



SOCIO-ECONOMIC DETERMINANTS OF WOMEN'S INTERNET USE IN INDIA: A STATE-LEVEL ANALYSIS USING NFHS 2023-24 DATA

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Abstract:

Background: Since India's Independence in 1947, the country has made substantial progress in promoting women's empowerment through improvements in education, healthcare, and economic opportunities. In recent years, digital inclusion has emerged as an important dimension of women's empowerment. Despite rapid digital expansion, only about one-third of Indian women have ever used the internet compared with more than half of men, with wide variation across states and Union Territories. Identifying the socio-economic factors influencing women's internet use is therefore essential for developing effective digital inclusion policies.

Method: This study employs a cross-sectional quantitative research design using secondary data from the National Family Health Survey (NFHS) 2023–24. The analysis covers 35 Indian States and Union Territories, with Manipur excluded due to the unavailability of data. Women's internet use was considered the dependent variable, while women's educational attainment, mobile phone access, and household electrification were used as explanatory variables. Descriptive statistics, Pearson correlation, and multiple linear regression analyses were conducted using PSPP.

Key Results: The overall model was statistically significant ($F(3,31) = 10.92$, $p < .001$), explaining 47% of the variation in women's internet use across states (Adjusted $R^2 = .47$). Mobile phone ownership was the only individually significant predictor ($\beta = .47$, $p = .011$). Education showed a positive but non-significant association ($p = .221$), and household electrification showed no significant independent effect ($p = .462$).

Conclusion: Women's internet use across Indian states is driven primarily by mobile phone access rather than basic infrastructure availability, which has reached near-saturation nationally. Findings support prioritising affordable device access and digital-skills interventions over infrastructure expansion alone.

Keywords: Women's internet use; Digital gender divide; Women's empowerment; Mobile phone access; Education; Household electrification; India.

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Introduction

Digital access has become a foundational determinant of economic opportunity, access to education, health information, financial inclusion, and civic participation in India. Since India's Independence in 1947, the country has made significant progress in promoting women's empowerment through improvements in education, healthcare, economic participation, and social welfare. In recent years, digital inclusion has emerged as another important dimension of women's empowerment, enabling women to access knowledge, employment opportunities, government welfare schemes, digital financial services, healthcare information, and social networks. However, despite India's rapid digital transformation, access to the internet remains uneven across genders and regions.

Nationally representative evidence indicates that only one-third (33%) of women in India have ever used the internet, compared with more than half (55%) of men (Chandra et al., 2024). This gendered digital divide is further compounded by socio-economic inequality, with internet use among women in the lowest wealth quintile as low as 9% (Chandra et al., 2024). These disparities suggest that digital exclusion is not merely a technological issue but also reflects broader structural inequalities, particularly in education, household wealth, and access to resources, which shape women's opportunities to participate in the digital environment (Chandra et al., 2024).

India records one of the widest gender gaps in internet use within the Asia-Pacific region (Nikore, 2021). Women remain significantly less likely than men to own mobile phones and use mobile internet (GSMA, 2021). Previous studies have identified education, household wealth, place of residence, employment status, and other socio-demographic characteristics as important determinants of internet use among women in India (Chandra et al., 2024). Together, these findings suggest that improving digital inclusion requires interventions that address underlying socio-economic inequalities alongside expanding digital infrastructure.

State-level disparities further complicate the digital gender divide in India. Women's internet use is considerably higher in urban areas than in rural areas, and substantial variation exists across Indian States and Union Territories, with some regions demonstrating significantly higher levels of digital participation than others (Singh et al., 2025). These variations reflect broader inequalities in ICT access and availability across Indian States (Agarwal & Panda, 2019). Such regional disparities highlight the importance of state-level analysis for designing targeted and context-specific policy interventions.

Although previous studies have documented the existence of the digital gender divide in India, comparatively fewer

studies have examined the combined influence of women's educational attainment, mobile phone access, and household electrification on women's internet use using recent state-level data. Understanding the relative contribution of these socio-economic factors is important because internet access today extends far beyond communication; it has become an essential means through which women acquire education, participate in the digital economy, access government services, improve financial inclusion, and strengthen their social and economic empowerment (Sonne Vyas, L., 2025; Mukherjee et al., 2024; Showkat et al., 2024).

Against this background, the present study examines the socio-economic determinants of women's internet use across the 35 Indian States and Union Territories using secondary data from the National Family Health Survey (NFHS-6) 2023–24. The NFHS-6 was conducted by the International Institute for Population Sciences (IIPS) in collaboration with the Ministry of Health and Family Welfare (MoHFW) and provides nationally representative data on demographic, health, and socio-economic indicators across India (IIPS & MoHFW, 2026). Specifically, the study investigates whether women's educational attainment, mobile phone ownership, and household electrification significantly influence internet use among women. By identifying the factors most strongly associated with digital participation, the study seeks to contribute to the growing literature on digital inclusion and provide evidence to inform more effective policies for promoting women's digital empowerment in India.

Literature Review

A substantial body of literature has established that women in India continue to experience a significant digital divide despite the rapid expansion of digital infrastructure. Nationally representative evidence indicates that women's internet use varies considerably across socio-economic groups, states, and rural–urban locations. Education, household wealth, place of residence, employment, and access to digital devices have repeatedly emerged as important factors associated with women's internet use. These findings suggest that digital exclusion is closely connected with broader patterns of socio-economic inequality rather than being solely a consequence of limited technological infrastructure.

Recent empirical studies using nationally representative data provide further evidence of these disparities. Analysing NFHS-5 data, Singh et al. (2025) demonstrate that education and household wealth explain a substantial proportion of the rural–urban gap in women's internet use, while social group and other socio-demographic characteristics also contribute to the observed differences. Likewise, Chandra et al. (2024) identify substantial inequalities in women's internet use in India, with education, household wealth, and place of residence emerging as the principal contributors to digital

inequality. Together, these findings indicate that socio-economic disadvantage continues to shape women's access to and use of digital technologies, with important implications for their ability to benefit from digital health services and other internet-enabled opportunities.

Mobile Phone Ownership and Digital Access

Access to a personal digital device represents another important dimension of the digital divide. Reports by the GSMA (2021) and analyses by Nikore (2021) indicate that although mobile phone ownership and mobile internet use among Indian women have improved, substantial gender gaps persist. Research from India further shows that economic barriers and gender-related social inequalities constrain women's mobile phone ownership, limiting their ability to participate fully in digital environments (Potnis, 2016). Since mobile devices constitute an important gateway to internet access in India, unequal ownership and control of mobile phones can translate into unequal opportunities for digital participation. This makes mobile phone ownership particularly relevant when examining differences in women's internet use across states.

However, the literature cautions against treating device ownership as equivalent to meaningful digital participation. Scott et al. (2021) found that women's mobile phone use in rural India is influenced not only by access to a handset but also by household decision-making, autonomy, and prevailing gender norms that can restrict women's independent use of mobile phones. Similarly, Barboni et al. (2018) demonstrate that women's adoption of mobile technology in India is shaped by intra-household relationships, social norms, and constraints on women's autonomy, suggesting that access to a device does not automatically translate into independent digital engagement. Beyond device access, social norms and cultural expectations also influence women's ability to access and use mobile phones, with gendered barriers affecting their participation in digital environments (Pooja & Padiyar, 2024). Further, Hilbert (2011) argues that gender inequalities in ICT access and use are embedded within broader socio-economic inequalities, where factors such as education, income, and social conditions influence women's ability to benefit from digital technologies. Thus, possessing a device does not necessarily imply that women have the freedom, confidence, or control required to use digital services effectively. This distinction is important because state-level differences in internet use may reflect not only variations in device access but also differences in the extent to which women are able to use digital technologies independently and meaningfully.

Education, Digital Literacy, and Women's Digital Participation

Education represents an important socio-economic determinant of women's digital participation. Research suggests that education influences internet use not only by increasing access to digital resources but also by improving the skills required to use digital technologies effectively. Hilbert (2011) found that gender differences in ICT participation are strongly associated with broader socio-economic inequalities, with education playing an important role in shaping women's ability to access and benefit from digital technologies. Similarly, van Deursen and van Dijk (2014) showed that digital inequality has increasingly shifted from differences in physical access toward differences in digital skills, usage patterns, and the ability to obtain meaningful outcomes from internet use.

The literature on digital literacy further highlights that formal education alone may not eliminate digital inequalities. Robinson et al. (2015) argue that digital divides are multidimensional and include disparities in digital skills, confidence, patterns of use, and the ability to obtain meaningful outcomes from online resources. In the context of gender, Antonio and Tuffley (2014) show that women in developing countries often face additional barriers to digital participation, including limited educational opportunities, lower levels of digital skills, and socio-cultural constraints. These findings suggest that education and digital literacy operate as complementary factors, where strengthening women's capabilities through digital training and skill development is essential for achieving meaningful digital inclusion.

Importantly, the relationship between education and internet use may also overlap with other socio-economic characteristics. Women living in households with greater economic resources or higher educational attainment may simultaneously have greater access to mobile devices and other enabling technologies. Consequently, examining education alongside mobile phone ownership is important for determining whether education retains an independent association with internet use once device access is taken into account. This provides a rationale for examining these variables simultaneously rather than considering each determinant in isolation.

Infrastructure and the Changing Nature of Digital Exclusion

Infrastructure has traditionally been regarded as a fundamental prerequisite for digital inclusion. Reliable electricity, telecommunications networks, and internet connectivity are particularly important for enabling digital access, especially in rural and economically disadvantaged communities. Households without reliable electricity may face practical constraints in charging and operating digital devices, potentially limiting opportunities for internet use. The World Bank (2016) argues that digital infrastructure provides a necessary foundation for digital development but

emphasizes that infrastructure alone cannot ensure digital inclusion without complementary investments in human capital, affordability, and effective institutions.

However, the relevance of basic infrastructure may change as infrastructure becomes increasingly widespread. As electrification and network coverage expand, differences in basic infrastructure may provide less explanatory power for variations in internet use than at earlier stages of digital development. James (2008) argues that as ICT infrastructure becomes more widely available, digital inequalities increasingly reflect differences in education, income, and users' capabilities rather than connectivity alone. Similarly, the International Telecommunication Union (2022) reports that despite substantial improvements in global connectivity, affordability, digital skills, and socio-economic inequalities continue to constrain meaningful digital participation. The barriers to digital participation may therefore shift from basic infrastructure availability towards affordability, personal device ownership, digital skills, and social conditions. This perspective is particularly relevant to the present study because household electrification can be examined alongside mobile phone ownership and education within the same analytical framework.

This perspective is consistent with Singh et al. (2018), who identify socio-economic, structural, psychological, and institutional barriers as interconnected constraints on women's access to information and communication technologies. The literature therefore suggests that infrastructure may be a necessary condition for digital participation but not necessarily a sufficient condition for meaningful internet use. Examining household electrification together with education and mobile phone ownership can help assess whether basic infrastructure continues to distinguish states once other socio-economic factors are considered.

Internet Use as a Dimension of Women's Empowerment

Beyond physical access to technology, the literature increasingly conceptualises women's internet use as an important dimension of broader social and economic empowerment. Digital access can expand women's opportunities to obtain information, participate in education and employment, access financial and government services, and engage with wider social networks. Evidence from India suggests that ICT-based interventions can support women's entrepreneurship, financial independence, and access to information when accompanied by appropriate skills and enabling conditions (Lalrinsangi & Kharbiryumbai, 2024; Showkat et al., 2024).

This broader perspective is important because internet use should not be understood simply as a measure of technological connectivity. The ability to independently access information, digital financial services, educational

resources, employment opportunities, and government schemes can increase women's capacity to make decisions and participate in economic and social life. At the same time, the literature indicates that these potential benefits depend on the presence of enabling conditions such as education, device ownership, affordability, digital skills, and supportive social environments (Sonne Vyas, L., 2025; Mukherjee et al., 2024; Showkat et al., 2024). Thus, women's internet use can be viewed simultaneously as an outcome of socio-economic development and as a potential mechanism through which women's empowerment can be strengthened.

Synthesis and Research Gap

Taken together, the existing literature indicates that women's internet use is shaped by an interaction of material access, socio-economic resources, education, digital capabilities, and social conditions (Hilbert, 2011; World Bank, 2016). Previous studies have provided valuable evidence on individual-, household-, and social-level determinants, rural-urban disparities, digital skills, gender norms, and the importance of mobile device access (Scott et al., 2021; Barboni et al., 2018; International Telecommunication Union, 2022). However, much of the existing research focuses on individual women, specific communities, rural-urban differences, or particular dimensions of digital exclusion. Comparatively less attention has been given to examining how education, mobile phone ownership, and basic household infrastructure jointly relate to differences in women's internet use across Indian States and Union Territories.

In particular, there is scope to examine whether basic infrastructure continues to differentiate women's digital participation when electrification has become widespread, and whether access to a personal mobile device has a stronger independent relationship with internet use than educational attainment. Examining these factors simultaneously is important because they are not necessarily independent of one another: education may improve digital capability, mobile ownership may provide the immediate means of access, while electricity provides the basic infrastructure required to operate digital devices. By analysing these determinants together at the state and union territory level, the present study seeks to contribute to the literature by identifying the relative importance of these socio-economic factors in explaining regional variations in women's internet use across India.

The present study addresses this gap by examining state-level variation in women's internet use using data from the 2023–24 National Family Health Survey (NFHS) state factsheets. Rather than treating digital exclusion as the consequence of a single factor, the study considers women's educational attainment, mobile phone ownership, and

household electrification simultaneously and examines their relationships with women's internet use through Pearson correlation and multiple linear regression. This approach allows the study to assess the relative explanatory contribution of these socio-economic factors and to determine which factors are most strongly associated with interstate variation in women's digital participation.

Overall, the existing literature provides strong evidence that the digital gender divide in India is multidimensional. While education, wealth, digital skills, social norms, infrastructure, and device access all contribute to women's digital experiences, their relative importance may differ as digital infrastructure becomes increasingly widespread. By bringing education, mobile phone ownership, and household electrification into a common state-level analytical framework, the present study seeks to contribute empirical evidence to the growing literature on women's digital inclusion and to inform more targeted approaches to reducing India's gendered digital divide.

Objectives of the Study

Primary Objective

The primary objective of this study is to examine the socio-economic determinants of women's internet use across Indian States and Union Territories by assessing the relative influence of women's educational attainment, mobile phone access, and household electrification on state-level variations in internet use.

Specific Objectives

- To analyse the relationship between women's educational attainment and women's internet use.
- To examine the influence of mobile phone access and household electrification on women's internet use.
- To identify the most significant predictor of women's internet use across Indian States and Union Territories.
- To provide evidence-based policy recommendations for promoting digital inclusion and strengthening women's empowerment in India.

Materials and Methods

Research Methodology

Research Approach: The study adopts a quantitative research approach based on the analysis of secondary data.

Research Design: A cross-sectional, state-level analytical research design was employed to examine the socio-economic determinants of women's internet use across Indian States and Union Territories.

Study Area: The study covers 35 Indian States and Union Territories, with Manipur excluded owing to the unavailability of data resulting from disrupted fieldwork during the survey.

Data Source: The study is based on secondary data obtained from the *National Family Health Survey (NFHS-6)*, 2023–24: *India and State/UT Fact Sheets*, published by the International Institute for Population Sciences (IIPS) in collaboration with the Ministry of Health and Family Welfare (MoHFW), Government of India (IIPS & MoHFW, 2026). The required indicators were extracted from the official state/Union Territory fact sheets to construct a state-level dataset.

Unit of Analysis: The unit of analysis is the State/Union Territory, with each State or Union Territory treated as one observation. The final dataset consists of 35 observations.

Variables:

Dependent Variable

- Percentage of women who have ever used the internet.

Independent Variables

- Percentage of women with 10 or more years of schooling, representing women's educational attainment.
- Percentage of women who own a mobile phone that they themselves use, representing women's access to digital devices.
- Percentage of households with electricity, representing basic household infrastructure.

Statistical Model: The relationship between women's internet use and the selected socio-economic determinants was estimated using the following multiple linear regression model:

$$\text{Internet}_i = \beta_0 + \beta_1 \text{Education}_i + \beta_2 \text{Mobile}_i + \beta_3 \text{Electricity}_i + \varepsilon_i$$

where:

- Internet = Percentage of women who have ever used the internet.
- Education = Percentage of women with 10 or more years of schooling.
- Mobile = Percentage of women who own a mobile phone that they themselves use.
- Electricity = Percentage of households with electricity.
- β_0 = Intercept.
- β_1 – β_3 = Regression coefficients.
- ε = Error term.

Data Analysis: The data were compiled into a state-level master dataset and analysed using PSPP statistical software. Descriptive statistics (mean, standard deviation, minimum, and maximum) were computed to summarise the characteristics of the variables. Pearson correlation analysis was conducted to examine the strength and direction of the relationships among the variables. Multiple linear regression (Enter method) was then employed to estimate the joint and individual effects of women's educational attainment, mobile phone access, and household electrification on women's internet use. Model performance was evaluated using the coefficient of determination (R^2), Adjusted R^2 , and the F-statistic, while the statistical significance of individual predictors was assessed using t-tests.

Limitations of Data Coverage: Manipur was excluded from the NFHS round used due to disrupted fieldwork, giving an analytic sample of 35 states/UTs across all variables.

Results

The results below present the descriptive profile of the variables, their bivariate correlations, and the multiple regression model estimating the determinants of women's internet use across states.

Descriptive Statistics of Study Variables:

Table 1 presents the state-level descriptive statistics for women's internet use and the three independent variables. Figure 1 visualises the same data, ranking all 35 states/UTs from lowest to highest internet use.

Table 1. Descriptive Statistics of Study Variables (State-Level, %)

Variable	N	Mean	Std. Dev.	Min	Max
Internet use (Y)	35	69.54	11.32	48.8	94.0
Education (X1)	35	52.81	13.86	32.9	86.6
Mobile ownership (X2)	35	73.41	12.85	47.8	91.6
Electricity access (X3)	35	98.77	1.17	95.8	99.8

Descriptive statistics indicate wide state-level variation in women's internet use (ranging from 48.8% to 94.0%) and education (32.9% to 86.6%), while household electrification shows near-universal coverage with very little variation (95.8% to 99.8%), suggesting limited scope for this variable to statistically explain further variation in internet use.

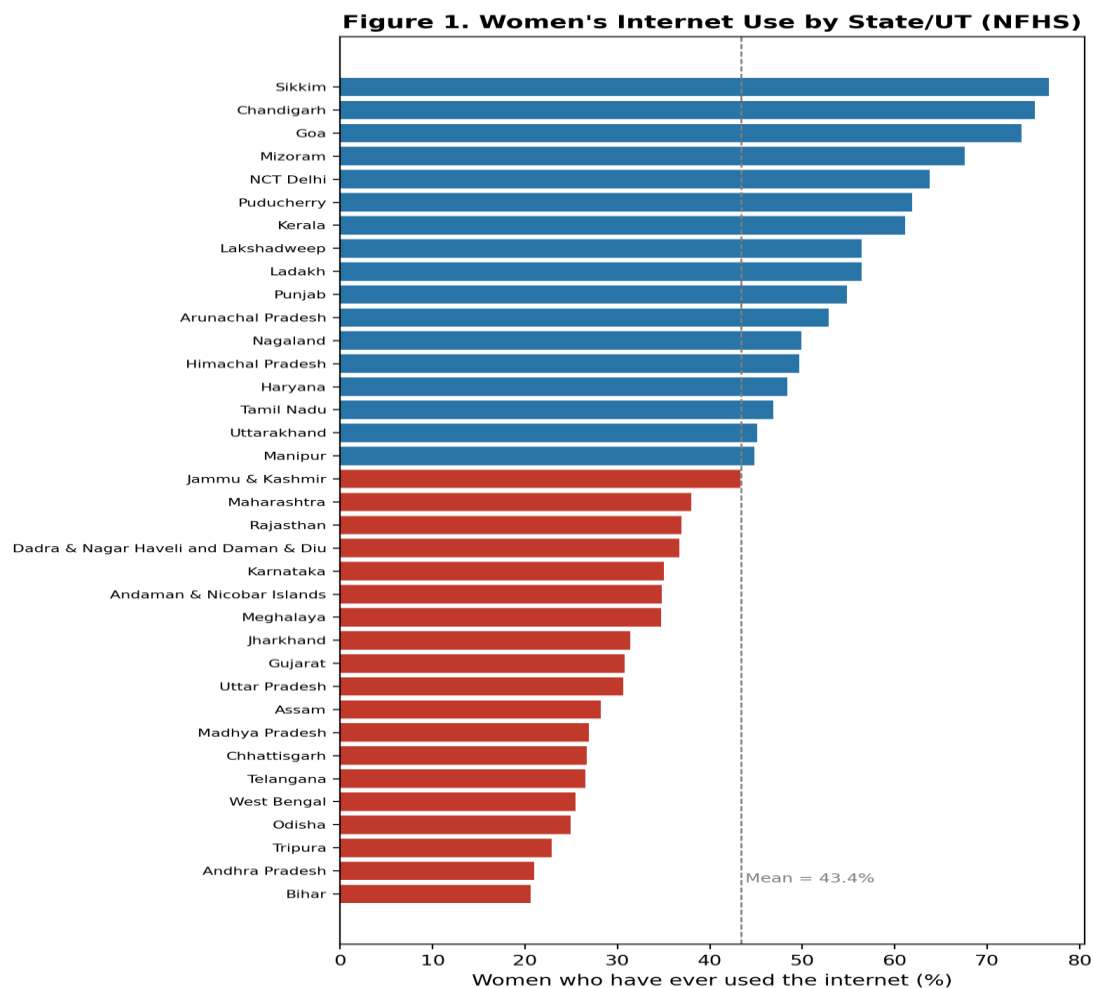


Figure 1. Women's internet use by state/UT, ranked lowest to highest. The dashed line marks the 35-state mean (69.5%).

As Figure 1 shows, states above the 69.5% mean (shaded blue) are concentrated among smaller states and Union Territories, while several larger, more populous states fall below the mean (shaded red), indicating that internet use is not simply a function of state size or economic weight but varies with the specific socio-economic factors examined in this study.

Correlation Analysis:

Table 2 presents Pearson correlation coefficients between all four study variables, used to examine bivariate relationships and screen for multicollinearity before regression.

Table 2. Pearson Correlation Matrix

	Internet	Education	Mobile	Electricity
Internet	1.000			
Education	.629**	1.000		
Mobile	.672**	.685**	1.000	
Electricity	.380*	.536**	.290	1.000

** Correlation significant at $p < .01$; * significant at $p < .05$. $N = 35$ for all pairs.

All three independent variables correlate positively and significantly with internet use at the bivariate level. Education and mobile ownership are themselves

moderately-to-strongly correlated ($r = .685$), which is examined further below in relation to the regression results.

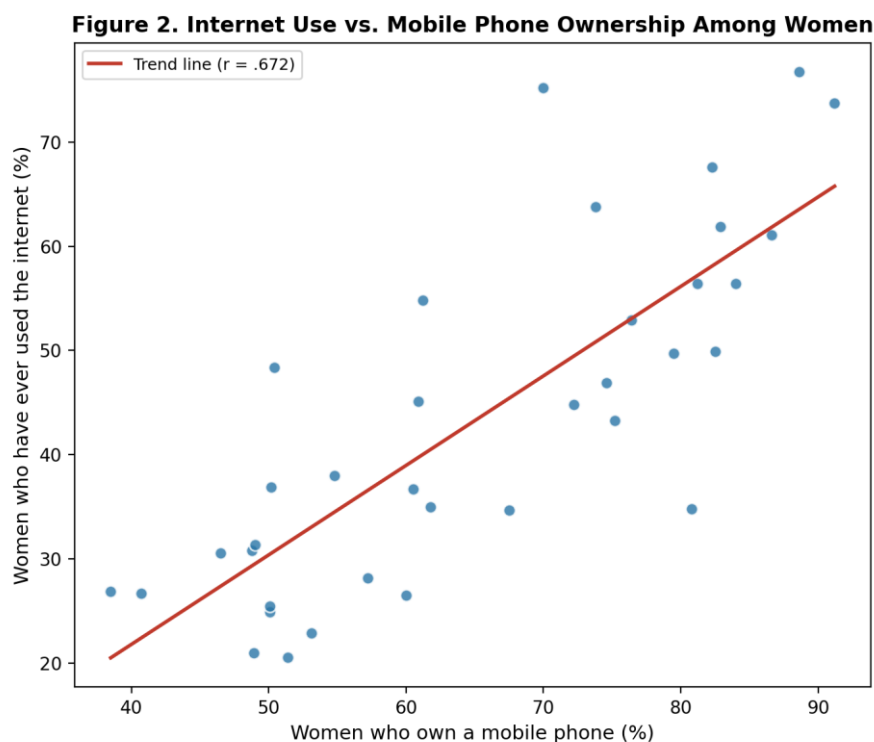


Figure 2. Scatter plot of women's mobile phone ownership against women's internet use across states, with linear trend line ($r = .672$).

Figure 2 illustrates the strongest bivariate relationship in the dataset. States cluster fairly closely around the trend line, with mobile ownership explaining approximately 45% of the variance in internet use on its own ($r^2 = .672^2 \approx .45$), before any other variables are accounted for.

Regression Analysis Results:

Multiple linear regression was conducted to estimate the joint and individual effects of education, mobile ownership, and electrification on women's internet use. Table 3 presents the model summary and ANOVA, and Table 4 presents the individual regression coefficients.

Table 3. Regression Model Summary and ANOVA

R	R Square	Adjusted R ²	Std. Error	
.72	.51	.47	8.27	

	Sum of Sq.	df	Mean Sq.	F	Sig.
Regression	2239.08	3	746.36	10.92	.000
Residual	2118.74	31	68.35		
Total	4357.82	34			

The overall regression model was statistically significant, $F(3, 31) = 10.92$, $p < .001$, indicating that the three predictors jointly explain a significant proportion of the

variance in women's internet use across states. The model explains 51% of the variance ($R^2 = .51$; Adjusted $R^2 = .47$ after adjusting for the number of predictors).

Table 4. Regression Coefficients

Variable	B	SE	Beta	t	Sig.	95% CI
(Constant)	-78.31	140.74		-.56	.582	-365.35, 208.74
Education	.20	.16	.25	1.25	.221	-.13, .53
Mobile	.42	.15	.47	2.72	.011	.10, .73
Electricity	1.08	1.45	.11	.75	.462	-1.88, 4.04

Among the three predictors, mobile phone ownership was the only statistically significant individual predictor of women's internet use ($\beta = .47$, $t = 2.72$, $p = .011$), holding education and electrification constant. Education showed a positive but non-significant coefficient ($\beta = .25$, $p = .221$). Electrification showed no significant independent effect ($\beta = .11$, $p = .462$), despite a significant positive bivariate correlation with internet use — a pattern discussed further below.

Overall Summary of Results:

Taken together, the descriptive, correlation, and regression results converge on a consistent picture: women's internet use varies substantially across Indian states (Table 1, Figure 1), all three socio-economic factors are positively associated with it at the bivariate level (Table 2), but only mobile phone ownership retains an independent, statistically significant effect once the other factors are controlled for (Tables 3-4, Figure 2). H_0 is therefore rejected for the model as a whole, while only partially supported at the level of individual predictors — the evidence supports H_1 most strongly for mobile ownership specifically, rather than uniformly across all three socio-economic variables tested.

Discussion

The present study examined the socio-economic determinants of women's internet use across Indian states

using multiple linear regression. The overall regression model was statistically significant ($R^2 = 0.51$, $F = 10.92$, $p < .001$), indicating that women's education, mobile phone ownership, and household electrification jointly explained approximately 51% of the variation in women's internet use across states. Among these variables, however, only women's mobile phone ownership emerged as a statistically significant independent predictor, while education and household electrification did not show significant independent effects after controlling for the other variables.

The finding that mobile phone ownership is the strongest and only statistically significant individual predictor of women's internet use is consistent with previous literature identifying access to personal digital devices as a major determinant of women's digital inclusion in India (Nikore, 2021; GSMA, 2021). Given that internet access in India is predominantly mobile-based, disparities in women's ownership and control over mobile phones are likely to translate into corresponding inequalities in internet use. The present study extends this evidence by demonstrating, at the state level, that states with higher levels of women's mobile phone ownership also exhibit significantly higher levels of women's internet use. This interpretation is further supported by Gupta (2024), who argues that women's digital exclusion in India is influenced not only by network availability but also by inequalities in mobile ownership,

affordability, digital skills, and the capacity to effectively use digital technologies.

Women's education showed a positive but statistically non-significant relationship with internet use after accounting for mobile phone ownership. Although education has consistently been identified as an important determinant of women's digital inclusion, recent evidence from India shows that educational attainment is significantly associated with women's internet use, alongside other socio-economic factors such as wealth and access to digital resources (Chandra et al., 2024; Singh et al., 2025). The present findings suggest that the association between education and women's internet use may partly reflect differences in access to digital devices and digital capabilities. This interpretation is supported by the moderately strong positive correlation between education and mobile phone ownership ($r = .685$) observed in the present study, indicating that more educated women are also more likely to own and use mobile phones. Previous policy-oriented research further emphasises that digital literacy and awareness are essential for enabling women to effectively use digital technologies and benefit from digital services, highlighting the importance of strengthening digital education and skills development to reduce gender disparities in digital inclusion (Fernandez & Puri, 2024).

Household electrification did not emerge as a statistically significant predictor of women's internet use. This finding should not be interpreted as suggesting that electricity is unimportant for digital inclusion. Rather, descriptive statistics show that household electrification has already reached near-universal levels across the sampled states (mean = 98.77%; SD = 1.17), leaving limited variation for the regression model to explain. Consequently, differences in electrification no longer appear to distinguish states in terms of women's internet use.

This interpretation aligns with previous research suggesting that, once basic digital infrastructure is available, barriers to digital inclusion increasingly shift towards factors such as device ownership, affordability, digital skills, and socio-cultural constraints. Singh et al. (2018) report that women's access to and use of information and communication technologies (ICTs) are shaped not only by the availability of technology but also by socio-economic, structural, psychological, and institutional barriers, as well as women's perceptions of ICT and its benefits. Similarly, Nikore (2021) argues that India's digital gender divide is increasingly shaped by disparities in mobile phone ownership, affordability, digital literacy, and women's ability to independently access and use digital technologies. The World Bank (2016) further emphasises that digital infrastructure alone cannot guarantee meaningful digital inclusion unless it is complemented by investments in human capital, affordability, and digital skills. Therefore, in

contexts where electricity access has become widespread, factors such as mobile phone ownership and digital capability may become more important determinants of women's internet participation.

Overall, the findings suggest that policies aimed at reducing India's digital gender divide should move beyond infrastructure expansion alone and place greater emphasis on improving women's independent access to mobile phones and strengthening digital literacy. Evidence from initiatives such as Internet Saathi demonstrates the potential of community-based digital literacy programmes to enhance rural women's digital awareness, confidence, and engagement with digital technologies (Bridgespan Group, 2018). More recent evidence from rural India further indicates that structured digital literacy interventions can significantly improve women's digital skills and their capacity to effectively access and use online services (Gogoi et al., 2025). The findings of the present study therefore support a policy shift from focusing primarily on expanding digital infrastructure towards ensuring that women possess both the means and the capabilities required to make meaningful use of digital technologies.

Limitations

Several limitations should be noted. First, the state-level (ecological) design means findings describe relationships between state averages, not individual women, and results should not be interpreted as individual-level causal effects (ecological fallacy). Second, the cross-sectional design does not permit causal inference. Third, the analysis included all available states and union territories from the survey ($N = 35$). Although this is a relatively small sample for a three-predictor regression and may have reduced statistical power, it represents the complete set of available state-level data. In addition, the moderate correlation between education and mobile ownership ($r = .685$) means their individual coefficients should be interpreted with some caution regarding shared variance. Fourth, Manipur was excluded from the underlying survey round due to disrupted fieldwork, and this should be borne in mind when generalising findings to all of India.

Conclusion

This study examined the socio-economic determinants of women's internet use across Indian States and Union Territories using state-level data from the National Family Health Survey (NFHS) 2023–24. The findings indicate that the proposed regression model explains a substantial proportion of the variation in women's internet use across states, with mobile phone ownership emerging as the only statistically significant independent predictor. In contrast, women's educational attainment and household electrification did not demonstrate significant independent effects after controlling for the other variables. While

education remains positively associated with internet use, its association with internet use appears to be partly explained by differences in access to mobile devices and digital capabilities. Similarly, the non-significant effect of household electrification suggests that, with electrification having reached near-universal levels across most states, infrastructure alone is no longer sufficient to explain differences in women's digital participation.

These findings highlight that reducing India's digital gender divide requires moving beyond infrastructure expansion towards policies that improve women's independent ownership and use of mobile phones, while simultaneously strengthening digital literacy and digital skills. Expanding affordable access to digital devices, promoting digital education, and supporting community-based digital inclusion initiatives can play an important role in ensuring that women are able to participate fully in the digital economy and society.

Although the study is based on aggregate state-level data and therefore does not establish causal relationships at the individual level, it provides recent empirical evidence on the factors associated with women's internet use across India. The findings contribute to the growing literature on digital inclusion by demonstrating the relative importance of device access over basic infrastructure in explaining interstate variation. Future research using individual-level and longitudinal data may further examine the causal mechanisms linking education, digital skills, mobile phone ownership, and women's internet use.

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The author conducted the research, collected and analysed the data, and interpreted the results independently. AI-based language tools were consulted solely to enhance the clarity and readability of the manuscript. All scientific content, analysis, and conclusions presented in this study are the sole work of the author.

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