GSMA

Methodology: The Mobile Gender Gap Report 2025

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Introduction

This document details the methodology behind *The Mobile Gender Gap Report 2025*. This GSMA report is part of an annual series analysing the gender gap in mobile ownership, smartphone ownership and mobile internet adoption in low- and middle-income countries (LMICs).[1] This accompanying methodology report describes the analysis and modelling techniques we used and highlights important methodological changes from previous years.

This document is designed as a supplement to the main report and includes:

1. The parameters of the GSMA Consumer Survey 2024, on which the findings of this study are based.
2. Extrapolation models, which provide estimates of the gender gaps in mobile ownership, mobile internet adoption and smartphone ownership in LMICs not included in the GSMA Consumer Survey.
3. Analytical approaches used to investigate the results of survey questions on mobile use, and the barriers preventing mobile internet adoption and use.

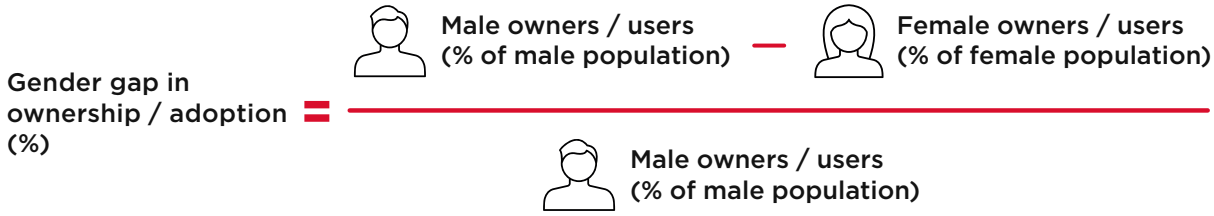
Comparisons with the GSMA Connected Women programme's earlier work

Every year the wording and structure of the GSMA Consumer Survey are revised and the underlying methodology is refined. Care should therefore be taken in drawing conclusions about country-level, year-on-year changes from previous *Mobile Gender Gap* reports. Any trends identified in this year's report are based on longitudinal assessments of gender-disaggregated data by the GSMA and third parties, and have been determined to have sufficient evidence on a case-by-case basis.

1. See Table 1 for definitions of the gender gap and other key terms.

Table 1
Definitions of key terms

KEY TERM	DEFINITION
ARPU	Average revenue per user. Calculated as recurring revenues divided by total number of unique subscribers.
Low- and middle-income countries (LMICs)	Countries classified as low income (GNI per capita of $1,145 or less in 2023), lower-middle income (GNI per capita between $1,146 and $4,515) or upper-middle income (GNI per capita between $4,516 and $14,005) by the World Bank.[2]
Mobile internet user	A person who has used the internet on a mobile phone at least once in the last three months.[3] Mobile internet users do not have to personally own a mobile phone and, therefore, can be non-mobile phone owners who use mobile internet by accessing it on someone else's mobile phone.
Socio-economic class (SEC)	A classification system to indicate the economic and social status of an individual based on factors such as employment, education level and living standards. Exact definitions and classification criteria vary by country.
Unique smartphone subscriber	Unique smartphone subscribers are calculated by taking the number of smartphone connections from GSMA Intelligence data and dividing this by the average number of SIMs per smartphone user using a combination of GSMA Intelligence and survey data to obtain an estimate of "unique" smartphone connections.
Unique subscriber	A unique user who is subscribed to mobile services at the end of a period. Subscribers differ from connections in that a unique user can have multiple connections. Note that this methodology report also refers to unique subscribers as mobile owners and mobile phone owners. These terms are used interchangeably to mean a person who has sole or main use of a SIM card or a mobile phone that does not require a SIM and uses it at least once a month. The vast majority of SIM owners also have sole or main use of a handset (ranging from 88% to 97% across the sample countries).
Unique subscriber penetration	Total subscribers at the end of a period expressed as a percentage share of the total market population.
Gender gap	The gender gap in mobile ownership (also referred to as SIM ownership), mobile internet adoption and smartphone ownership is calculated using the following formula:



2. The World Bank Country and Lending Groups includes 138 countries. See: World Bank Country and Lending Groups, FY 2025.
3. Respondents were asked the question: "Have you ever used the internet on a mobile phone? Please think about all the different ways of using the internet on a mobile phone. Just to confirm, people are using the internet on their mobile phones when they do any of the following: visit internet websites (e.g., Google or Amazon), visit social networking websites (e.g., Facebook, Twitter, YouTube, Weibo), send emails or instant messages (e.g., WhatsApp, Snapchat, WeChat, LINE) or download apps." Mobile internet users are those who answered, "Yes, I have used the internet on a mobile phone in the last three months."

The GSMA Consumer Survey 2024

Scope of the survey

The Mobile Gender Gap Report 2025 is based primarily on nationally representative[4] surveys of 15 LMICs conducted as part of the GSMA Consumer Survey 2024 (see Figure 1 and Table 2). This year the survey had more than 17,100 respondents. *The Mobile Gender Gap Report* series covers 30 countries representing up to 79% of the adult population in LMICs. (See Table 2 for a comprehensive list of countries covered by the annual GSMA Consumer Survey). The survey is representative of the entire adult population[5] of these countries, including both mobile users and non-mobile users.

Figure 1
Surveyed countries in this report

4. Except Ethiopia, where no interviews were conducted in the Amhara region and four other zones due to local conflict and security concerns.
5. Except Ethiopia.

Table 2
Surveyed countries, by region

COUNTRY	2017	2018	2019	2020	2021	2022	2023	2024
Algeria	✓	✓	✓	✓	–	–	–	–
Argentina	✓	✓	–	–	–	–	–	–
Bangladesh	✓	✓	✓	✓	✓	✓	✓	✓
Brazil	✓	✓	✓	–	–	–	–	–
Chile	✓	–	✓	–	–	–	–	–
China	✓	✓	–	–	–	–	–	–
Colombia	✓	✓	–	–	–	–	–	–
Côte d'Ivoire	✓	✓	–	–	–	–	–	–
Dominican Republic	✓	✓	–	–	–	–	–	–
Egypt	✓	–	–	–	✓	✓	✓	✓
Ethiopia	–	–	–	–	–	✓	✓	✓
Ghana	✓	–	–	–	–	✓	–	–
Guatemala	✓	✓	✓	✓	✓	✓	✓	✓
India	✓	✓	✓	✓	✓	✓	✓	✓
Indonesia	✓	✓	✓	–	✓	✓	✓	✓
Kenya	✓	✓	✓	✓	✓	✓	✓	✓
Mexico	✓	✓	✓	–	✓	✓	✓	✓
Mozambique	–	✓	✓	✓	–	–	–	–
Myanmar	✓	✓	✓	✓	–	–	–	–
Nicaragua	✓	–	–	–	–	–	–	–
Nigeria	✓	✓	✓	✓	✓	✓	✓	✓
Pakistan	✓	✓	✓	✓	✓	✓	✓	✓
Philippines	✓	–	–	–	–	–	–	✓
Rwanda	–	–	–	–	–	–	–	✓
Senegal	–	–	✓	–	✓	✓	✓	✓
South Africa	✓	✓	✓	–	–	–	–	–
Tanzania	✓	✓	–	–	–	–	–	✓
Thailand	✓	–	–	–	–	–	–	–
Uganda	–	–	✓	–	–	–	✓	✓
Vietnam	✓	–	–	–	–	–	–	–

Sampling and fieldwork

In each country, a sample of approximatively 1,000 male and female adults aged 18 and over were surveyed, with the exception of India (and China, when covered) where the sample was approximatively 2,000. The samples are nationally representative, except in Ethiopia where no interviews were conducted in 2022 in the Tigray region and six other zones[6] due to conflict. In 2023 and 2024, no interviews were conducted in the Amhara region and four other zones[7] due to local conflict and security concerns. These excluded areas in the most recent survey represent 27% of Ethiopia's population, therefore, the sample was representative of the remaining 73% of the population living outside these areas.

To achieve a nationally representative sample, quotas were applied in line with census data (or other appropriate sources) on the following metrics:

- Age category, by gender
- Urban and rural distribution, by gender
- Region/state
- Socio-economic class (SEC) to ensure a representative segment of lower income respondents were included (no such quota was applied in Mozambique, when covered, in the absence of reliable SEC profiling data).

While a quota was not applied to education (other than where it contributed to SEC classification), it was tracked regionally and nationally during and after fieldwork as an important indicator of a representative sample.

Sampling points where interviews were conducted were distributed proportionately between urban and rural areas in accordance with census data and national statistics offices. To achieve wide geographical coverage and to reduce the effects of clustering, a minimum of 100 sampling points were used in each country (200 in India).

The research used a mix of purposive and random sampling approaches. Depending on the country, sampling points were either randomly distributed – with an administrative area's probability of selection proportionate to the size of its population (random sampling) – or selected to reflect the linguistic, cultural and economic variations of each country (purposive sampling). Local experts and national statistics offices checked the sampling frames to ensure they were valid and representative.

The survey was delivered via interviewer-administered computer-assisted personal interviewing (CAPI). Survey interviews were conducted in the local language(s) by both female and male interviewers. In more remote rural areas in countries such as Bangladesh, India and Pakistan, local teams tried to ensure female interviewers conducted the survey for female respondents, where practical. Interviews were conducted at respondents' homes. Within sampling points, systematic random routes were used for residence selection.

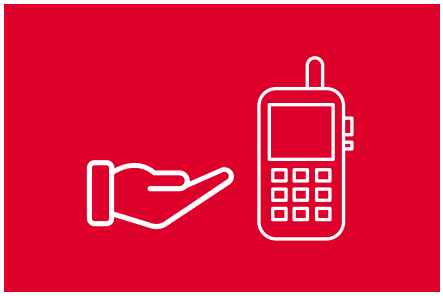
Weights were applied to the data using a random iterative method (RIM) whereby several non-interlocking quotas were applied in an iterative sequence and repeated as many times as needed for the quotas to converge. This corrected any imbalances in the profiles, although weightings (and the resulting impact on effective sample sizes) were minimised as much as possible by controlling key quota variables over the course of the fieldwork.

The sampling approach was designed to achieve full national representation where practical; however, some more remote rural areas or regions with on-going unrest or security concerns were excluded from sampling. This may have had an impact on the results, especially since mobile phone coverage, access and use will be different – and likely most limited – in these areas, particularly for women.

6. The excluded areas in 2022 apart from the Tigray region were Metekel-Zone (Benishangul Gumz), Zone 2 Zone (Afar), West Wellega-Zone (Oromia), Guji-Zone (Oromia), Kelem Wellega Zone (Oromia), Horo Gudru Wellega-Zone (Oromia). These areas represented 12% of Ethiopia's population in 2022.
7. Western Tigray, Metekel-Zone (Benishangul Gumz), Zone 2 Zone (Afar) and Guji-Zone (Oromia).

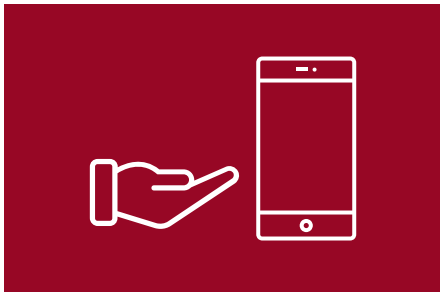
Gender gap extrapolation models

The Mobile Gender Gap Report 2025 **provides estimates of the gender gaps in surveyed LMICs for three key metrics:**



MOBILE OWNERSHIP

MOBILE INTERNET ADOPTION



SMARTPHONE OWNERSHIP

The gender gap figures for countries covered by the 2017–2024 GSMA Consumer Surveys are derived from survey results for each country surveyed in a given year. The group of countries surveyed depends on the year and overall to date covers 30 countries representing up to 79% of the adult population in all LMICs.[8]

In addition, we relied on third-party and publicly available survey data in countries not surveyed in a given year, when we considered it robust. The subset of countries for which third-party survey data was used varies by the year and is listed in Box 1. This provided gender gap proxy measures for selected years for: mobile ownership in another 10 countries; mobile internet use in 14 countries, and smartphone ownership in two countries.[9]

8. United Nations Department of Economic and Social Affairs, Population Division. (2022). World Population Prospects 2022.
9. Data was sourced from After Access (Cambodia, Paraguay, Peru and Rwanda for mobile and mobile internet for 2017 and Uganda and South Africa for mobile internet for 2018 and 2022); from Pew Global Attitudes and Trends (mobile and mobile internet for Jordan and Lebanon for 2017 and Philippines for 2018 and 2019); ITU (Iran for mobile and mobile internet for 2017 to 2019); RLMS-HES (Russia for mobile, mobile internet and smartphone for 2018 and 2019); CNNIC (China for mobile internet for 2017 to 2022); ZimStat (Zimbabwe for mobile, mobile internet and smartphone for 2020); and the Global Digital Inclusion Partnership (Brazil for mobile internet).

Box 1

Countries covered by third-party surveys, by region

Country	2017–2018 (9 countries)	2018–2019 (6 countries)	2019–2020 (3 countries)	2020–2021 (2 countries)	2021–2022 (1 country)	2022–2023 (3 countries)	2023–2024 (1 country)	2024–2025 (1 country)	Sources
Rwanda	✓	–	–	–	–	–	–	–	After Access
South Africa	–	✓	–	–	–	✓	–	–	After Access
Uganda	–	✓	–	–	–	✓	–	–	After Access
Zimbabwe	–	–	–	✓	–	–	–	–	ZimStat
Cambodia	✓	–	–	–	–	–	–	–	After Access
China	✓	✓	✓	✓	✓	✓	✓	✓	CNNIC
Philippines	–	✓	✓	–	–	–	–	–	Pew Global Attitudes and Trends
Russia	✓	✓	–	–	–	–	–	–	RLMS-HES
Paraguay	✓	–	–	–	–	–	–	–	After Access
Peru	✓	–	–	–	–	–	–	–	After Access
Iran	✓	✓	✓	–	–	–	–	–	ITU
Jordan	✓	–	–	–	–	–	–	–	Pew Global Attitudes and Trends
Lebanon	✓	–	–	–	–	–	–	–	Pew Global Attitudes and Trends

To estimate the size of the mobile gender gaps in the remaining LMICs, we relied on machine learning (ML) classifiers, which are trained using data from countries where observations of gender gaps in mobile technology are available. We combined these observations into a dataset that included other variables that are potential predictors of mobile gender gaps, such as indicators of technology adoption and socio-economic conditions.

We used this dataset as training data to teach the classifiers what patterns of technology adoption and socio-economic conditions are associated with higher or lower mobile gender gaps. The trained classifiers then used these recognised patterns to make predictions about gender gaps in countries where it is not directly surveyed. We used separate classifiers to estimate each type of mobile gender gap (mobile ownership, mobile internet use, and smartphone ownership).

Datasets

We gathered data on potential predictors of mobile gender gaps. This data, which was not uniformly available for every country and year, included indicators sourced from the United Nations Human Development Index (HDI), the World Bank, Gallup World Poll and others (Table 3). Given that some data was missing for certain country-year combinations, we relied on a multiple imputation technique. This created several estimates for each missing value based on the patterns observed in other variables of the dataset.

We relied on MICE (Multiple Imputation by Chained Equations) forests,[10] which is a specific implementation of multiple imputation that uses decision trees to impute missing values.[11] The MICE forests algorithm works by creating a decision tree for each variable with missing data and using these trees to predict the missing values based on the patterns observed in the other variables. The predictions from each tree are then combined to create a single imputed dataset.

In general, we found there were only minimal changes to our gender gap estimates when we used different imputed datasets. Therefore, to manage the computation time, we relied on five imputed datasets. To reflect the minimal variation in estimates, the predicted gender gap values were calculated as the average across the five imputed datasets.

10. The "forests" part of the name comes from the fact that MICE forests can generate multiple imputed datasets, each of which contains a different set of plausible values for the missing data. These imputed datasets are then used to perform the analysis. The results are combined to produce a final estimate, which also can be used to understand the uncertainty associated with that estimate.
11. van Buuren, S. (2018). *Flexible Imputation of Missing Data*. Second Edition.

Table 3
Variables used as predictors of mobile gender gaps

Variable(s)	Source
Mean schooling years – females and males and gender ratio[12]	UN Human Development Reports
Expected schooling years for a child entering education – females and males and gender ratio	UN Human Development Reports
Human Development Index – overall and females only	UN Human Development Reports
Gender Inequality Index	UN Human Development Reports
Gender Development Index	UN Human Development Reports
Gross national income (GNI) per capita – female and male absolute income and gender ratio	UN Human Development Reports
Gross domestic product (GDP) per capita, purchasing power parity (PPP)	IMF World Economic Outlook
Percentage of persons with access to internet – overall and females only	Gallup World Poll
Gender gap in internet	Gallup World Poll
Percentage of persons owning a mobile phone for personal calls – overall and females only	Gallup World Poll
Gender gap in mobile ownership for personal calls	Gallup World Poll
Facebook Gender Gap	GSMA Intelligence analysis of Facebook Audience Insights
World region dummy variables	World Bank regional groupings
Income group dummy variables	World Bank analytical classifications
Measure of gender equality under law – overall index score and individual area scores	World Bank Women, Business and the Law indicators
Average revenue per subscriber	GSMA Intelligence database

Source: GSMA Intelligence analysis

12. The gender ratio for a variable is calculated by taking the female value and dividing it by the male value. For example, the gender ratio for mean schooling years is equal to mean female schooling years divided by mean male schooling years.

Predicting mobile gender gaps

We relied on gradient-boosted regression forests to predict all mobile gender gaps: mobile ownership, mobile internet adoption and smartphone ownership. Gradient-boosted regression forests is a specific machine learning technique based on estimating multiple predictive decision trees. In an evaluation we conducted in 2023, it outperformed other models in the reliability of the predicted gender gaps in mobile ownership, mobile internet adoption and smartphone ownership.

Adult male and female mobile subscribers

This was calculated by using the estimated gender gap in mobile ownership, GSMA Intelligence estimates and forecasts of the adult mobile penetration rate and UN estimates and forecasts of the adult population by gender.

Adult male and female mobile internet users

This was calculated by using the estimated gender gap in mobile internet use, GSMA Intelligence estimates and forecasts of the adult mobile internet penetration rate and UN estimates and forecasts of the adult population by gender.

Adult male and female smartphone users

This was calculated in three steps:

- First, to estimate the number of unique smartphone subscribers, we scaled down GSMA Intelligence data on smartphone subscriptions to adjust for the average number of devices per subscriber in the GSMA Intelligence database. This number was further adjusted by the GSMA Consumer Survey estimate of the average number of devices per smartphone user to reflect that smartphone users generally tend to own more devices than an average non-smartphone mobile user.
- We then scaled the estimated number of unique subscribers by the share of adults among total subscribers. This yielded an estimate of unique adult smartphone subscribers. Given a lack of data on this share of smartphone users, we relied on GSMA Intelligence data on the share of adults among total mobile internet subscribers (all ages).
- Finally, we used the estimated gender gap in smartphone ownership to calculate the number of unique adult female and adult male mobile subscribers and the mobile penetration rates.

Analysing mobile internet use cases and barriers to adoption and further use

Barriers to mobile internet adoption and use

In the survey for *The Mobile Gender Gap Report 2025*, respondents who were aware of mobile internet but had not used it (in the past three months) were asked to identify the barriers preventing them from adopting it,[13] and respondents who had used mobile internet (in the past three months) were asked to identify the barriers preventing them from using it more.

The GSMA Consumer Survey 2024 allowed respondents to identify barriers by level of importance, ranging from "This is a barrier" to "This is one of the most important barriers" to "This is the single most important barrier". By staggering the questions, we could analyse in detail the key barriers women (and men) face to mobile internet adoption and further use. Survey respondents were asked to identify barriers to mobile internet adoption and further use from a list of 22 barriers (see Table 4 for a comprehensive list). To analyse the top barrier to mobile internet adoption and further use, similar barriers were grouped into five broad themes identified by the GSMA in earlier research.

The five overarching themes were:

- Affordability
- Literacy and digital skills
- Relevance
- Safety and security
- Access

Within each theme, responses to individual barriers were grouped into a single composite figure, except those under the Access theme, which were too diverse to be combined into one. Table 4 shows how the barriers to mobile internet adoption and further use were grouped by composite. The composites were calculated by summing the responses across sub-barriers within that composite and are not an average of the values of all barriers within that composite. This helps to illustrate the importance of broad themes, which consumers can experience in a variety of ways. For example, low digital skills or literacy can create a range of barriers to using mobile internet, and multiple questions must be asked to capture the extent of its influence. By contrast, the importance of cost as a barrier can be captured in just two questions.

Composite barriers therefore allow the various components of more complex barriers to be combined, and the importance of the barrier to be represented more accurately. For both mobile internet adoption and further use, these composites are shown in the report averaged across survey countries to provide an "All countries" ranking and are also shown at the country level.

13. Respondents who were not aware of mobile internet were not asked to identify the barriers preventing them from using it as it was not deemed appropriate.

Table 4
Individual barriers within each composite theme

Affordability composite	Literacy and digital skills composite	Relevance composite	Safety and security composite	Access (not composite)
Handset cost	Reading/writing difficulties	Internet is not relevant for me	Strangers contacting me	Internet drains my battery
Data cost	Difficulties using a mobile in general	Insufficient content in local language	Harmful content (self/family)	Access to agent support
–	Not confident using mobile internet	–	Do not trust information on websites or apps	Inconsistent/no coverage
–	Not sufficient support in learning to use internet	–	Scams or fraud	Slow connection speeds
–	–	–	Information security	Do not have time to use mobile internet
–	–	–	–	Shared phone access
–	–	–	–	Family does not approve
–	–	–	–	*Only allowed to use mobile internet for specific reasons
–	–	–	–	*Only allowed to use mobile internet for a limited amount of time or at certain times of the day

* The individual barriers with an asterisk were only asked of respondents who already use mobile internet.

Analysing use of mobile internet services

The GSMA Consumer Survey 2024 asked mobile internet users to identify the types of services they used on mobile internet. Respondents were asked to select from a list of 16 distinct mobile internet use cases ranging from social media and video calls to earning money and supporting one's education (see Table 5). Respondents were also asked to report how frequently they used each type of service. Analysis in *The Mobile Gender Gap Report 2025* focused on weekly usage to exclude services used only sporadically.

Questions about mobile internet use were not exclusive to a respondent's personal handset. Therefore, the survey data is indicative of a respondent's overall usage regardless of who owned the handset.

Table 5
Types of mobile internet use cases

- Call online
- Video calls
- Instant messaging
- Social media
- Watching online video
- Accessing online entertainment
- Reading the news
- Search for online information
- Accessing information to support education
- Search for online information for work or business
- Ordering and purchasing goods
- Income generation
- Using online banking or online mobile money services
- Accessing services that improve or monitor health
- Accessing government services
- Accessing online information on farming or fishery services

For more information about the methodology of *The Mobile Gender Gap Report 2025*, contact **GSMA Connected Women.**

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