced, costly devices. This claim is further supported by the significant number of women (8%) claiming handset affordability as a key barrier towards accessing mobile in comparison to men (5%), giving rise to a high barrier gap of 38% (see *Figure 6*). In regard to the leaky pipeline, 62% of women were aware of mobile internet in 2024, but only 39% had adopted it — reflecting a 23- point loss.

The fourth and final stage is daily access to a mobile phone and the internet to perform at least one task. The trend in daily usage of mobile internet is parallel to the trend in mobile internet adoption. This suggests that women's day-to-day digital access is dependent on their ability to adopt mobile internet data. This step is again dependent on the women's ability to own internet-enabled handsets and their awareness of the internet.

5.2. Pandemic (emergencies) as a driving force towards digital empowerment

Almost all the trends on different types of digital access in the findings have shown that the gender gap significantly reduced in 2020. The year 2020 has also been marked by Lockdown due to COVID -19, where physical interactions were restricted, so people had to take the help of mobile phones and the internet for communication, education, and economic activities. This makes an interesting discussion point, where necessity has driven more women towards digital empowerment in comparison to men. However, this push towards digital empowering women was not sustainable enough as the gender gap spiked in the subsequent years, leading to stagnant growth towards women's digital empowerment.

5.3. Removing structural hierarchies for sustainable equality

Women often experience barriers more intensely because of the nature of structural inequalities, such as lack of access to owning assets (income) and literacy skills (education). The high percentage of women respondents stating difficulty with reading and writing as key barrier towards accessing mobile suggests that literacy skills are central to women's digital empowerment, rather than merely a technical prerequisite for accessing digital facilities. Even if digital infrastructure and the availability of devices are growing, these advancements do not equate empowerment for women, not without foundational of skill to use digital tools on their own. Under such conditions, digital expansion will likely reinforce dependency and exclusion instead of reducing the gender digital divide.

With reference to a comparative global framing, the implication of India's rank as the fifth-highest out of fifteen Global South LMICs (GSMA, 2025) in women reporting difficulty in reading and writing as top barrier to use mobile internet highlights systemic constraint on women's digital empowerment. This suggests that women's limited ability to access and use digital platforms is not solely an individual limitation but reflects broader educational, social, and gender norms that shape digital capability.

6. Conclusion

India is closing the basic digital access gap, and these efforts are showing positive results. The gender norm holding down women from buying even a basic gadget is loosening. However, the story of India's longitudinal mobile gender-gap data is far from steady. This shows that narrowing the gap of mobile ownership is an insufficient step. The persistent gender gaps at various stages of digital empowerment, that is, internet-enabled phone ownership, awareness, access to data, and ability to access daily digital content, shed light on the deeper structural gender inequities, that is, economic, educational, and patriarchal barriers are being reproduced in the digital domain. Trends for Mobile Internet Adoption & Daily Use were the most important and least misleading indicators. Both increased initially and then plateaued since 2020. The drive needed to turn awareness and a device into adoption and everyday usage is lagging, predominantly due to a lack of skills and confidence among women. Limited literacy access and socioeconomic autonomy are most probably the potential reasons that hinder women from taking full advantage of the internet.

Empowering women means shifting the paradigm from "women on the Internet" toward "women using digital tools in a meaningful way for their lives." This calls for targeted and gender-transformative interventions that address the interrelated technical, economic, and social barriers. It is only then that the potential of leveraging the mobile phone as a tool for real gender empowerment can be fully realised, turning digital divides into digital dividends for everyone.

7. References

1) Banerjee, A., & Biswas, R. (2025). Empowering Educators, Bridging Divides: Evaluating Diksha and Swayam for Digital Teacher Training and Economic Inclusion in India. *International Journal of Creative Research Thoughts*, 13(7). Pp 710-726
2) GSMA. (2025). The Mobile Gender Gap Report 2025. GSMA. https://www.gsma.com/r/gender-gap/.
3) GSMA. (2024). The Mobile Gender Gap Report 2024. GSMA. https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/blog/the-mobile-gender-gap-report-2024/
4) GSMA. (2023). The Mobile Gender Gap Report 2023. GSMA. https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/blog/the-mobile-gender-gap-report-2023/
5) GSMA. (2022). The Mobile Gender Gap Report 2022. GSMA. https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/blog/the-mobile-gender-gap-report-2022/

6) GSMA. (2021). The Mobile Gender Gap Report 2021. GSMA. https://www.gsmaintelligence.com/research/the-mobile-gender-gap-report-2021
7) GSMA. (2020). The Mobile Gender Gap Report 2020. GSMA. https://www.gsma.com/r/gender-gap-2020/
8) Ommundsen, K. (2024). *How Closing South Asia's Digital Gender Divide Could Unleash Billions*. World Economic Forum. https://etradeforall.org/et4women/news/how-closing-south-asias-digital-gender-divide-could-unleash-billions
9) Srinivasan, R., Sharma, P., & Sarma, A. (Eds). (2025). *Decoding Digital Public Infrastructure: Scripting Inclusive Digital Futures*. Observer Research Foundation.
10) TOI Business Desk (2025, December 08). Digital dominance: UPI tops global real time payments with 49% share. Times of India. https://timesofindia.indiatimes.com/business/india-business/digital-dominance-upi-tops-global-real-time-payments-with-49-share-govt-tells-lok-sabha/articleshow/125838621.cms
11) United Nations: High-Level Panel on Digital Cooperation. (2019). *The age of digital interdependence: report of the UN Secretary-General's High-Level Panel on Digital Cooperation*. United Nations Digital Library. https://digitallibrary.un.org/record/3865925?ln=en&v=pdf
12) World Economic Forum. (2024). *Global Gender Gap Report 2024*. https://www.weforum.org/publications/global-gender-gap-report-2024/