Modeling the digital divide in mobile internet: An interactive web tool to guide inclusive digital practice over the next decade

Request for Proposal (RFP)

Submissions due no later than June 30, 2025, 12:00 PM U.S. Pacific Time

Summary: We request proposals for grant funding to develop a computational model of current and future mobile internet trends ("*mobile internet model*") and to expand the mobile internet model to understand the impact of the digital divide on key development outcomes over the next decade. Based on the model(s), the team will host an open-source, interactive, web-based interface that enables users to simulate current and future trends in mobile internet use in low- and middle-income countries (LMICs), focused on South Asia and sub-Saharan Africa. The interactive web interface will facilitate exploration of differential mobile internet trends under plausible, alternative, demand- and supply-side factors at the individual, market and policy levels over the next decade and visualize differential impacts on key population segments, highlighting, for example, digital gaps by geography and/or one or more vulnerabilities (gender, urbanicity, age, SES, educ., etc.). An expanded mobile internet model and interface will also allow users to explore the potential impact of the digital divide on development outcomes (i.e., health, economic opportunities, agriculture), guiding stakeholders to consider interventions that close the divide more rapidly and fulfill the promise of digital to improve lives and livelihoods.

Motivation: The project is motivated by the hypothesis that rapid advancements in digital technologies, including generative artificial intelligence (GAI)-enabled solutions, will only achieve expected efficiency gains and impact in health, agriculture, education, and economic development if the existing, and potentially persistent, gaps in meaningful connectivity are more rapidly reduced or closed.[1] Without intervention, the digital divide in mobile internet access may widen, leaving women, rural, poor, or less educated further behind. Illustrative, but not exhaustive, supply- and demand-side barriers to mobile internet reach and adoption are presented in Table 1.

Table 1: Example influences on mobile internet expansion

Supply-side	Demand-side
• Access: Mobile network factors: coverage, infrastructure strength, and reliability (Fiber, 2G-5G, internet exchanges, etc. • Affordability: Device cost and availability (smartphone vs. basic/feature phones) • Digital infrastructure investment • Data affordability (price per GB; pricing frameworks; spectrum policy) • Electrification status and availability (esp. for device charging) • Regulatory/governance frameworks, • Data security, privacy standards • Compute capacity/energy demands for AI	• Affordability of devices and data at the individual level • Digital literacy/skills • Social/gender norms: decision-making authority for women or within households • Perceptions of internet safety, trust, security (esp. for women; technology-facilitated gender-based violence, privacy concerns) • Relevance of digital internet platforms (lower literacy rates, language, potential preference for voice over text, time poverty, etc) • Perceived benefits for health, finance, etc.

[1] "'Meaningful connectivity'" is a level of connectivity that allows users to have a safe, satisfying, enriching and productive online experience at an affordable cost." https://www.broadbandcommission.org/universal-connectivity/#:~:text=%E2%80%9CMeaningful%20connectivity%E2%80%9D%20is%20a%20level,experience%20at%20an%20affordable%20cost

These diverse supply- and demand-side factors combine and interact to affect where individuals are in their *digital readiness*[2], provisionally categorized as:

1. *Unconnected*: Individuals without mobile phones and without mobile internet access;
2. *Under-connected:* Individuals with own/share feature phones and sporadic/unreliable connectivity or those with smartphones with infrequent mobile internet use;
3. *Meaningfully connected:* Individuals with own (or decision-making power for a shared) reliable (ideally, smart) phone and consistent/reasonably affordable internet; and
4. *AI ready:* Individuals who a) have access to or ownership of smart phones of sufficient quality to hold and run AI applications, b) live in geographies with strong, fast, reliable and affordable data infrastructure to implement scalable AI models, and, when/where possible, c) those who live in geographies with other enabling environment factors (e.g., GENAI in local language, compute capacity, digital governance, data access, etc.).

RFP Objectives: 1) To build a computational mobile internet model based on current data that factors in both supply- and demand-side influences on the digital divide, projecting the trajectory of the digital divide over the next decade; 2) Use the mobile internet model to create an interactive, web-based tool for users to visualize and toggle how might changes in supply- and demand-side factors affect the speed at which commercial markets can close the digital divide, especially for more vulnerable populations (women, low income, rural, etc.) across different digital readiness segments in LMICs in South Asia and sub-Saharan Africa over the next decade; and 3) Expand the mobile internet model to understand how trends in the digital divide may affect development outcomes (health, agriculture, education, and economic), adding these visualizations into the web-based tool to show how the digital divide may affect critical development outcomes, including potentially differential impacts on population segments in those same geographies.

Response: With the fast-paced evolution of the technology landscape, we acknowledge that this project will take technical expertise, creative thinking, and a tolerance for a high degree of unknowns. The primary step is to develop a mobile internet model(s) followed by optimization of an open-source, visualization tool that allows for model assumptions to be changed and parameterized to examine subpopulations and different contexts and over time. The interactive tool will visualize key supply- and demand-side drivers of the digital divide, allowing users to toggle levels of these influences on different geographies, populations, and digital readiness segments at the national and sub-national level, where feasible. The second stage model expands to consider the digital divide's impact on development outcomes, allowing for scenario exploration in the web-based tool. The RFP respondent should design for continuous model improvement and future interface iterations, including the ability to layer additional open-source datasets and potentially complete finer-grain projections. The final products aim to help diverse stakeholders assess where, when, how, and for whom different types of digital interventions (SMS, voicetech, AI, in-person, etc.) could be more efficient or effective, informing the optimal pairing of digital

[2] "Digital readiness" refers to the extent that an individual has the capacity to use a digital tool to improve their life or livelihood. https://www.governinghealthfutures2030.org/pdf/policy-briefs/DigitalHealthFuturesReadiness.pdf

interventions with an optimistic development impact timeline for the Foundation and other development stakeholders.

Data & Methods: We acknowledge the various forms of existing data impose various modeling constraints (given limited historical longitudinal durations, limited sample sizes, limited demographic data fields, etc.), which may require creativity in developing projections by population sub-segment and at sub-national level, in particular. We expect respondents to this RFP will propose what they consider to be the best methodology to meet these objectives. Teams are encouraged to build upon current literature, existing modeling efforts, and interactive platforms, including those on digital gender gaps[3] and models of trends in both basic[4] and smartphone[5] expansion. Early models and interface iterations are expected to be discussed with key digital stakeholders, including GF, to build consensus on the assumptions, data inputs, optimal modeling approaches, and limitations. All data, data sources and modeling methods should be transparent and clearly documented with the expectation of public data sharing on the grantee's publicly accessible website. It is expected that this broadly disseminated tool will be a living model, i.e., future data will be applied for annual model recalibration, modified trend analysis, updated interface options and potential expansion in scope or granularity.

Focus geographies: LMICs in South Asia and sub-Saharan Africa, with potential country level deep dives in 3 or more focus countries.

Objective 1: Build a computational mobile internet model(s) of mobile internet access based on current data that factors in both supply- and demand-side influences on the digital divide

For objective 1, develop an open-source mobile internet model(s) that simulates current and future supply- and demand-side trends in the mobile internet digital divide across diverse subpopulations and geographic contexts over the next decade at the national and sub-national levels, where possible. Teams may build upon or leverage prior models. As determined by the team, mobile internet model(s) may apply machine-learning algorithms, calibrating, cross-validating and assessing the model performance against historic and currently available datasets. Additional data curation or integration activities may be needed; however, we do not expect modeling to require primary data collection. This mobile internet model should inform responses to:

- Over the next decade, what supply- and demand-side factors appear most influential in closing the digital divide?
- Which factors, or combination of factors, may lead the divide to stagnate, grow, or decline in LMICs under current and future scenarios at the country- or sub-national level?
- Among which populations, or population segments, is the digital divide growing, declining, or stagnating (rural/urban, gender, age groups, SES, education) in LMICs under current and future scenarios at the country- or sub-national level?

[3] Breen, Casey F., Masoomali Fatehkia, Jiani Yan, Xinyi Zhao, Douglas Leasure, Ingmar Weber, and Ridhi Kashyap. 2024. Mapping Subnational Gender Gaps in Internet and Mobile Adoption Using Social Media Data. Working paper. https://doi.org/10.31235/osf.io/qnzsw https://digitalgendergaps.org/dashboard/

[4] Björkegren, Daniel. "The adoption of network goods: Evidence from the spread of mobile phones in Rwanda." *The Review of Economic Studies* 86.3 (2019): 1033-1060.

[5] Shreeti, Vatsala. *Tracing the adoption of digital technologies*. Bank for International Settlements, Monetary and Economic Department, 2024.

Objective 2– Use the mobile internet model(s) from objective 1 to **create an interactive platform (e.g., dashboard, website, tool) that allows users to toggle how different demand- and supply-side factors may influence current and future trends in the digital divide in key geographies over the next decade**

For objective 2, the team will use the model(s) developed for objective 1 to create a visualization tool that allows for model assumptions to be changed and parameterized to examine subpopulations and different contexts. The teams may build upon or expand prior visualization tools. The visualization tool for the RFP will allow the user to explore the potential impact of supply (e.g., strength, cost, and reliability of mobile internet (2G-5G), etc.) and demand (e.g., digital literacy, norms, safety, etc.) drivers on mobile internet over the next decade. Key applications of the tool should include ability to visualize the impact of the divide based on:

- Supply side factors
- Demand-side factors
- Individual/segments characteristics:
    - Demographics: gender, urbanicity, education, SES, religion, caste, etc.
    - Digital readiness segments (e.g., unconnected, under-connected, meaningfully connected, and AI ready)
    - Phone ownership trends: sole ownership, shared, borrowed or no phone
    - Phone type trends: smart, feature, basic
- Interactions across and among these factors

Objective 3: Expand the mobile internet model(s) and the interface to aid understanding of how the digital divide may impact critical health and livelihoods outcomes, especially for women, children, rural, and poor over the next decade.

For objective 3, the team will expand upon the mobile internet model (objective 1) and its interface (objective 2) to estimate the impact of the mobile internet digital divide on development outcomes, principally health (e.g., <5 mortality, nutrition, HIV, malaria) and livelihoods (agriculture, economic opportunities, etc.), over time at the national- or sub-national level. This expanded model from Objective 1 will now include current and projected economic, health, agricultural outcomes in these same geographies over the next decade to draw conclusions on potentially correlated outcomes between mobile internet and development outcomes. Key considerations for Objective 3 model and visualization are to increase understanding of how the digital divide may affect health and livelihoods outcomes based on toggling differing scenarios of:

- Supply side factors
- Demand-side factors
- Individual/segments characteristics:
    - Demographics: gender, urbanicity, education, SES, religion, caste, etc.
    - Digital readiness segments (e.g., unconnected, under-connected, meaningfully connected, and AI ready)
    - Phone ownership trends: sole ownership, shared, borrowed or no phone
    - Phone type trends: smart, feature, basic
- Interactions across and among these factors

Potential data sources for consideration may include, but are not limited to:

- Findex (new 2024 data, release June 2025)
- GSMA, ITU, digitalgendergaps.org, Pulse, ISOC
- Usage statistics from FB, TikTok, Instagram, Google, WhatsApp, etc.
- Open fiber standards and local infrastructure datasets
- Household and microenterprise surveys (HDI, MICS, LSMS, RIA, AfterAccess)
- IHME 5x5 km/other geospatial datasets linked to health outcomes
- Malaria – similar to UN Malaria risk mapping or the Malaria Atlas
- DHS/UNICEF/MICS: <5 mortality, maternal mortality, immunization rates, malnutrition
- CGIAR, UNDP: Agricultural yields
- World Bank mobile banking uptake
- Pathways vulnerability segmentation (tool to aid health behavior predictions)

DELIVERABLES:

1. Objective 1: Computational model(s) of the mobile internet trends over the next decade.
    a. Analysis that includes raising understanding and explaining the influence and potential impact of a diverse array of demand-, supply-, and interactive factors on the digital divide across national and sub-national (when possible) geographies and population segments of interest
    b. Analysis that includes raising understanding and explaining how the digital divide may impact development outcomes (health, agriculture, economic development, etc) across geographies, vulnerabilities (gender, urbanicity, SES, education, etc) and digital readiness segments
    c. Segmentation & Addressable Market Analysis
        i. Quantified estimates of the current and future addressable market for digital across the 4 digital readiness segments
        ii. Estimates of the more salient supply- and demand-side forces that affect the addressable market
    d. When feasible, fit models at the sub-national level, including for specific focus countries to be determined based on GF preference and available data
2. Objective 2: Interactive website/tool to visualize the model(s)
    a. Online hosting of an interactive forecasting dashboard/tool with scenario visualizations of current and future mobile internet and its impact at the national level, and sub-national where feasible, allowing users to explore via simulation (e.g., toggling supply- or demand-side, government subsidies, digital literacy campaigns, phone prices, etc).
    b. Country/regional simulations incorporating supply/demand drivers
        i. Ability to toggle by supply- and demand-side factors
        ii. Ability to toggle scenarios by additional individual, interactive, factors
        iii. Ability to toggle impact on the 4 digital readiness segments in specific geographies
3. Objective 3: Expanded Obj. 1 model and updated Obj. 2 interactive website/tool
    a. Updated model from Objective 1 with impact on development outcomes
    b. Updated interface from Objective 2 with impact on development outcomes
    c. Same exploration of supply, demand, and individual/geographic considerations
4. Knowledge Contributions
    a. Thought leadership on modeling digital equity via demand- and supply-side drivers

   b. Conduct Delphi or other consensus building approach to socialize and optimize the model within key stakeholder community
   c. Brief reports (1-3 pages) + slide deck of primary outcomes and findings
   d. Peer-reviewed or other publications advancing digital divide models and segmentation.
5. Toolkits and Guidance for tool use and adaptation
   a. Dissemination deck and brief for external audiences.
   b. Technical documentation for replicating/adapting the model and segmentation work.

TIMELINE: The project is expected to start in July 2025. The results for the initial model draft (Obj. 1) are tentatively expected by September 2025. Interface drafts are expected to be discussed in Q4, 2025 with optimization of model and interface before completion of Q2, 2026. The grantee is expected to host the product for a minimum of 5 years.

BUDGET: Teams that respond to this RFP are expected to provide a rational and reasonable budget aligned with a proposed timeline. Only a high-level budget is required at the time of submission. Additional budget detail will be requested from the finalist.

SELECTION CRITERIA

1) Proposed team's qualification, including modeling and gender expertise
2) Partnerships and consortiums are allowed, with a clear plan for multiple organization contributions and responsibilities
3) Knowledge and/or experience with phone, smartphone, technology or mobile internet adoption in LMICs, in the three focus countries, or similar geographies.
4) Deep expertise in the methodologies required to complete the work with the ability to explain those methods in clear, concise, and accessible language to lay audiences
5) Engagement of relevant, LMIC, university, or local organizations to provide thought partnership and context validation of the methodologies, processes, and outcomes.
6) Quality of performance history, including experience with adherence to deadlines, quality of deliverables, and effective cost control.
7) Flexibility, rigor, innovation, and creativity, with a clear and meaningful plan of action.
8) Demonstrated commitment to working with stakeholders, training interested users, and building additional tooling to make it easy for others to expand upon this work in future.
9) Appropriate budget.

APPLICATION SUBMISSION & POINT-OF-CONTACT

- Research proposals must be no more than 7 pages. Suggested sections include: Brief background; research questions/objectives; model description; data sources; model calibration/validation processes; data analysis; interface creation/dissemination; limitations; consensus building/next steps; timeline/budget.
- Additional pages are allowed for: cover page/affiliations, CVs of PIs/leads, references, timeline and high-level budget.
- 12-pt font. 1" margins. Single spacing is acceptable.
- **Attach your document in a single PDF in the Survey Monkey Tool**

Please submit any questions regarding this RFP via e-mail to Caryl Feldacker, Senior Program Officer, Gender Impact Accelerators, Gates Foundation (caryl.feldacker@gatesfoundation.org). Please include the following in the subject line of your e-mail: "RFP- Digital Divide Modeling".

All application documents should be submitted **no later than June 30, 2025, 12:00 PM U.S. Pacific Time.**