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# Engendering ICT

## Toolkit for World Bank Task Team-Leaders (2018)

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Engendering ICT Toolkit (2018)

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***Acknowledgements***

We set out with an ambitious task - to develop a toolkit that can serve as a 'ready reckoner' for Task Team Leaders (TTLs) to design and implement ICT project plans that promote women's inclusion. We could not have delivered this toolkit within a short timeline of two months without the invaluable support and guidance we received from Ms Seda Pahlavooni, an incredible TTL who helped us at every step of the project.

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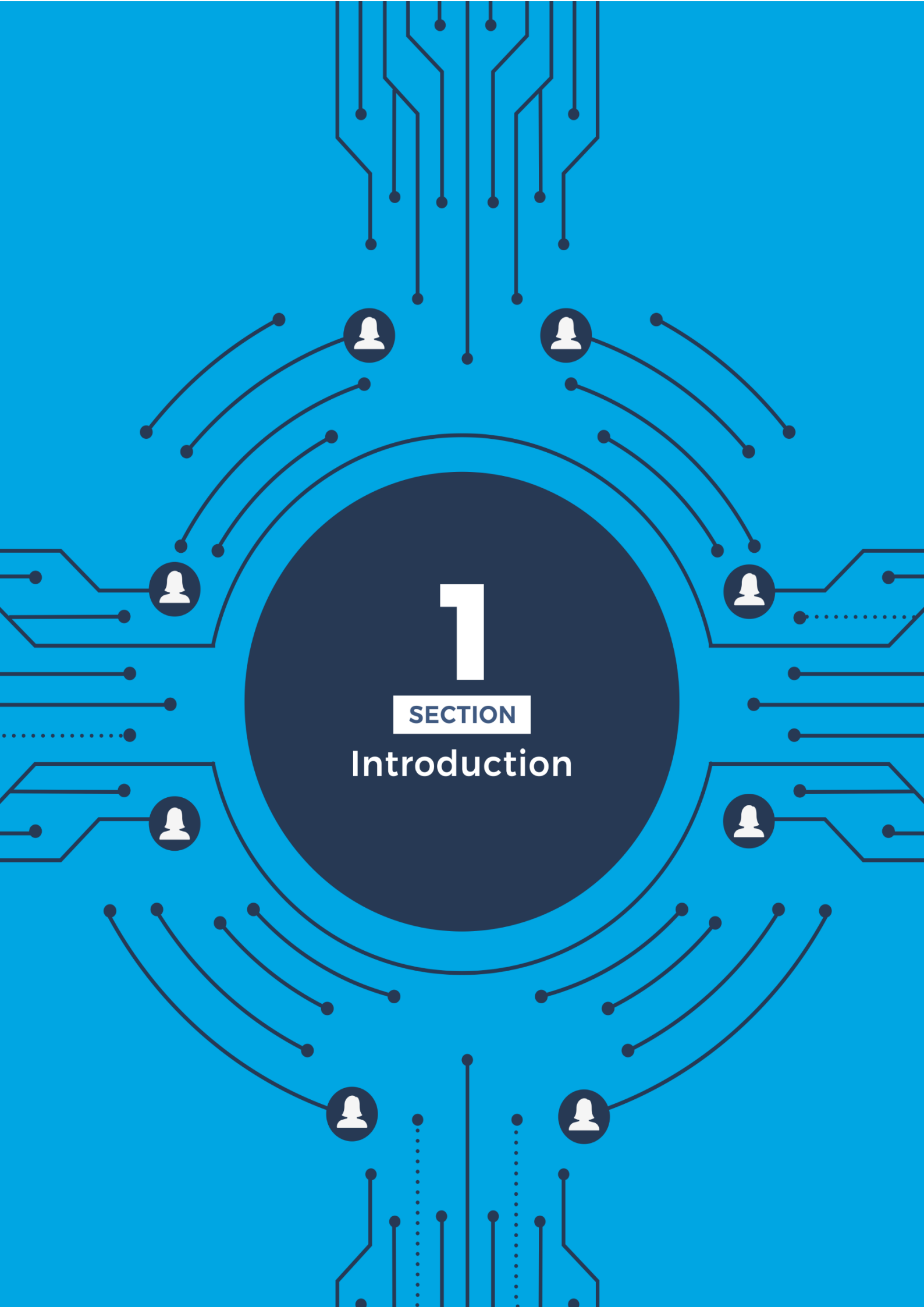
### *List of abbreviations*

| | |
|---|---|
| AML | Anti-Money Laundering |
| APC | Association for Progressive Communications |
| ATI | Access to Information |
| BBVA | Banco Bilbao Vizcaya Argentaria |
| BCC | Behaviour Change Communication |
| BCs | Banking Correspondents |
| BISP | Benazir Income Support Program |
| CARE | Cooperative for Assistance and Relief Everywhere |
| CBO | Community Based Organisations |
| CERT | Computer Emergency Readiness Team |
| CFT | Countering Financial Terrorism |
| CNIC | Computerized National Identity Cards |
| CSO | Civil Society Organisations |
| FATF | Financial Action Task Force |
| FGD | Focus Group Discussion |
| FIR | First Information Report |
| G2P | Government to Person |
| GSMA | GSM Association |
| HDI | Human Development Index |
| HRMIS | Human Resource Management Information System |
| ICT | Information and Communication Technologies |
| IEC | Information, Education, Communication |
| IFMIS | Integrated Financial Management System |
| ILO | International Labour Organization |
| IPR | Intellectual Property Rights |
| ITES | Information Technology Enabled Services |
| ITU | International Telecommunication Union |
| KYC | Know your customer |
| LFPR | Labor Force Participation Rates |
| LPG | Liquified Petroleum Gas |
| M&E | Monitoring & Evaluation |
| MFI | Micro Finance Institutions |
| MNO | Mobile Network Operators |
| MOOC | Massive Open Online Course |
| MSME | Micro, Small and Medium Enterprises |
| MVNO | Mobile Virtual Network Operators |
| PAD | Project Appraisal Document |
| PoS | Point of Sale |
| PPP | Public Private Partnership |

| | |
|---|---|
| QoS | Quality of Service |
| RTI | Right to information |
| RTT | Round Trip Time |
| STEM | Science, Technology, Engineering and Math |
| TTL | Task Team Leaders |
| UNCTAD | United Nations Conference on Trade and Development |
| USAF | Universal Service Access Fund |
| USAID | United States Agency for International Development |
| VAT | Value Added Tax |
| VAW | Violence against Women |
| VOIP | Voice over Internet Protocol |


1
SECTION
Introduction

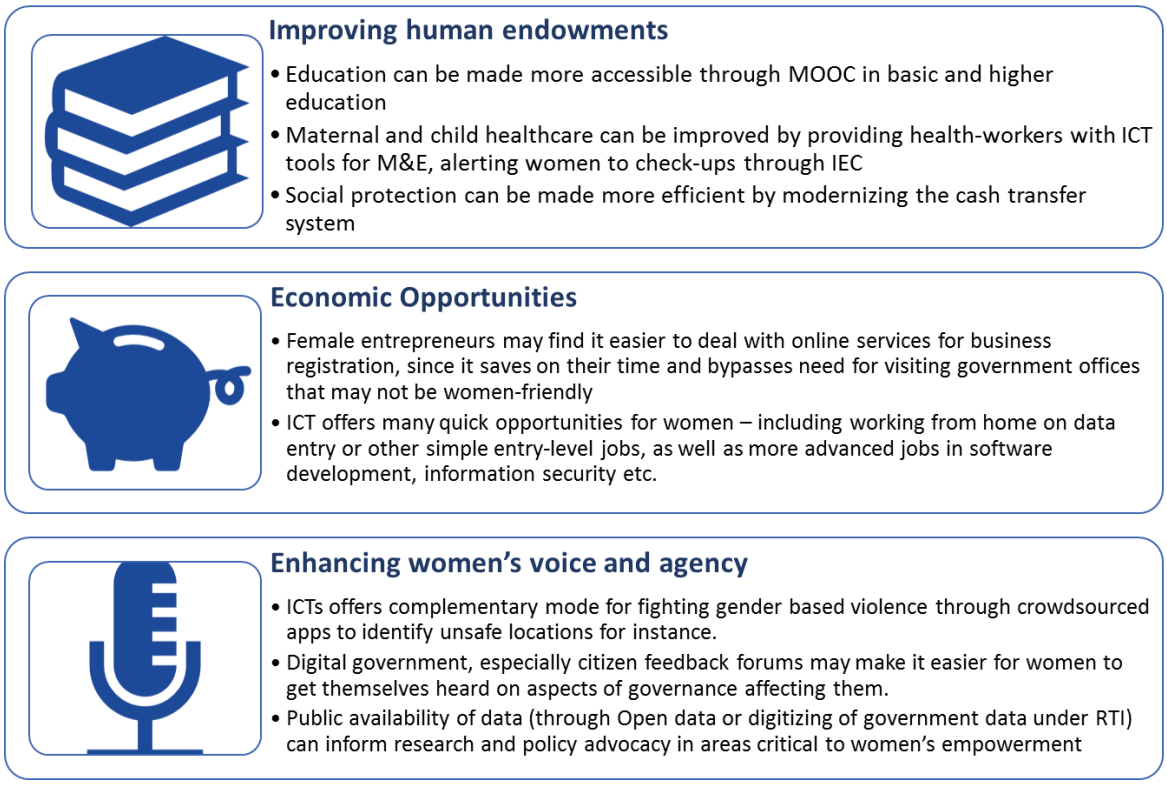
# 1. Introduction

## 1.1. Need for this Toolkit

The digital inclusion of women can catalyze development by empowering them to pursue new professions, access critical government and private services, and become more informed citizens. However, regional and global research indicate a persistent gender gap in access to, and adoption and use of Information and Communication Technology (ICT) tools which could prevent them from reaping digital dividends – in turn hindering their economic as well as political empowerment.

As a corollary, any World Bank project with an ICT component (whether as an end goal or as an instrument for social service delivery) must account for the possibility of excluding one half of the targeted beneficiaries from availing the benefits of the program due to pre-existing barriers that limit access or usage. Additionally, projects should also take advantage of the potential of ICT to further gender empowerment goals (such as Goal 5.B of the Sustainable Development Goals). As Figure 1 shows, ICT can be used to further all three strategic objectives that comprise the World Bank Gender Strategy (2016-23).

*Figure 1: Strategic Objectives under World Bank Gender Strategy (2016-23) and ICT: Examples of Use Cases*




Knowledge of barriers to women's access to ICT and opportunities that ICTs may provide for women's empowerment, should accordingly alter program design and modalities of implementation for maximum impact.

This Toolkit serves as the first step in that direction, and seeks to highlight the likely barriers that women face in owning, accessing, and benefiting from digital sector interventions implemented by the World Bank. It also identifies opportunities for using ICT to empower

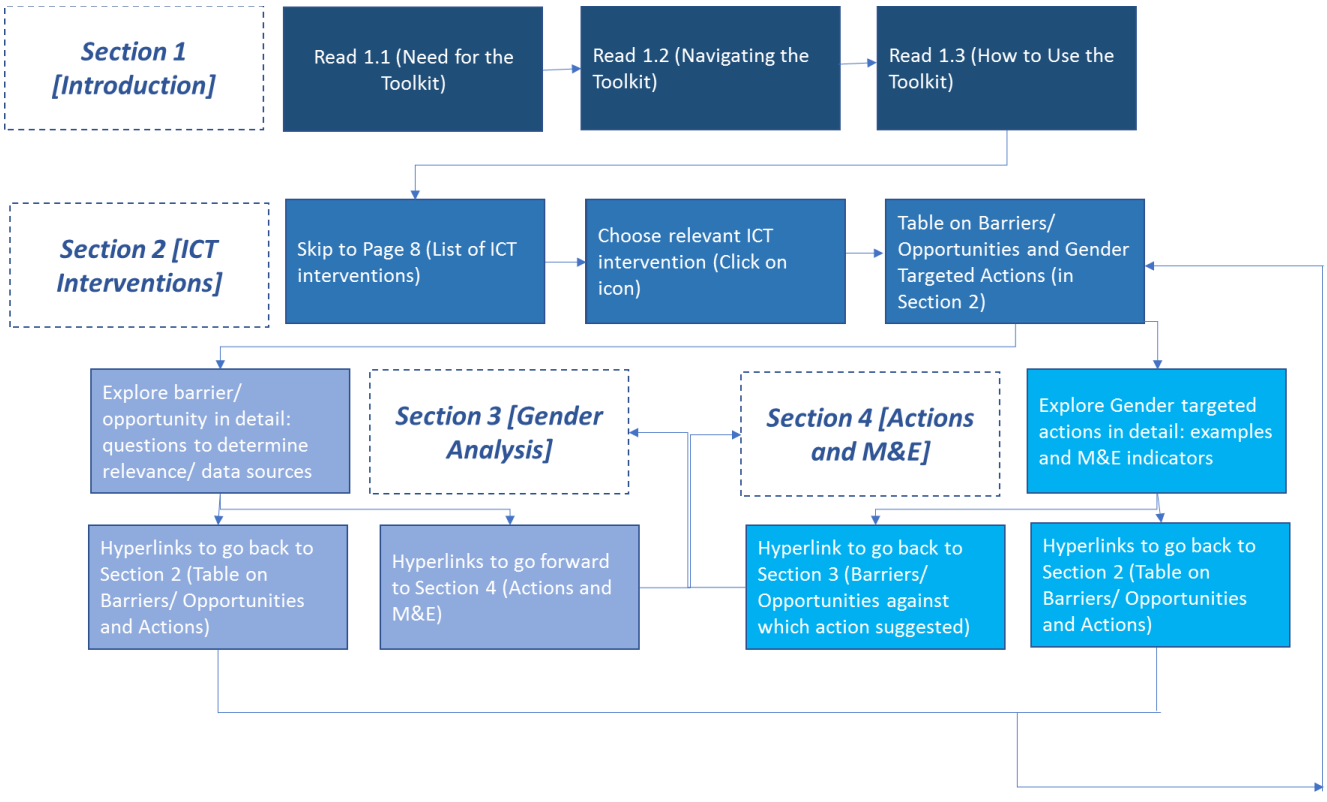
women. It then goes on to suggest a set of actions, drawing from existing examples, that have the potential to address these barriers.

In 2005, the World Bank produced the Engendering ICT Toolkit framed within the context of the Millennium Development Goals. The dramatic changes to the ICT sector since then together with the extended scope of ICT and gender within the Sustainable Development Goals, have rendered it outdated in some respects. The current Toolkit also aims to overcome the limitations of the older resource by:

- identifying specific barriers/opportunities against each ICT intervention;
- providing guidance to Task Team Leaders (TTLs) to decide whether the barrier/opportunity is relevant to their context;
- suggesting targeted actions, based on existing knowledge of previously attempted approaches, to mitigate each barrier or advance each opportunity, if the barrier/opportunity is deemed relevant; and
- listing a set of potential indicators (results framework) to track the performance of ICT interventions and solutions to overcome identified barriers or capitalize on opportunities.

Since TTLs are time-constrained, the Toolkit is designed in such a way that they need not go through the document in its entirety. However, it is recommended that they read the sections on 'Navigating the Toolkit' (Section 1.2) and 'How to use the Toolkit' (Section 1.3) before proceeding to the main text. The section on 'Navigating the Toolkit' provides a brief overview of the document structure and enables quick access to the sections relevant to the TTL. 'How to use the Toolkit' explains how the guidance in this document can help the TTL through the project cycle.

*Figure 2: Navigating the Toolkit*



## 1.2. Navigating the Toolkit

The Toolkit design seeks to ensure that TTLs do not have to go through the entire document to mainstream gender into their daily operations. Instead there are embedded hyperlinks that allow jumping to the relevant section.

The Toolkit begins with a typology of ICT interventions grouped under three headings: Digital Ecosystem; Digital Infrastructure and Connectivity; and Platforms and Services (Page 8). The headings are further divided by sub-headings, into more specific interventions. The chapter on ICT interventions (Section 2) provides summary tables against each intervention, with internal links to possible gender barriers and opportunities (Section 3), and associated targeted actions to mitigate/capitalize on these (Section 4). Not all interventions pose the same exclusion risks or offer the same degree of opportunities for pursuing gender equity goals. The degree of these risks and opportunities is identified in one paragraph ('Why should you care about gender?')' before each intervention in Section 2.

The aim of the section on Gender Analysis (Section 3) is to alert the TTL to constraints that exclude women from availing benefits of the respective intervention. It also identifies opportunities that could enable gender empowerment, subject to the adoption of suggested gender-targeted actions. Every identified barrier or opportunity that the Toolkit identifies against an intervention may not be relevant to the project on which the TTL is involved. To assess relevance, the Toolkit provides guidance on how to assess whether a given barrier is relevant to specific project context. This is in the form of questions (not exhaustive), which are expected to guide the TTL in thinking along the desired lines.

The Toolkit also helps answer these questions by making references to global standards (where they exist) and providing other tips where they don't, and identifying possible data sources to make such a calculation. Due to paucity of sex disaggregated secondary data on the subject, answers to many assessment questions require primary research. While guidance on how to conduct this research is outside the scope of the current Toolkit, TTLs may refer to the recent USAID Toolkit as well as other resources mentioned in the text. A summary of existing data sources is provided in Section 6.3.

If a TTL decides that a given barrier or opportunity is relevant to the ICT intervention on which she is working, she will be guided to possible actions (Section 4 called 'Actions and M&E) that may be taken to overcome the barrier or fulfill the opportunity of gender empowerment. These solutions are supplemented with examples where they may have been implemented. For the majority of the examples, the Toolkit provides external links that allow the TTL to explore the issue at hand, in detail. For specific examples, greater details are provided within the text.

Lastly, against each action, the Toolkit identifies possible indicators that the TTL may monitor during the implementation of the project. This could help answer the question on how effective a given intervention was in overcoming a gender barrier or capitalizing on an opportunity for gender empowerment.

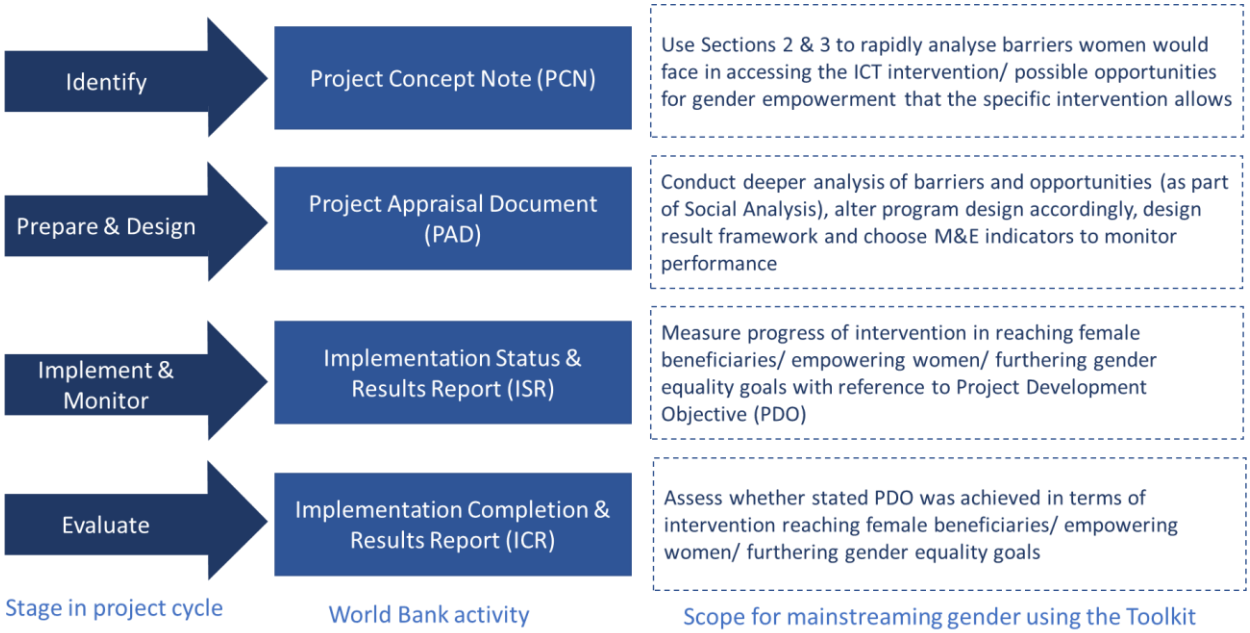
It is possible to navigate back and forth from one section of the Toolkit to another. ICT interventions (Section 2) link to Section 3 and 4. Links embedded in Section 3 allow navigation to sections 2 and 4. Similarly, links provided in section 4 allow returning to the relevant parts of the report in Sections 2 and 4.

## 1.3. How to use the Toolkit

The various sections of the Toolkit can assist the TTL in different stages of the project cycle. As Figure 3 shows, there are four broad stages in the project life cycle:

***One***, where interventions relevant to the target geography are identified. Correspondingly, a Project Concept Note (PCN) is generated. To mainstream gender at this stage, the TTL may conduct a rapid review of possible barriers and opportunities using Sections 2 and 3 of the current toolkit. The TTL will need to choose the relevant interventions by clicking on the links on Page 8, which will take her to the list of potential Barriers/Opportunities linked to it. For each barrier and opportunity, are associated questions that seek to answer whether the current barrier/opportunity is relevant to the present scenario (Section 3). These include questions that can be answered through primary or secondary research. At the PCN stage, answering questions through data in the public domain/available with the partner country government will suffice.

*Figure 3: Using the Toolkit, through the Project Cycle*




***Two***, at the project preparation and design stage, deeper analysis will be undertaken of the relevant barriers and opportunities identified at the PCN stage. This can be done through consultations with women's groups and representatives of targeted groups, as required. Actions to mitigate the barriers, or to take advantages of the opportunities will also have to be decided at this stage. This can be done by exploring the ideas identified in Section 4 or through consultations with the partner government. The result framework is also designed at this stage, choosing relevant indicators to monitor performance. Ideas for these can also be found in Section 4. All of the above feeds into the Project Appraisal Document (PAD). To enable quick turn-around times on PAD preparation, the Toolkit is designed to align with the 'Gender Tag' framework of Analysis-Action-M&E and seeks to serve as a quick resource for TTLs. The toolkit content may also be directly adapted (based on perceived relevance to project) into the PAD data sheet as illustrated below:

| PAD Sections | Toolkit Section | Description |
|---|---|---|
| Implementation: Results Monitoring and Evaluation | Gender Actions and M&E | The section identifies potential M&E indicators against actions that the PAD may aim to implement, to measure the performance of actions taken to mitigate/capitalize on identified Barriers/Opportunities respectively. |
| Appraisal Summary: Introduce a segment on Gender | Gender Actions and M&E | For gender tagged ICT interventions, a new segment titled 'Gender Safeguards' may be added (apart from environment and social safeguards). This would identify the actions being taken to mitigate barriers/capitalize on opportunities identified by the TTL. Nomenclature may vary since the possibility of incorporating gender equality considerations goes beyond 'safeguards' required to mitigate barriers. |
| Sectoral Context: Introduce a segment on likely Gender Barriers | Gender Analysis | As part of the sectoral context, the content from this section may be used to articulate the likely barriers and opportunities that are relevant to the project context. |

***Three and Four*** involve implementation, monitoring and evaluation of the project. The corresponding actions for mainstreaming gender would be to monitor the indicators identified at the project design and preparation stage, for measuring project performance. Feedback and learning from this stage can inform actions in future, and can be incorporated into the Toolkit as well.

## 1.4. Limitations

This Toolkit is a first step in creating a repository of primary gender barriers and potential solutions associated with different types of ICT interventions implemented in the World Bank's ICT and transport division. It was developed on the basis of the analysis of publicly available literature and expert inputs. This Toolkit and its content should be viewed in the context that it was developed, while being aware of the following limitations:

1. The list of ICT Interventions is limited to those implemented in the ICT and Transport Division of the World Bank.
2. The solution pathways/gender actions are indicative and not comprehensive, and need to be assessed in the project context to identify if and how such solutions need to be adapted to suit the specific context within which the TTL's intervention will operate.
3. The M&E indicators identified are linked to the solution pathways and barriers identified in the report and are therefore useful starting points, but not necessarily a comprehensive list.

# 2

SECTION

# ICT Interventions

# ICT interventions

## DIGITAL ECOSYSTEM

### Policy & Legal/ Regulatory Framework

- Infrastructure policy
- Universal service policy: Public access initiatives
- Spectrum management policy
- Interconnection policy
- Competition & pricing policy
- Taxation policy
- Licensing
- Quality of service (QOS) regulation
- Right to information/ access to information
- Intellectual property right policy
- Online safety policy
- Privacy & data protection
- Policy on Mobile money & other financial services
- Public-Private Partnership (PPP) design

### Institutional capacity building

### Facilitating digital entrepreneurship

### Training

### Cyber-security

## DIGITAL INFRASTRUCTURE & CONNECTIVITY

### Last mile connectivity

### Technical Backbone Infrastructure

### Improving Device Ownership

## PLATFORMS & SERVICES

### Digital Government & Citizen Services

- Government to Government & Government to Employee Services
- Government to Citizen & Government to Business Services

### Identity creation & management

### Cash transfers & E-vouchers

- G2P payments through bank accounts
- G2P mobile based payments

### Information, Education, Communication & Awareness


2.1
SECTION
Digital Ecosystem

# 2.1. Digital Ecosystem

## 2.1.1. Policy and Legal/Regulatory Framework

### 2.1.1.1. Specific ICT interventions

- Design of national ICT sector policy
- Design of policy and regulatory frameworks for:
  - Infrastructure
  - Universal service policy
  - Spectrum management
  - Interconnection
  - Competition and pricing
  - Taxation
  - Licensing
  - Quality of Service Regulation
  - Right to information/access to information (RTI/ATI)
  - Intellectual property rights
  - Online safety
  - Privacy and data protection
  - Mobile money and other financial services
  - PPPs

### 2.1.1.2. Why should you care about gender?

Given that women constitute half of the worlds' population, it is important to identify at the policy, legislative and regulatory level, what actions (if at all) can be taken to ensure equitable access to ICT networks and services. This of course has intrinsic importance in terms of expanding reach. Additionally, ICTs also have the potential to expand opportunities for women across domains. This includes access to education, health services, social security transfers, greater economic opportunities (both within and outside the ICT sector) and providing agency to women. Figure 1 above examines some ways by which this is made possible.

### 2.1.1.3. Barriers/opportunities and gender targeted actions

| ICT Intervention Type | Barrier/Opportunity | Gender targeted action |
|---|---|---|
| Infrastructure policy | Unaffordability of Voice/Data services | • Policies to promote affordable infrastructure |
| Universal Service Policy (public access initiatives) | Social constraints on economic/residential mobility | • Public access centers: Ensure rural/ remote locations receive adequate coverage |

| | | |
|---|---|---|
| | Social constraints on physical mobility | • Ensure that the location of public access centers is accessible for women |
| | Social constraints on interaction between the sexes | • Suitable designs in public access centers (with availability of female intermediary) |
| Spectrum Management Policy | Opportunity to overcome unaffordability of Voice/Data services | • Policies to promote affordable infrastructure (namely, releasing spectrum at an affordable cost to MNOs) |
| Interconnection Policy | Opportunity to overcome unaffordability of Voice/Data services especially International Connectivity | • Policies to ensure affordable international termination rates |
| Competition and Pricing Policy | Opportunity to overcome unaffordability of Voice/Data services | • Competition and pricing policy to increase affordability |
| Taxation policy | Opportunity to overcome limited device ownership due to unaffordability<br>Opportunity to overcome unaffordability of Voice/Data services | • Reduction and removal of taxes |
| Licensing policy | Opportunity to provide additional source of income to women | • Licensing policy that discriminates in favor of women |
| Quality of Service (QoS) regulation | Opportunity to ensure QoS indicators account for women's differential usage | • Use of appropriate indicators of QOS |
| Right to Information/ Access to Information | Social constraints on economic/ residential mobility | • Make available alternative modes of RTI application |
| | Social constraints on physical mobility | • RTI administration that considers women's different situations and needs<br>• Make available alternative modes of RTI application |
| | Time constraints | • Simple procedures to overcome time constraints<br>• Make available alternative modes of RTI application |

| | | |
|---|---|---|
| | Lack of awareness | • Awareness and capacity building; financial assistance for Intellectual Property Rights |
| | Lack of comprehensible content | • Program design to overcome constraints of literacy/ language competency |
| Intellectual Property Rights | Lack of awareness and capacity | • Awareness raising and financial assistance |
| Online Safety | Lack of awareness of threats | • Training to address lack of awareness of cyber-risks |
| | Gender blind online safety legislations | • Strengthen legislation for online safety |
| | Lack of law enforcement capacity to handle online gender based violence | • Capacity building for tackling cyber-crimes against women |
| Privacy and data protection | Lack of awareness of threats | • Training to address lack of awareness of cyber-risks |
| Mobile money and other financial services | See Section 2.3.3 for this. | |
| Public-Private Partnership (PPP) design | Opportunity to make PPP gender inclusive | • Mainstream gender in PPP |

## 2.1.2. Institutional strengthening

### 2.1.2.1. Specific ICT interventions

Institutions that need to be targeted for capacity development, so that ICT sector policies consider women's different situations and needs, and implement programs and budgets that promote women's inclusion, may include the following:

- Policy makers in departments such as Communications, Electronics and Information Technology, Ministry of Commerce (enacting policies related to tariffs on devices), Ministry of Finance (all ICT and gender related financial decisions), Ministry of Science and Technology etc.
- Telecom/Broadcast Regulators.
- Line ministries implementing ICT policies: For example, the Education ministry enacting and implementing policy for ICT enabled public education programs in the form of Massive Open Online Courses (MOOC). Similarly, the Health Ministry may be planning on digitizing the monitoring of maternal health in the country.

#### 2.1.2.2. Why should you care about gender?

Given that women constitute approximately half of the citizenry, and as such should enjoy equitable benefits from ICT networks and services, it is important to ensure that decision makers and officials implementing policies at the ground level are sensitized to the need of being gender-aware. This would ensure that the World Bank's effort at gender-mainstreaming sustains itself even after the end of the project currently being implemented.

#### 2.1.2.3. Barriers/opportunities and gender targeted actions

| Barrier/Opportunity | Gender targeted action |
|---|---|
| Lack of actionable sex disaggregated data | • Focus on strengthening the data ecosystem, with emphasis on the complementary role of administrative data, survey data, and big data |
| Lack of processes in decision making that consider women's different situations and needs | • Capacity-building programs for decision makers<br>• Capacity training for staff implementing policies/ data collection that includes women's different situations and needs<br>• Gender Mainstreaming in policy design |
| Lack of institutional capacity on gender | • Capacity-building programs for decision makers<br>• Capacity training for staff implementing policies/ data collection that includes women's different situations and needs<br>• Capacity building in gender-economics for enabling gender budgeting<br>• Review recruitment procedures in government and other sectors: Ensure presence of gender experts |

## 2.1.3. Facilitating Digital Entrepreneurship

### 2.1.3.1. Specific ICT interventions

- The overall aim will be to support the digital innovation ecosystem and to generate digital sector jobs and digital small and medium enterprises:
    - ICT interventions fostering ICT entrepreneurs such as mobile software and ICT application developers.
    - Technical training such as courses in coding, application development, among others.
    - Providing financial support to digital entrepreneurs by developing grants and venture funds.
    - Supporting digital business incubators and technology centers/ institutes to nurture new digital startups. Further reading.

### 2.1.3.2. Why should you care about gender?

While women-owned and managed businesses are observed to have made significant advances in the digital sector, there are inherent structural disadvantages that are often observed to prevent women from starting and upscaling businesses. Women suffer from relative disadvantages in terms of access to finance and networks in comparison with men. This, coupled with social stigmas associated with women in STEM make both entry into and scale-up of women-owned digital enterprises harder.

### 2.1.3.3. Barriers/opportunities and gender targeted actions

| Barrier/Opportunity | Gender targeted action |
|---|---|
| Low representation of women in STEM | • Awareness and sensitization campaigns in educational institutions to encourage girls to enter STEM<br>• Target local communities' awareness of ICT use<br>• Creating enabling environment: Linking with potential mentors/ role models for women from local and foreign tech companies |
| Social norms against women in STEM | • Awareness and sensitization campaigns in educational institutions to encourage girls to enter STEM<br>• Target local communities' awareness of ICT use |
| Lack of complementary non-ICT Skills | • Capacity building for entrepreneurs<br>• Capacity building of soft-skills for entrepreneurs |

| | |
|---|---|
| Limited access to finance to start or grow businesses | • Set up funding mechanisms specifically targeting women entrepreneurs<br>• Connect women digital entrepreneurs to investors |
| Unfavorable business climate | • Re-engineer processes to increase accessibility for women |
| Lack of access to entrepreneur networks/markets | • Facilitate and encourage women-centric networks to develop<br>• Policy changes such as affirmative action in procurement targeting women. |
| Lack of access to affordable, convenient early child facilities | • Subsidy schemes for Child care facilities |

## 2.1.4. Training

### 2.1.4.1. Specific ICT interventions

- General improvement of digital literacy among beneficiaries/ citizens
- Higher level skills training to increase STEM graduates and increase employment of women in ICT related fields

### 2.1.4.2. Why should you care about gender?

Women, especially in developing countries, tend to have unequal access to education than men. As a result, more women than men are technically illiterate or are unable to fully use and benefit from ICTs. There is also a lack of girls and women pursuing education and careers in STEM. Families and societies have the tendency to prioritize boys' education and use of ICT-related resources over girls. Moreover, ICT/STEM fields may be seen as 'unsuitable' for women; this stereotyping acting as a self-fulfilling prophecy in preventing girls from selecting courses in STEM and ICT fields. In some countries women are generally underrepresented amongst graduates and particularly postgraduates, in the disciplines that would allow them to participate in the services and managements sectors associated with the telecommunications industry. This applies equally to high level jobs and in the traditional disciplines of economics, law and politics which underpin policy formulation and regulation. The impact of stereotypes has been used to explain the lack of women in mathematics, for example (see here).

### 2.1.4.3. Barriers/opportunities and gender targeted actions

| Barrier/Opportunity | Gender targeted action |
|---|---|
| Social constraints on economic/ residential mobility | • Training design that considers women's different situations and needs (located as close to the intended beneficiary as possible) |

| | |
|---|---|
| Social constraints on physical mobility | • Training design that considers women's different situations and needs ensure convenient, safe location/ mode |
| Social constraints on interaction between the sexes | • Training design that considers women's different situations and needs: ensuring safe spaces for women in class |
| Social norms against women using ICT | • Target local communities' awareness of ICT use, tapping into CBO networks |
| Social norms against women in STEM and in other specialized, postgraduate disciplines relevant to sector operations and governance | • Awareness and sensitization campaigns in educational institutions to encourage girls to enter STEM |
| Time constraints | • Training design that considers women's different situations and needs: should be conducted at times women most likely to be available |
| Opportunity to overcome lack of awareness of information-security/ cyber-risks threats | • Training to address lack of awareness of cyber-risks, incorporated into digital training modules |

## 2.1.5. Cybersecurity

### 2.1.5.1. Specific ICT interventions

- Baseline analysis of existing legal measures in a country to both promote/protect cyber-security and along with a strategic plan to strengthen it; preparation of ToR for key personnel to be hired by the government to work on this.
- Awareness and capacity building: implementing tools, trainings and processes to strengthen capabilities to combat cyber-attacks.
- Governance and institutions: institutional arrangements and internal procedures for strengthening cyber-security.
- Establishing response and recovery mechanisms for detecting, investigating and monitoring cyber-incidents and loss of data (e.g. Computer Emergency Response Teams)

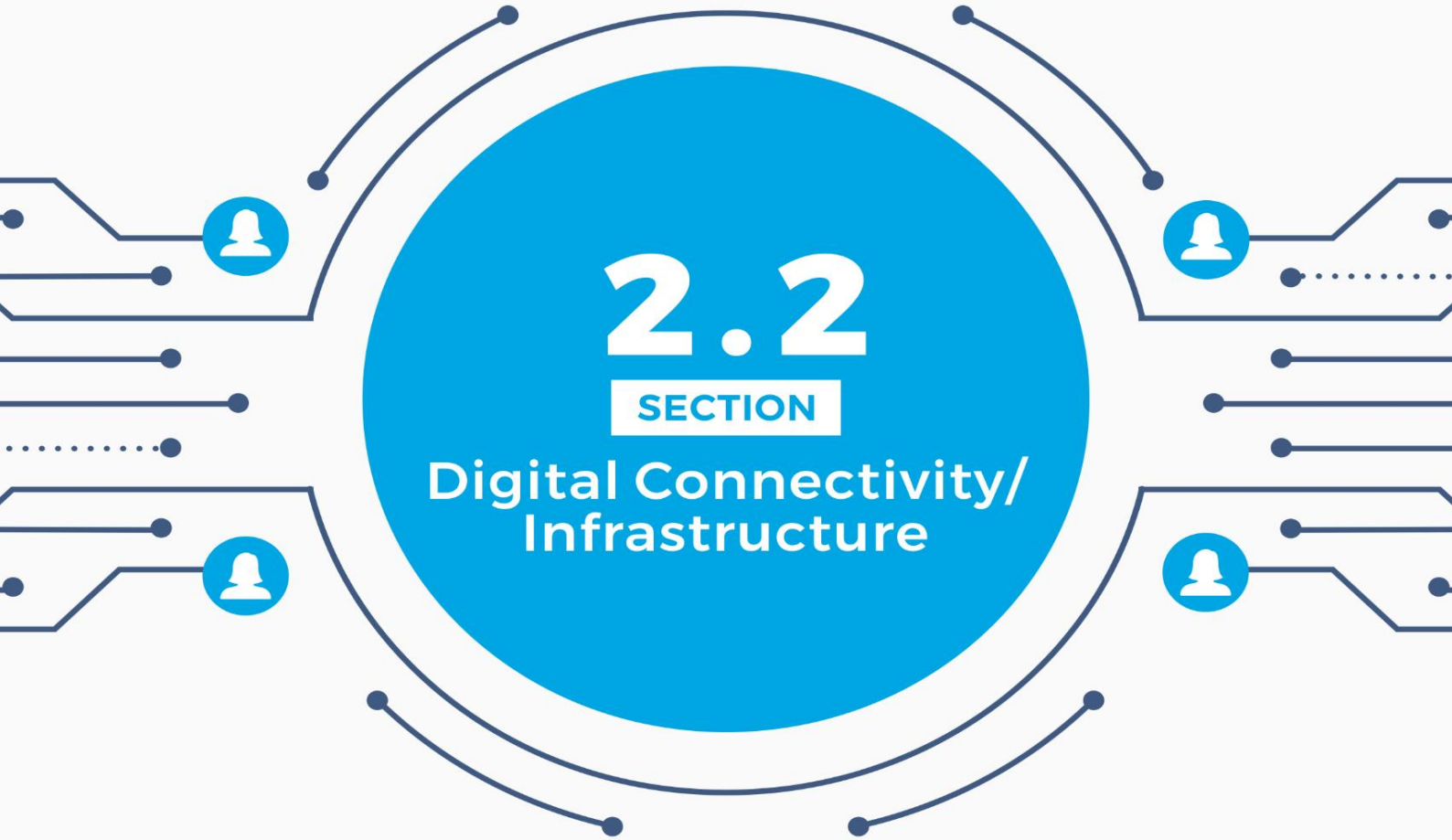
### 2.1.5.2. Why should you care about gender?

- Cyber-attacks have the potential to completely cripple critical digital infrastructure. Given the increasingly digital nature of governance in both developing and developed countries, affected infrastructure and sectors could range from economy, healthcare, energy, transport and communication systems, law enforcement, defense and public administration (ISCOM, 2004). Prima facie, these are likely to impact men and women equally.

- However, given that women are less likely to be digitally literate (especially in the backdrop of widespread disadvantage they face in basic literacy), they may be more vulnerable to cyber-security risks. Research ICT Africa's 2017 surveys conducted in Africa indicate that compared to men, women are far less aware of their digital rights and how to safeguard themselves and identify online sexual harassment (Gillwald, Mothobi, Schoentgen, 2017).
- Additionally, projects can incorporate gender awareness by supporting more women in obtaining relevant degrees and working in the cyber-security domain.

#### 2.1.5.3. Barriers/opportunities and gender targeted actions

| Barrier/Opportunity | Gender targeted action |
|---|---|
| Lack of awareness of information-security threats | • Training to address lack of awareness of cyber-risks. Should consider women's different situations and needs. |
| Opportunity to increase representation of women in information security | • Awareness and sensitization campaigns in educational institutions to encourage girls to enter STEM<br>• Program design to increase women in cyber-security (mentoring schemes and scholarships) |


2.2
SECTION
Digital Connectivity/
Infrastructure

# 2.2. Digital Infrastructure and Connectivity

## 2.2.1. Backbone Technical Infrastructure

### 2.2.1.1. Specific ICT interventions

This category refers to national or large regional technical infrastructure interventions that are of a backbone nature, which most commonly include the specific interventions listed below and possibly other similar ones.

- National & international/regional fiber backbone
- Government internal networks
- Internet exchange points
- National data center operations

It should be distinguished from infrastructure interventions that focus on promoting access, such as Last Mile Connectivity and Improving Device Ownership, which are very different from a gender perspective. Please see the hyper-linked sections for more details.

### 2.2.1.2. Why should you care about gender?

At the time this toolkit was drafted, the authors were not aware of any evidence showcasing how gender considerations may influence the outcomes of this category of interventions per se and do not see specific entry points for gender. Hence, this category is labelled as gender neutral.

However, setting up backbone infrastructure could entail labor influx, which in turn could pose a risk of increased instances of gender based violence. Refer to the recommendations of the World Bank Global Gender-Based Violence Task Force to address these risks (Gupta and Sierra, 2017).

## 2.2.2. Last Mile Connectivity

### 2.2.2.1. Specific ICT interventions

Expansion of fixed and wireless access network coverage in remote areas. This section only concerns itself with connectivity as a basis for services that can build upon such an infrastructure, but does not cover access to services themselves. Last Mile Connectivity projects that include any component beyond the infrastructure sense and aimed at expanding services should also refer to Section 2.3 Platforms & Services for additional guidance on ensuring that women may equally benefit from intended services.

### 2.2.2.2. Why should you care about gender?

Even though Last Mile Connectivity interventions focus mostly on extending technical infrastructure, gender considerations could significantly impact outcomes. Women in many countries are concentrated in rural areas, disadvantaged urban dwellings, and remote places that may naturally become the focus of Last Mile Connectivity and have the potential to become main beneficiaries of such interventions. However, women are often unable to enjoy connectivity even when there is coverage, due to unaffordability of the services and complementary requirements as well as social constraints that they face. In particular, women are concentrated at the bottom of the pyramid with less access to education and lower income, rendering them less likely to be able to afford connectivity even in the presence of access to networks.

### 2.2.2.3. Barriers/opportunities and gender targeted actions

| Barrier/Opportunity | Gender targeted action |
|---|---|
| Social constraints on economic/ residential mobility | • Policies to promote affordable infrastructure<br>• Public access centers: ensure adequate coverage in remote and poor locations, where women are often concentrated |
| Unaffordability of Voice/Data services | • Policies to promote affordable infrastructure<br>• Public access centers: ensure that services at public access centers are priced appropriately<br>• Encouraging private MNOs and retail sellers to pursue innovative pricing models in SIM |
| Lack of affordable access to electricity and charging infrastructure | • Actions to provide affordable electricity infrastructure<br>• Policies to promote affordable infrastructure<br>• Public access centers: ensure adequate coverage in remote locations |

## 2.2.3. Improving Device Ownership

### 2.2.3.1. Specific ICT interventions

- Subsidizing ICT devices such as mobile phones and computers
- Distributing free ICT devices at select locations or to select subgroups of the population
- Enable importation of approved low-cost devices
- Remove customs and excise duties on devices

It is also worth noting how these interventions are executed, as evidence of failed universal access strategies suggests that problems such as corruption, lack of sustainability, and market distortion, to name a few, have resulted in the interventions not reaching their intended beneficiaries. Hence, the output indicators linked to the gender targeted actions proposed in this section, while designed to evaluate the gender specific outcomes of proposed actions within the larger ICT interventions, may also partially act as indirect measures to assess the effectiveness of the ICT interventions themselves.

### 2.2.3.2. Why should you care about gender?

Device ownership is an area where large gender gaps in developing countries have been identified. Worldwide, women are 14% less likely than men to own mobile phones (GSMA, 2015). While this gap is already large, it further masks regional inequality--in South Asia, the gap is as large as 38% (Ibid), although work by Research ICT Africa indicates that the factors driving this inequality is not gender per se but levels of education and income (Chair, Deen-Swarray, and Khan, 2016). This gap is even bigger when mobile phone ownership is divided by smartphone ownership, and basic or feature phone ownership (#afteraccess 2017 survey).

Owing to the relatively low ownership, women tend to borrow, and share devices more than men do, which limits their opportunity to learn and access important and private information on the devices. It also has a direct impact on women's access to a wide range of ICT based services such as digital government services, mobile money, m-Health, m-Agriculture, to name a few. Consequently, neglecting to bridge the gender gap in device ownership will widen existing gender inequality as many women remain excluded from the digital dividends. Improving women's device ownership is also a complex issue that involves not only the affordability of a range of related products and prerequisites which are the usual targets for interventions, but also considerations of the gender gap in literacy and digital skills and social norms that often discourage women from acquiring ICT devices even when they can.

In addition, the challenges of implementing subsidies for devices and services have been widely documented. Corruption or incompetence in the administration of the subsidy often result in the subsidized services or devices not reaching their intended beneficiaries. In cases where the cost of the subsidy is levied on the operators who in turn add it to their cost of services, the subsidy drives up the cost of services and distorts market prices and efficiencies. The entry of low cost devices that are technically approved should be enabled with a waiver on the excise and customs duties, which can inflate the cost of devices by as much as 25 to 30%.

### 2.2.3.3. Barriers/opportunities and gender targeted actions

| Barrier/Opportunity | Gender targeted action |
|---|---|
| Lack of affordable access to electricity and charging infrastructure | • Actions to provide affordable electricity infrastructure |
| Unaffordability of Voice/Data services | • Encouraging private MNOs and retail sellers to pursue innovative pricing models in SIM<br>• Policies to promote affordable infrastructure |
| Limited device ownership due to unaffordability | • Program design that considers women's different situations and needs<br>  ○ Encourage private MNOs and retail sellers to pursue innovative device pricing models<br>  ○ Encourage R&D in cheap handsets<br>• Policy to reduce taxes and duties<br>• Policy to increase competition and decrease prices |
| Social norms against women using ICT | • Target local communities' awareness of ICT use |
| Discriminatory laws and procedures | • Policy advocacy to prevent/remove discriminatory rules and procedures |
| Lack of digital literacy | • Digital literacy training that includes women |
| Lack of trust in modern technology | • Digital literacy training taking advantage of the demonstration effect |


2.3
SECTION
Platforms &
Services

# 2.3. Platforms and Services

## 2.3.1. Digital government and Citizen services

### 2.3.1.1. Specific ICT interventions

Can be broken down into:

1. Interventions focused on internal government digital infrastructure and public-sector employees

- Leveraging private investments/services for public delivery (smart procurement)
- e service provision to citizens and businesses: including development of government portal/ apps implementation to include employee training, amending internal regulations, technical assistance, back office integration and digitization
- Setting up of cloud infrastructure for efficient government service delivery
- Establishment of National Enterprise architecture
- Establishment of National Data Centre
- Grievance redressal mechanisms
- Digitization of government offices including local governments
- Integrated Financial Management System/ Computerization of treasuries
- e-courts
- e-police: digitization and connection of police stations to enable crime and criminal tracking

2. Interventions focused on citizens and businesses

- Digitized National Health Information Systems
- e-agriculture: that allows online search for price data and other information critical to farmers, online agricultural markets
- e-education including learning facilities like online lectures and open courseware
- Online application for documents like passport, PAN card, birth/ death registration etc.
- e business registration
- Online filing of taxes
- e-Customs
- Online filing and tracking of Intellectual Property claims
- Online utilities payments
- Online tracking of posts
- Online property registration
- Employment exchanges

### 2.3.1.2. Why should you care about gender?

- Lack of infrastructure, device and connectivity unaffordability, digital illiteracy, fear of privacy loss are some of the barriers that can end up excluding vulnerable women from availing the benefits of digital governance. For example, a smart urban

governance initiative focussed on app based optimisation of transport routes may end up excluding poor women (who cannot afford smartphones).

- The divide between groups may also often be exacerbated if improving governance was focussed on just digitising services, without adequate investments in non-technological interventions. For example: apps to crowdsource information on 'unsafe' city locations or CCTV surveillance might not contribute to making public spaces safer for women, unless backed up by active policing on the ground. Hence partner countries should be sensitised to the fact that digital government is not an all-encompassing panacea.
- This is not to ignore positives of digital governance, including enabling easier lives for women by making available critical services at their doorstep, but men are often better placed to benefit from such initiatives unless special efforts are made to render these interventions more inclusive. Additionally, leveraging data that digital citizenship generates can enable better planning of gender services in the future.
- Lastly, encouraging women to share feedback on public service delivery through ICT enabled modes (e.g. citizen feedback forums) can create a platform for their voice to be heard, and their interests be addressed. This is a crucial step towards empowerment.

#### 2.3.1.3. Barriers/opportunities and gender targeted actions: Government to Government and Employees

| Barrier/Opportunity | Gender targeted action |
|---|---|
| Opportunity for effective gender-budgeting | • Ensure provision of functional specifications (in built gender budgeting formats) to vendors |
| Opportunity for gathering gender data for policy planning/research | • Open Data Standards while safeguarding privacy |
| Lack of digital skills among government employees | • Digital training that includes women (considering gender concerns especially at the local government level, where social norms are likely to be important barriers (in rural areas) |

#### 2.3.1.4. Barriers/opportunities and gender targeted actions: Government to Citizens and Businesses

| Barrier/Opportunity | Gender targeted action |
|---|---|
| Lack of last mile network infrastructure | • Public access centers: even remote locations should have public access centers<br>• Policies to promote affordable infrastructure |

| | |
|---|---|
| | • Use of alternate/complementary media to increase reach |
| Lack of electricity and charging infrastructure | • Actions to provide affordable electricity infrastructure |
| Limited device ownership due to unaffordability | • Public access centers<br>• Pursue innovative pricing models through private sector partnerships<br>• Use of alternate/complementary media to increase reach |
| Unaffordability of Voice/Data services | • Public access centers: ensure pricing of services is affordable<br>• Policies to promote affordable infrastructure<br>• Data lite options for apps<br>• Use of alternate/complementary media to increase reach<br>• Encouraging private MNOs and retail sellers to pursue innovative pricing models in SIM |
| Lack of digital literacy | • Digital training that includes women<br>• Intermediated access through Public access centers |
| Lack of substantive content suitable for women's needs | • Program design to ensure content suitable for women's needs through:<br>  ○ Citizen feedback forums<br>  ○ Innovation Support Program to encourage female entrepreneurs to build apps<br>• Institutionalize gender inclusion in prioritizing government service delivery. |
| Lack of comprehensible content | • Program design to ensure comprehensible content (using local languages and audio/visual content) |
| Fear of data privacy violation preventing uptake of services | • Pursue data privacy legislation<br>• Technological solutions to guard privacy<br>• Open Data Standards while safeguarding privacy<br>• Open standards of technical architecture |

## 2.3.2. Identity Creation and Management

### 2.3.2.1. Specific ICT interventions

- Identity proofing: i.e., process of formally establishing identity. Could involve examining other identification (known as breeder documents), validating this, collecting biometric information etc.
- Authentication: validating the claimed identity.
- Authorization: process of determining what action may be performed or services accessed based on the identity.

### 2.3.2.2. Why should you care about gender?

- Sex disaggregated data on availability of identity is not readily available. However, UNICEF (2013) found that gender differences in birth registration were largely insignificant.
- At the same time, available data on voter registration (for instance) seems to indicate gender gaps (Armytage & Fiaz, 2017). GSMA (2017) also notes several field studies that indicated gender gaps in identification –
    - 44% of women in Egypt (compared to 26% men) report identification as a barrier to accessing mobile services (GSMA, 2015).
    - Only 68% of women in rural and urban Uganda had any form of ID compared to 83% of all men (Financial Inclusion Insights, 2014).
    - Women living on less than $2.5 a day, and in the 15-24 age group are most likely to lack any form of identification in Tanzania (Financial Inclusion Insights, 2014).
- Moreover, identification can be a tool for women's emancipation by enabling access to financial services, social protection and empowering them to participate in the democratic process through voting (Dahan and Hanmer, n.d)[1]. Hence identity provision and management may be an important opportunity to further the Bank's gender equality goals.

### 2.3.2.3. Barriers/opportunities and gender targeted actions

| Barrier/Opportunity | Gender targeted action |
|---|---|
| Lack of breeder documents | • Balance social objectives with need for due diligence to counter lack of breeder documentation |
| Social constraints on economic/residential mobility | • Program design to reach remote locations |
| Social constraints on interaction between the sexes | • Design solutions in enrolment for ensuring women's access |

[1] In special cases, for example 'abandoned wives' in Tajikistan, separate identification for women – enabling access to jobs, loans, social security, can enable survival.

| | |
|---|---|
| Gender gap in perceived need for identification | • Program design to link the acquisition of the identity with tangible benefits |
| Discriminatory laws and procedures | • Policy assessment and advocacy |
| Fear of data privacy violation preventing uptake of services | • Policy assessment and advocacy in privacy policies<br>• Ensure design aligned to protect privacy |

### 2.3.3. Cash transfers and E-vouchers

#### 2.3.3.1. Specific ICT interventions

- Direct transfer to beneficiary bank accounts
- Use of mobile money for G2P payments
- e-voucher programs

#### 2.3.3.2. Why should you care about gender?

- World Bank (2017) estimates that 149 countries around the world have social safety nets. Of these, 77% countries have unconditional and 42% of countries have conditional cash transfer programs, respectively.
- Women are increasingly the beneficiaries of social safety net programs. Research (World Bank, 2014) shows that welfare outcomes of the household differs according to who the beneficiary is - for instance, consumption decisions are often pro-children (hence likely to be in line with program objectives) when women receive the transfer.
- Cash transfers (through digital modes) are also critical in post-disaster situations, provided markets and telecommunications infrastructure are still functional. This is critical for women as they hold traditional responsibilities of managing household finances, including remitted funds. This is corroborated by research among displaced populations in DRC and Uganda that found a higher proportion of women than men used mobile money. In the latter, the proportion of displaced women was much higher than the proportion of displaced women who owned phones, and also higher than the proportion of Ugandan women who used mobile money in general (irrespective of whether they had been displaced). Hence women overcame barriers of device ownership (through shared ownership models) to access remitted funds (GSMA, 2014).
- The mode of delivery for cash transfers/e-vouchers may impact the coverage of the program. For example, India's PAHAL Scheme uses beneficiary bank accounts and its unique identity number (Aadhaar) to transfer subsidies for Liquefied Petroleum Gas (LPG) connections and cylinders. Yet last mile connectivity to beneficiaries may be a problem if financial inclusion is patchy (Ministry of Finance, 2016).
- The gender gap in financial inclusion persists. Across the developing world, a lower proportion of women than men, report to having access to mobile money (Financial Inclusion Insights, 2015).
- However, mobile intermediated Government to Person (G2P) payments also offer the opportunity to encourage uptake of mobile services by women. For example,

Pakistan's United Bank Limited's mobile money service, Omni, has a clientele comprising of 86% women. This is primarily on the back of its linkage with the G2P scheme, Benazir Income Support Program (BISP) (Scharwatt, 2014). There is also some evidence that M-pesa in Kenya led to increase in mobile phone uptake (GSMA, 2015).

#### 2.3.3.3. Barriers/opportunities and gender targeted actions: G2P payments through bank accounts

| Barrier/Opportunity | Gender targeted action |
|---|---|
| Lack of financial inclusion | • Use banking correspondents/ mobile money for last mile access |
| Lack of digital literacy | • Digital training that includes women |
| Lack of trust on modern technology | • Offline support/intermediated access |
| Lack of prior identification documents | • Risk based due diligence regulatory framework |

#### 2.3.3.4. Barriers/opportunities and gender targeted actions: G2P mobile based payments

| Barrier/Opportunity | Gender targeted action |
|---|---|
| Lack of last mile network infrastructure | • Offline backup for e-voucher system<br>• Policies to promote affordable infrastructure |
| Lack of electricity and charging infrastructure | • Actions to provide affordable electricity infrastructure |
| Limited device ownership due to unaffordability | • Innovative pricing models<br>• Design solutions for e-vouchers without need for mobile phones with beneficiaries |
| Unaffordability of Voice/Data services | • Public access centers<br>• Policies to promote affordable infrastructure<br>• Design solutions for e-vouchers without need for mobile phones with beneficiaries<br>• Data lite options for apps |
| Lack of prior identification documents | • Risk based due diligence regulatory framework |
| Lack of digital literacy | • Digital training that includes women |

| | |
|---|---|
| Lack of trust in modern technology | • Intermediated access/offline support |
| Fear of data privacy violation preventing uptake of services | • Intermediated access/offline support (use of female agents) |

## 2.3.4. Information, Education, Communication & Awareness

### 2.3.4.1. Specific ICT interventions

IEC includes a broad range of activities and outputs including but not limited to:

- mass communication efforts to establish positive norms
- targeted interpersonal communication
- research to determine the content and delivery mode of messages

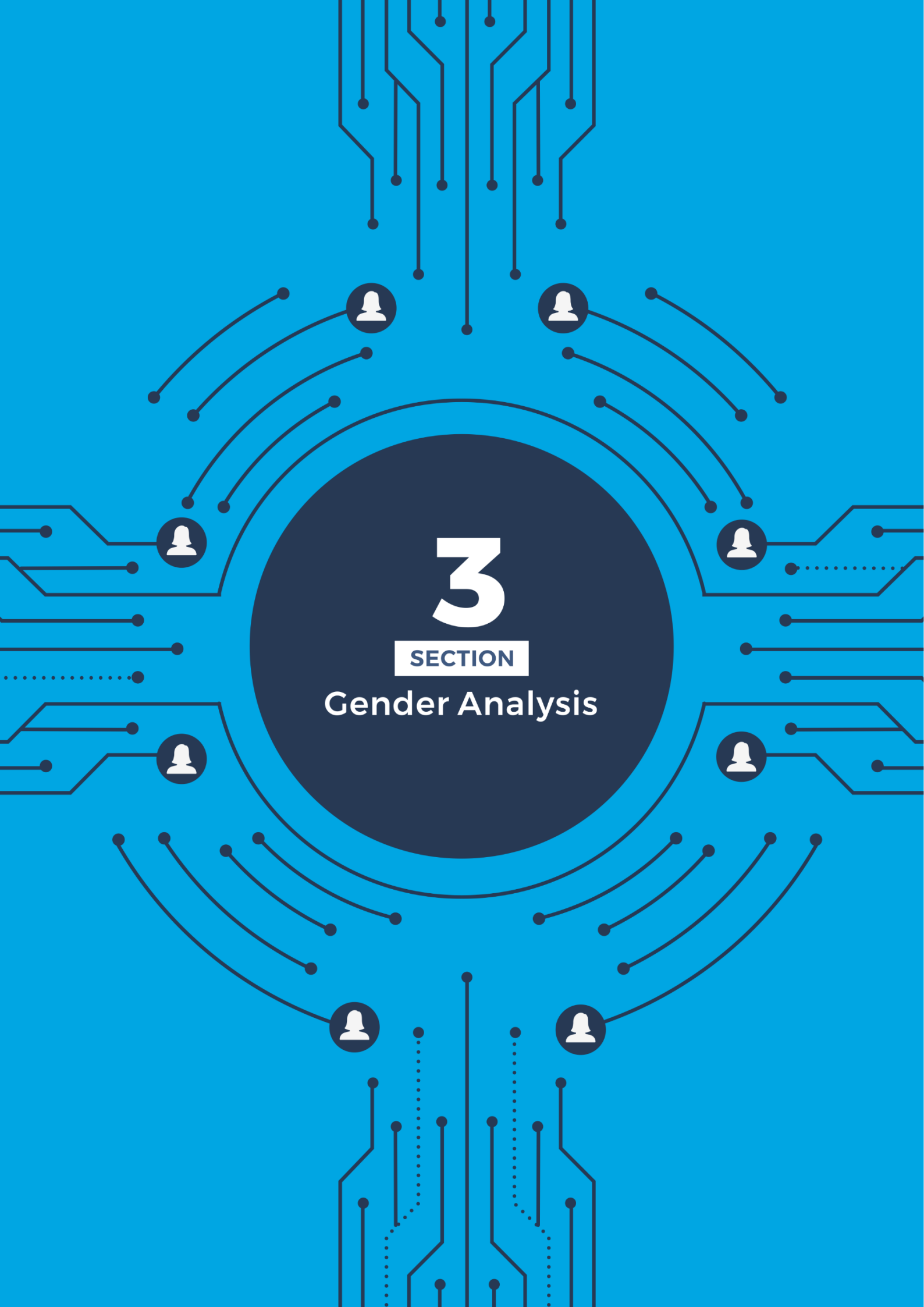
### 2.3.4.2. Why should you care about gender?

Due to women's lower ownership of devices, specific needs, education levels, time constraints, and social norms in the community, successful interventions need to consider both the tailoring of the content and the different ways of delivery to ensure that the messages are effectively communicated to women.

### 2.3.4.3. Barriers/opportunities and gender targeted actions

| Barrier/Opportunity | Gender targeted action |
|---|---|
| Opportunity to overcome time constraints | • IEC Campaigns that consider women's different situations and needs |
| Lack of substantive content suitable for women's needs | • IEC Campaigns that consider women's different situations and needs: conduct needs assessment |
| Lack of comprehensible content | • IEC Campaigns that consider women's different situations and needs: especially use of learning by doing, audio/ visual aid and local language |
| Opportunity to overcome social constraints on physical mobility or economic/residential mobility | • IEC Campaigns that consider women's different situations and needs: for example, repeat telecast (if radio/ TV is the medium), or availability of downloadable content. |
| Opportunity to overcome social constraints on interaction between the sexes | • IEC Campaigns that consider women's different situations and needs: capitalizing on women led community initiatives for training |
| Lack of digital literacy | • IEC Campaigns that consider women's different situations and needs-<br>○ Capitalizing on women led community initiatives for training for intermediation (See Mahiti Manthana Initiative) |

| | |
|---|---|
| | ○ Alternative modes of dissemination including radio/ television may be used |



# 3

SECTION

# Gender Analysis

# 3. Gender Analysis

This section is organized into key barriers that may exclude women from accessing and using ICTs, and main opportunities to bridge existing gender gaps using planned ICT interventions. Each barrier or opportunity then breaks into a list of questions to guide TTLs about the relevance of the given barrier/opportunity to the current project context. These questions are not meant to be exhaustive, but to guide the TTL towards thinking along the appropriate lines. Guidance and relevant data sources on how to answer these questions are also provided. Each barrier links to possible targeted actions that may be undertaken to overcome the barrier. Similarly, targeted actions against opportunities indicate steps that may be taken to ensure that the potential for furthering gender equality is fulfilled. The links take you to Section 4 (Actions and M&E) where a more detailed explanation is provided. Links against each action in that chapter will enable you to return to the barrier/opportunity you are exploring.

## 3.1. Barrier 1: Infrastructure

A primary barrier to access is the physical availability of relevant infrastructure. Although access is expanding rapidly in some regions, expenditure on last mile access, especially in areas prone to conflict, rural areas, or mountainous and otherwise geographically isolated areas –remain difficult to justify, both from a business case perspective and a public policy perspective (Chair, 2017; A4AI, 2016; APC, 2016; APC, 2015b; A4AI, 2015; LIRNE*asia* & GSMA, 2015; Deen-Swarray *et al.*, 2012). On the other hand, opportunities for overcoming these difficulties – including innovative approaches being developed by operators and platforms alike – continue to expand. Other physical barriers related to the availability of infrastructure include shortages and/or high costs of electric power (APC, 2015d), which may limit opportunities to charge devices for women.

Lack of infrastructure access can be particularly limiting for those who live in rural areas or face mobility constraints due to social norms (Ya'u & Aliyu, 2017).

Hence, this section covers the following specific types of barriers:

- Lack of last mile network infrastructure
- Lack of electricity and charging infrastructure

While discussion of this barrier is strictly concerned with infrastructure itself, other related barriers that often coexist with infrastructure issues in an ICT intervention, such as social constraints on women's mobility, unaffordability of connectivity and services, and digital literacy skills to maximize personal benefits from the infrastructure, could offer additional insight when examined in combination with infrastructure.

### 3.1.1. Lack of last-mile network infrastructure

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What is the intended content for service delivery? What are its data requirements?*** | • Discussions with partner government |

| | |
|---|---|
| ***Guidance***: This question is related to the intended content of the service which will be provided through the available infrastructure. While some services can be provided using mobile networks (for example Dr. SMS in Kerala (India) uses SMS services to provide information on health resources in the district), other services may need high bandwidth internet data. For example, consider Swayam, the Govt. of India's e-governance program to provide accessible, equitable and quality education to all. The instructional videos under Swayam are likely to entail high data requirements that the most prevalent 2G mobile internet may not be able to support. | |
| ***Does the target area have adequate coverage of mobile/ internet to the last mile?*** | • Existing or new demand side surveys, such as including sufficient ICT questions on household surveys (big data from the supply side cannot disaggregate by gender, and social network algorithms only show the tiny portion of women online in many developing countries)<br>• GSMA also has had two surveys (2010 and 2015) to measure gender gap in mobile ownership and usage.<br>• For data on presence of infrastructure in target areas, following types of databases may be tapped:<br>  ○ **Private sector**: Example - Airtel's Open Network database<br>  ○ **Government databases:** Example - BBNL's mobile app for monitoring of BharatNet project |
| ***Guidance:*** This can be gauged from multiple indicators including sex disaggregated internet/mobile penetration by region, and comparing it to comparable countries (by GDP or other socio-economic indicators) which have higher levels of government digitization. Alternatively, this can be assessed through the presence of mobile towers/fiber optic networks in the target region. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Digital Government: G2C/G2B | • Public access centers<br>• Policies to promote affordable infrastructure<br>• Use of alternate/complementary media to increase reach |
| G2P mobile based payments | • Offline backup for e-voucher system<br>• Policies to promote affordable infrastructure |

### 3.1.2. Electricity Infrastructure

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What proportion of areas have electricity access, by region?***<br>***What is the average number of hours of electricity provided to households in a day, by region?***<br>***What premium are unelectrified household paying for charging devices and what are the opportunity costs of being offline, when devices are flat or charging at collective charging stations?*** | • Government databases. For example, see here.<br>• Mobile operators who invest in extensive road and (often green) power infrastructure, which are main contributors to infrastructure extension in many developing countries, especially in Africa |
| ***Guidance***: Electricity can be both an infrastructure and an affordability issue. Developing countries often lack grid connectivity. Moreover, weak definitions of 'electrification' often mean that even having grid connectivity in the village, does not guarantee that a given household can access electricity[2]. This must be considered as well, when assessing the infrastructure. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Last mile connectivity | • Actions to provide affordable electricity infrastructure |
| Digital Government: G2C/G2B | • Actions to provide affordable electricity infrastructure<br>• Use of alternate/complementary media to increase reach |
| G2P mobile based payments | • Actions to provide affordable electricity infrastructure |

[2] For example, in India, a village is said to be electrified when distribution transformer and electricity lines are present, public places like schools, panchayat offices etc. have electricity, and at least 10% of the households have electricity connection. Note that this makes no reference to number of hours of power available in a day. Source: http://www.ddugjy.gov.in/mis/portal/definition_electrified_village.jsp

## 3.2. Barrier 2: Affordability

The cost of both data and Internet-enabled or smart devices is identified as one of the most significant barriers to access (GSMA, 2015; Broadband Commission, 2013; CSTD, 1995). At times, prices of equipment are unnecessarily inflated because of various taxes, duties and royalty stacking on IT devices (Broadband Commission, 2013). Similarly, regulatory challenges like sparse competition in telecommunications markets and misallocation of spectrum also impact costs and quality (e.g. IGF CENB, 2016). Low-cost devices tend to lack the functionality and design that users demand or prefer (e.g. A4AI, 2016; LIRNE*asia* & GSMA, 2015).

High prices may affect women more as they tend to have less disposable income, fewer opportunities to access external sources of finance, and limited economic power. This means that they tend to experience affordability challenges more profoundly than men (e.g. A4AI, 2016; APC, 2015; GSMA, 2015a; UNCTAD & ILO, 2014). Lowered prices and costs could therefore 'disproportionately benefit women' (GSMA, 2015a) as long as they perceive it as worth the sacrifice (i.e., if associated barriers like lack of relevant content and applications are addressed).

This section includes the following types of barriers:

- Unaffordability of Voice/Data services
- Electricity & Charging
- Limited device ownership due to unaffordability
- Cost of Commute

### 3.2.1. Unaffordability of Voice/Data services

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Is the cost of 500MB of data as a proportion of monthly income higher for women than men?***<br><br>***Is the cost of 500MB monthly mobile data and broadband as a proportion of monthly income greater than 5% of average monthly income?*** | • Private sector: use tariffs of the telecom provider with largest market share. Also include taxes in calculating the price (ITU guidance).<br>• Average monthly incomes accessible from National Statistics Organizations of the respective countries or other limited surveys done to calculate the average monthly incomes of males and females respectively.<br>• ITU ICT price baskets, published in the ITU's annual Measuring the Information Society Reports.<br>• RIA African Mobile Pricing (RAMP) Portal |
| ***Guidance***:<br><br>(1) Instead of average monthly income (averaged over all residents of a country), the average income of the poorest/ middle x% of the population may provide better assessment of affordability.<br><br>(2) All taxes to be included in cost calculations. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Infrastructure policy | • Policies to promote affordable infrastructure |
| Spectrum Management policy | • Policies to promote affordable infrastructure: releasing spectrum at low cost to MNO |
| Competition and pricing policy | • Competition and pricing policy to increase affordability |
| Taxation policy | • Reduction and removal of taxes and customs/excise duties |
| Facilitating digital entrepreneurship | • Policies to promote affordable infrastructure<br>• Public access centers |
| Training | |
| Last mile connectivity | |
| Digital Government: G2C/G2B | • Policies to promote affordable infrastructure<br>• Public access centers or Citizen Service centers<br>• Data lite options for apps<br>• Use of alternate/complementary media to increase reach |
| G2P mobile based payments | • E-voucher design without need for beneficiary mobile phones<br>• Data lite options for apps |

### 3.2.2. International Connectivity

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Does a disproportionately high proportion of women work abroad, relative to men?***<br>***What is the cost of a three-minute call from the destination country (using the largest network in the respective country) to home country as a proportion of the average daily income for an emigrant worker?*** | • National labor force surveys<br>• Service provider websites<br>• Labor force surveys in destination countries<br>• International Labor Organization (ILO) surveys or databases<br>• International termination rate benchmark studies |
| ***Guidance:*** For certain countries—especially where a significant proportion of its female workforce has emigrated for earning | |

| | |
|---|---|
| opportunities, such as the Philippines and Sri Lanka, the high cost of international phone calls (resulting from high international termination rates) could be a much larger burden for women than for men. This would restrain female immigrant workers from utilizing digital services for fear of income deprivation. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Interconnection policy | • Affordable international termination rates and efficient international data transmission |

### 3.2.3. Electricity & Charging

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What proportion of local households consume electricity on a regular basis? What is the price of 30 kWh of monthly electricity expressed as proportion of monthly household income?*** | • State utility company data<br>• Sales data from private companies that sell standalone household power generators |
| ***Guidance:*** Urban slums as well as remote rural areas often have problematic electricity connection. Even in places covered under national electrification programs, many residents may not choose to have electricity in their homes due to issues such as high upfront and monthly costs and low perceived needs for electricity (for further reading, see criticisms on Kenya's national electricity project). City-wide electricity coverage ratios are often calculated without including the slum areas, thereby masking inequality and underestimate the electricity demand gap. Women headed households are even less likely to be connected due to lower disposable income. In addition, women's lower mobility prevents them from charging phones elsewhere, such as at workplaces. Lack of affordable access to electricity means that potential mobile phone users may not be able | |

| | |
|---|---|
| to charge phone batteries as regularly as needed, thereby discouraging device ownership and usage.<br><br>There are different benchmarks available to judge whether electricity is affordable. However, the Sustainability Energy for all (World Bank and IEA, 2015) considers anything (allowing access to 30 kwH) within 5% of monthly household income to be affordable. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Last mile connectivity | • Actions to provide affordable electricity infrastructure |
| Improving Device Ownership | |

### 3.2.4. Limited device ownership due to unaffordability

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What is the gap between women's and men's abilities to pay for devices such as handsets and other complements?***<br><br>***1. What % of men and women (as proportion of total male and female populations) own different types of phones - basic/ feature/smart phones[3]?***<br>2. ***Price of cheapest available phone (basic/feature/ smartphones) as proportion of annual disposable income.*** | • Prices released by private mobile phone companies with largest market shares.<br>• Periodic studies released by organizations like GSMA.<br>• Statistical organizations of the countries for calculating disposable income/ gender disaggregated access in census/ household survey.<br>• Existing surveys such as the 2017 #afteraccess surveys (accessible at https://researchictafrica.net/after-access-surveys/), which disaggregate ICT access and usage by smart, feature, basic phones and by gender. |
| ***Guidance:*** If no previous studies on device affordability are available, the relevance of this barrier may be approximated through (1. And 2. Above). Regarding disposable income, it would be more pertinent to use that of the bottom quintile or quartile (or poorest/ middle x % of the population), whenever such data is available. It would also provide additional | |

[3] Basic phones allow calling/ SMS but no internet/Wi-Fi capabilities. Feature phones allow for all services available on basic phones plus some internet capabilities, not on par with smartphones.

| | |
|---|---|
| insight to compare these affordability indicators of the client country to those of other countries with similar socioeconomic characteristics. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| G2P mobile based payments | • Design solutions for e-vouchers without need for mobile phones with beneficiaries<br>• Innovative device pricing models in partnership with private firms. |
| Digital Government: G2C/G2B | • Public access centers<br>• Innovative device pricing models in partnership with private firms.<br>• Use of alternate/complementary media to increase reach |
| Improving Device Ownership | • Innovative device pricing models in partnership with private firms.<br>• Encourage R&D in cheap mobile handsets<br>• Reduction and removal of taxes<br>• Policy to increase competition and reduce price |
| Taxation policy | • Reduction and removal of taxes |

### 3.2.5. High cost of commute reducing uptake

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Evaluating all locally available transportation methods, how much money would it take for women to commute to and from the locations selected for training, public access points, citizen service centers, etc.?***<br>***At the frequency of visit desired by policymakers, what % of an average local woman's disposable income will this take?***<br>***Is there high likelihood of women facing sexual harassment in public transport and public spaces?*** | • Surveys on the target population<br>• Digital maps such as Google maps<br>• Local transportation authorities and/or companies<br>• FGDs with women, existing survey data, if available |
| ***Guidance:*** Note that the likelihood of women using a specific mode of transport may | |

| | |
|---|---|
| depend on aspects other than costs. For example, according to Borker (2017) college-going women in Delhi are willing to spend up to USD 290 per year for accessing a safer route of commute. This is especially true as sexual harassment in transit is often a wide-spread problem. For example, 86.5% of women in Egypt felt unsafe while using public transport (UNWOMEN & CDC, 2013).<br><br>In sum, it becomes necessary to evaluate different modes of transport (public or otherwise) to see if the costs are affordable to women. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Training | • Digital training that also includes women cognizant of cost of commute considerations |

## 3.3. Barrier 3: Time Constraints

Besides lower ability to pay for ICT products and services, another key barrier that prevents women from using ICT is the lack of time due to competing demands of both productive and reproductive tasks. Women's productive tasks include not only working outside the home in professional or informal settings (e.g. selling produce and small commodities) but also helping, and in many cases shouldering most of the responsibilities on family farms. Meanwhile, women and girls in many developing regions are often the only ones to take care of household needs such as cooking, cleaning, and childcare, which is a major drain on their limited time. Furthermore, these tasks not only restrain the amount of time women can spend on ICT but also determine what times of the day women can access ICT services, attend training sessions and meetings, and respond to survey questions, etc. Therefore, ICT interventions that neglect the times of day for women to be present as well as the amount of time these activities take, including time spent on commute, will likely yield very few female participants and beneficiaries[4].

### 3.3.1. Daily Schedule

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|

[4] It should be noted that ICT interventions can also be used to overcome time constraints faced by women. For example, see section on IEC. Moreover, ICT can help expand women's economic opportunities (if time constraints are combined with social constraints on mobility) by bringing education and training to their homes (through MOOC) and allowing them the flexibility to work from home.

| | |
|---|---|
| ***What does an ordinary local woman's typical day look like? This may include but is not limited to:***<br>• ***What productive tasks does she do outside the home, and what are the times of the day and days of the week she is involved in these (professional jobs, informal employment, farming, etc.)?***<br>• ***Of the reproductive tasks she does inside the home (cooking, cleaning, childcare, etc.), which ones have inflexible times (e.g. fetching water may need to be done at certain times of the day), and what times of the day (before dark) and days of the week are considered relatively flexible?*** | • Surveys of the target population<br>• Focus group discussions with small groups of women representatives of the target population<br>• Previous studies done on the same or similar communities |
| ***Guidance:*** Understanding a typical local woman's daily schedule is essential to identifying potential time slots for training workshops, radio broadcasts, and other time sensitive activities. Any planned activity that requires women to leave the home needs to ensure that they can reach home before dark (including time spent on traveling and not just when the activity finishes). As it is generally perceived to be unsafe for women to be out when it is dark, neglecting such may result in very low attendance. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Right to Information/Access to Information | • Make available alternative modes of RTI application<br>• Simple procedures to overcome time constraints |
| IEC | • IEC campaigns that consider women's different situations and needs |
| Training | • Digital training that also includes women: suitable timing for women |

### 3.3.2. Childcare Requirements

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What is the average fertility rate in program areas?***<br>***Who (the mother, the father, older siblings, childcare facilities, etc.) assumes the responsibility of childcare in program areas, and approximately how much of it falls on women and girls (in the case of elder sisters)?*** | • Surveys of the target population<br>• Focus group discussions with small groups of women representatives of the target population<br>• Fertility rates/ family size should be available for regions from national statistical organizations/ Census organizations |
| ***Guidance:*** Childcare is often the biggest and most important restraint on the time of women and girls. In many places, it requires women with young children and babies to stay at home or nearby places in order to constantly attend to the children. Therefore, programs that require women to leave the home for an extended period of time without providing childcare support may suffer from very low female participation. In addition, in cultures where girls are also expected to shoulder major responsibilities of caring for their younger siblings, this practice may undermine their educational opportunities. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Training | • Digital training that also includes women: suitable timing, child care facilities |

### 3.3.3. Commute Time

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***How much time, on average, does it take a local woman to reach the location selected for training, public access points, citizen service centers, etc.? What is the longest time it takes for any woman to reach these places?*** | • Surveys on the target population<br>• Digital maps such as Google maps<br>• Local transportation authorities and/or companies |

| | |
|---|---|
| ***Is there high likelihood of women facing sexual harassment on public transport and in public spaces?*** | • FGDs with women/ Existing survey data on gender based violence, if available |
| ***Guidance:*** This should not be entirely measured in absolute distance. A woman living in a place closer to program locations but without convenient public transportation nearby may spend much more time on commute as against some who lives farther away but alongside a major transit line. Hence, commute time needs to be calculated based on not only distance but also methods of transportation, congestion, etc. Additionally, the monetary cost of commute may influence women's choices of transportation methods and hence time spent on commute).<br><br>The likelihood of women using public transport also depends on the perceived safety in using public transport. For example, 86.5% of women in Egypt felt unsafe while using public transport (UNWOMEN & CDC, 2013). Hence this should also be a consideration when evaluating the barrier of commute time and cost. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Training | • Digital training that also includes women |

## 3.4. Barrier 4: Lack of Relevant Content

Many women are unsure about what the Internet is (Ya'u & Aliyu, 2017; LIRNE*asia* & GSMA, 2015); often even equating it to Facebook or other social media (Chair & Deen-Swarray, 2016; LIRNEasia & GSMA, 2015; Mirani, 2015). For women with little disposable income and even less time, this uncertainty coupled with the lack of relevant content on the Internet means that they do not see the value in sacrificing time and money to gain access (e.g. Web Foundation, 2016; LIRNEasia & GSMA, 2015; Wang and Wang, 2010; Jouhki, 2013). The creation of more content relevant to women in their specific circumstances, and in languages they understand, can thus be crucial in generating demand (Web Foundation, 2016; Cummings & O'Neil, 2015; APC, 2015; Broadband Commission, 2013).

Services and applications tend to be neither gender-specific nor owned by women, and are thus often shaped by existing economic and social structures that will hamper women's ability to benefit from them (Cummings & O'Neil, 2015). For example, e-governance services and digital tools that aim to support citizens, are generally not designed with women's specific needs in mind; limiting their potential benefit to women's empowerment (Cummings & O'Neil, 2015).

This reflects the low representation of women in the ICT sector, as well as in STEM education (World Bank, 2016; Huff & Cooper, 1987). Literature displays growing awareness of the need to ensure that women are more than passive consumers of content but can also develop the skills to produce content themselves (c.f Thas, 2005). Cummings & O'Neil (2015) take the view that digital ICTs also 'hold the possibility that large numbers of women and girls can not only receive information and ideas but can also convey them – and this is a necessary, if insufficient, condition for their having voice and influence'.

While many are skeptical about the effects of zero-rated access to social media platforms or 'the Internet' (e.g. the public pushback to Facebook's Internet.org initiative in India in 2016), a recent study in South Africa by Research ICT Africa has indicated that while social networking may initially drive Internet access for women, it may also enable them to develop the capacity to also use the broader Internet for empowering them to access their economic, social, and cultural rights (ESCRs) in the future (Chair & Deen-Swarray, 2016; c.f. Chair, 2017b).

The following issues are discussed in this section:

- Lack of substantive content addressing women's concerns
- Lack of comprehensible content (language, literacy barriers)

### 3.4.1. Lack of substantive content addressing women's concerns

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What are the most pressing needs (e.g. reproductive health, different agricultural information) and biggest interests exclusive to local women that the current ICT interventions can help address?*** | • Focus group discussions with small groups of women representatives of the target population<br>• Previous studies done on the same or similar communities |
| ***Guidance:*** Studies widely indicate that majority of ICT applications and services are male centric, that is they only considers the interests and needs of men, thereby discouraging women users because of the low perceived value especially when faced with lower ability to pay and lack of time (Jouhki, 2013; LIRNEasia & GSMA, 2015; Wang and Wang, 2010). In agriculture for example, women may engage in different production, processing, and marketing activities even when they work in the same value chain as men (World Bank, 2017). Hence, an awareness intervention that only addresses the activities that men conduct, would exclude women. If designed carefully, ICT can also create opportunities for women to move | |

| | |
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| beyond passive receivers to become active creators of content. | |
| ***For digital government:*** | |
| ***What % of current users of digital government services (if they exist) are women?*** | • Government data of e-service delivery users, Primary data collection through FGDs with targeted citizens.<br>• Existing surveys such as the 2017 #afteraccess surveys, accessible at https://researchictafrica.net/after-access-surveys/. |
| ***Guidance***: Compare this to data on proportion of ICT users who are women. If the% of female users is significantly less than the% of those using ICT, it may be indicative of the lack of relevant content. | |
| • ***What are the (off-line) services that are used by women more? Can providing the often-used service through digital platforms increase uptake by women?***<br>• ***Can providing the less used service through digital platforms increase uptake by women?***<br>• ***What services have the potential to enable women's empowerment?*** | • Government data (if available), focus group discussions with groups of women representatives of the target population, previous studies done on the same or similar communities. |
| ***Guidance***: From the above questions, we can try to assess priority areas for provision of digital government solutions to citizens and businesses owned and operated by women. For instance, female uptake of birth certificates may be higher than that of passports. Moreover, birth certificate being an important document for school enrolment in most geographies and requiring minimal breeder documents, can enable easy access to formal education for women. Hence online provision of birth certificates may be a compelling cause. At the same time, women's (offline) uptake of passports may be low. However, this does not automatically render e-delivery of passports an unimportant pursuit from a gender perspective. It must be assessed what are the barriers to women's offline uptake. If these revolve around issues that can be resolved through e-delivery (for instance, distance of Passport office from residence, citizen queues at Passport office, demand for bribes by bureaucrats due to personal interface), then online provision of passports may be more pertinent from a gender perspective than in the situation where social norms constrain women's travel across | |

| | |
|---|---|
| domestic boundaries (Hijab and Zambrano, 2008). | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| IEC | • IEC Campaigns that consider women's different situations and needs: needs assessment |
| Digital Government: G2C/G2B | • Program design to ensure content suitable for women's needs through:<br>○ Citizen feedback forums<br>○ Innovation Support Program to encourage female entrepreneurs to build apps<br>○ Institutionalize gender inclusion in prioritizing government service delivery. |
| Policy and Legal/Regulatory Framework: RTI | • Program design to overcome constraints of literacy/language competency |

### 3.4.2. Lack of comprehensible content

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What proportion of women only understand one local language, relative to men?***<br>***What proportion of women are illiterate, relative to men?*** | • Census data<br>• Previous studies done on the same or similar communities |
| ***Guidance:*** Even in cases where women's needs are taken into the content design, the form in which such content is delivered also dictates its accessibility to women. As women often have lower levels of literacy and language skills, purely text based content in official /national rather than local languages may render it incomprehensible to many women. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|

| | |
|---|---|
| IEC | • IEC Campaigns that consider women's different situations and needs: audio/visual content/ translation software |
| Digital Government: G2C/G2B | • Program design to ensure comprehensible content (using local languages and audio/visual content) |

## 3.5. Barrier 5: Lack of prior identification documents

***Description:*** For new identification to be generated, the process of identity proofing would ordinarily require existing proof of identity or address to be presented to the authorities. These are known as breeder documents. However, for several reasons (social constraints on economic/residential mobility, social constraints on interaction between the sexes, gender gap in perceived need for identification etc.) women may lack these, and hence get excluded from receiving the new identification (and attendant benefits) as well. One of these benefits may be access to mobile phone connections, mobile money and bank accounts—things critical to women's financial inclusion.

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What % of the male/female population is registered in civil registries – birth/death/marriage/passport etc.?*** | • Civil registries/national databases |
| ***Guidance***: If the % of male population registered is substantially higher than the female population registered, there would be a need for tailoring of program design. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Identity creation and management | • Balance social objectives with need for due diligence to counter lack of breeder documentation |
| G2P payments through bank accounts | • Risk Based Approach to Due Diligence |
| G2P mobile based payments | • Risk Based Approach to Due Diligence |

## 3.6. Barrier 6: Social norms driven barriers to access

Barriers to women's education include a tendency to prioritize boys' education and use of ICT-related resources over girls. Moreover, stereotypes prevent girls from selecting courses in the science, technology, engineering and mathematics (STEM) fields; and women and

girls are limited by social norms and their ability to *safely* access ICTs to develop their digital skills in after-school or public access facilities (Cummings & O'Neil, 2015; UNESCO & Intel, 2014). Additionally, there is limited data to understand why and how women develop digital skills in diverse contexts, which makes it difficult to adopt generic, one-size-fits-all solutions in diverse contexts (UNESCO & Intel, 2014).

Women without digital skills tend to lack the confidence needed to use the Internet (LIRNE*asia* & GSMA, 2015; GSMA, 2015; Web Foundation, 2015) and may limit their use to only a selection of services or applications (Broadband Commission, 2013). Where mobile devices are concerned, for example, the GSMA has found that women with limited skills tend to constrain their use to so-called 'application islands' due to the inability to adapt and apply skills to new applications. Women also rely on friends and family who may have limited skills themselves to teach them how to use mobile applications and services. In some contexts, family members discourage women's exploration due to negative connotations and perceptions of the Internet (Ya'u & Aliyu, 2017; GSMA, 2015). In other contexts, social barriers impeding economic or physical mobility may impede ICT access.

Illiteracy and confidence gaps also compound other challenges such as women's awareness of safety and privacy settings online, placing them at risk of digital threats (see Barrier 7: Privacy, Security and Online Safety Concerns). The World Bank (2016) has argued that a combination of these factors may contribute to women feeling that they lack the necessary control over technology. On the other hand, studies also suggest that owning a device like a mobile phone – as well as knowing how to use it – can increase women's social and community status (Cummings & O'Neil, 2015).

This section includes the following sub-barriers:

- Social constraints on economic/ residential mobility
- Social constraints on physical mobility
- Social constraints on interaction between the sexes
- Gender gap in perceived need for identification
- Social constraints against women's ICT use
- Gender bias against pursuing STEM Education and ICT related employment
- Discriminatory laws and procedures

## 3.6.1. Social Constraints on Economic/Residential Mobility

Women may be over-represented in villages if social norms dictate that they work primarily at home or in agricultural professions. Hence, out-migration to (more accessible) cities and towns may be dominated by men, leaving women outside the purview of government services, identity creation and management and the like.

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What is the difference in labor force participation rates (LFPR) for women and men?***<br>***What is the sector specific LFPR for men and women? [Where sector refers to*** | • Sociological studies from the country in question (or comparable country based on location, level of development, HDI rank etc.), |

| | |
|---|---|
| ***economic sectors: primary, secondary and tertiary]***<br><br>***What is the rural-urban distribution of both genders?*** | • International Labor Organization, ILOSTAT Database (Further reading)<br>• Country census databases |
| ***Guidance***: The questions above are indicative of restrictions on women's mobility that may confine them to rural or relatively remote locations. Large gender gaps in LFPR as well as a high concentration of women in rural areas likely indicate social norms restricting their employment and hence mobility. To determine what is considered "large gender gaps" in LFPR, it would be helpful to compare gender differentials in LFPR between countries which have similar per capita GDP. Meanwhile, gender imbalances in population of rural and urban settings additionally imply that specific actions may have to be taken to reach remote areas in interventions such as training and enrollment in national ID databases, expanding last mile access to avoid exclusion of women. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Universal service policy: public access initiatives | • Ensure rural/ remote locations receive adequate coverage of public access centers |
| Right to Information/Access to Information | • Make available alternative modes of RTI application |
| Training | • Digital training that also includes women |
| Identity creation and management | • Program design aiming to reach remote locations |
| IEC | • IEC Campaigns that consider women's different situations and needs |
| Last mile connectivity | • Policies to promote affordable infrastructure<br>• Public access centers |

### 3.6.2. Social constraints on physical mobility

Constraints on mobility dictated by social norms can prevent or restrict women's use of and access to services outside the home.

In some instances, certain types of locations (e.g., commercial shops) might be deemed less appropriate for women to visit than others (e.g., local schools and libraries). In other cases, women may be restricted from leaving their homes without a male chaperone. These constraints can prevent women from making use of public access centers. Hence it becomes necessary to ensure that public access points are in places deemed to be 'appropriate' for women to visit.

Similarly, if women cannot commute to training centers (because of the distance), training centers should come to them, as was done in the case of training small female entrepreneurs in Philippines (Philippine Commission on Women, 2012).

Similarly, patriarchal social norms that confine women to the home (seen as primarily involved in home making, child care, etc.) may not allow women the time to pursue RTI/ATI requests or government service delivery; furthermore, the perception that it is a man's responsibility to deal with government matters may preclude women from seeking access to government information.

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Who bears the primary 'responsibility' for dealing with issues requiring interface with government/people outside the home?***<br>***Are women mostly meant to be confined to domestic spaces or do they play an active role in the social/economic sphere?***<br>***Are women free to leave the home without a male chaperone or permission?***<br>***Is there discrimination against women who visit government offices?***<br>***What is the ratio of female-male employment in government offices?*** | • FGDs with women of varying education and income levels<br>• FGDs and key informant interviews with local community leaders, experts, information officers and civil servants<br>• Mystery Shopping exercises<br>• Observation and interviews with government office visitors<br>• Public sector employment data |
| ***Guidance***: The questions above are indicative of restrictions on women's mobility that may confine them to their homes. There are no objective criteria for assessing these apart from discussions with women and subjective judgement on how wide-spread this practice is (if at all). Some of this can also be supplemented with objective measures of mobility like differential rates of LFPR of men and women (see Social constraints on economic/residential mobility). | |

| Related ICT Interventions | Gender targeted actions |
|---|---|

| | |
|---|---|
| Universal service policy: public access initiatives | • Public access centers located in places accessible for women |
| Right to Information/Access to Information | • RTI administration that considers women's different situations and needs<br>• Make available alternative modes of RTI application |
| Training | • Digital training that considers women's special needs (location must be in safe areas and environments where women are permitted to participate, etc.) |
| IEC | • IEC Campaigns that consider women's different situations and needs |

### 3.6.3. Social constraints on interaction between the sexes

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Are there social/ religious constraints on interaction between the sexes? For example:***<br>• ***Is education mostly segregated by gender? What % of schools in rural areas are co-educational?***<br>• ***What is the overall LFPR of women relative to that of men? Is it common for women to work outside the home in non-family based employment?***<br>• ***Can women leave the home without a chaperone?***<br>• ***Is sexual harassment in public spaces common?***<br>• ***Are there laws that reinforce traditional cultures by institutionalizing absence of women from certain domains (for example, laws constraining mobility or employability)?*** | • FGDs/IDIs with representatives of women groups. |
| ***Guidance***: Traditional cultures may place constraints on interaction between the sexes, thereby generating serious negative repercussions on women's ability to benefit from ICT. For example, this may discourage women from going to enrollment centers for identity proofing, accessing the internet or other ICT tools at public access points, or attending Digital training that also includes women since these locations might provide more opportunities to interact with men. It | |

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| should also be noted that local context is of utmost importance here. While women and men may mix freely in urban areas and some rural areas as well, specific rural areas in certain regions of the country may not enjoy the same cultural freedoms. Hence it is necessary to evaluate this barrier at the local level, depending on target geography of interest. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Universal service policy: public access initiatives | • Suitable designs in public access centers with presence of female intermediaries |
| Training | • Digital training that also includes women: the classroom must be a safe space for women to enable learning |
| Identity creation and management | • Design of enrolment centers that also suit women's needs |
| IEC | • IEC Campaigns that consider women's different situations and needs: Female trainers, women's community led initiatives for training |

### 3.6.4. Gender gap in perceived need for identification

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Is there a gender gap in perceived need for identification?*** | • Survey literature on existing identity cards or surveys on national identity done in comparable countries. FGDs with women could also be done to understand perceptions. |
| ***Guidance***: Social norms, lack of education, income etc. may feed the assumption that an identification is unnecessary. For instance, in a survey to understand gender barriers in accessing the Computerized National Identity Card (CNIC) in Pakistan, 30% women said they did not need the card, compared to 20% men (IFES, 2013).They may also expect to rely on the identity cards of their male relatives. GSMA (2017) finds that in some social groups in Cote d'Ivoire, men help female family members access medical services using only their own id. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Identity creation and management | • Program design to link the acquisition of the identity with tangible benefits |

### 3.6.5. Social norms against women's ICT use

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Do people in the local community (men, women, authorities, etc.) have negative perceptions towards women who use ICT?***<br>***Is women's access to mobile phones and other ICT modes and devices deemed unnecessary?*** | • FGDs; surveys of the target population; previous studies done on the target communities. |
| ***Guidance:*** Many societies view ICT as a space reserved for men and subsequently consider it unnecessary and even undesirable for women to access digital services and own ICT devices. For example, women farmers in Africa who use mobile phones to exchange information on farms and agricultural products can experience suspicions of infidelity by their husbands that lead to marital problems (World Bank, 2017). Similarly GSMA and Cherie Blair Foundation for Women (2010), found the lack of perceived need for mobile phones to be a barrier to device ownership.<br>Prevailing social norms may influence not only men's perceptions towards women's ICT usage but also the attitudes of women themselves. These established attitudes can discourage many women from adopting ICT if not properly addressed. | |

| Related ICT Interventions | Solutions |
|---|---|
| Training | • Target local communities' awareness of ICT use |
| Improving Device Ownership | |

### 3.6.6. Gender bias against pursuing STEM education and ICT related employment

Families and schools are integral in encouraging and supporting girls into ICT/STEM. In some countries there are negative biases associated with girls pursuing STEM education and/or ICT careers. Further, girls themselves may see technology as a male domain and need to be encouraged to enter STEM/ICT fields.

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Percentage enrolment of women in engineering courses in the country***<br>***Number of women working in the IT/ ITES domain as a proportion of total employees in the sector***<br>***Are teachers aware of the need to encourage girls actively to pursue careers in STEM?***<br>***Do schools conduct any awareness programs for parents on girls and STEM?***<br>***Have there been awareness campaigns conducted in the community on STEM/ITES education?*** | • Interviews and FGDs with Local gender experts, school parent- teacher organizations, community based organizations.<br>• Ministry of education statistics, education curriculum, reports, plans. |
| ***Guidance:*** Schools are integral in encouraging and supporting girls into STEM/ICT. Especially in societies where large gender bias is present, having STEM clubs and programs for girls, as well as female role models such as teachers, and other women in tech, will inspire and encourage girls to enter STEM fields instead of being taught to view these as exclusively reserved for boys. These efforts at targeting young girls will help reduce gender gaps in ICT adoption down the road. | |
| ***Do families and local community (men, women, authorities, etc.) have negative perceptions towards women and girls pursuing education and jobs in ICT fields or STEM subjects?*** | • Local gender experts, FGDs with community based organizations, previous studies done on the target communities. |
| ***Guidance***: Families and communities must be made aware of STEM education, careers, and training programs for girls and their concerns must be understood and addressed for them allow girls to participate. It's important to develop an active partnership between any program and parents for success. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Training | Targeted actions to influence behavior change |

### 3.6.7. Discriminatory laws and procedures

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Do any of the laws /procedures of service registration require male support (e.g. co-signing) or place additional burden on women?*** | Government sources on procedures for obtaining identification; policies of mobile network operators. |
| ***Guidance***: Traditional societies may formalize barriers to women's registration for services such as national ID and mobile money accounts through discriminatory laws and policies.<br><br>To obtain a Tazkera ID (primary personal identification document) in Afghanistan, for example, the support of a male relative is mandatory. This may disadvantage female – headed households (Samuel Hall and Norwegian Refugee Council, n.d.) in getting the id. Similar restrictions also apply to Iraqi women (ITU-T Focus Group Digital Financial Services, 2016), which may restrict access to not only breeder documents but also the new form of identification.<br><br>This in turn may limit access to devices/SIM or data connections. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Identity creation and management | Policy advocacy to remove discriminatory laws and procedures |
| Improving Device Ownership | |

## 3.7. Barrier 7: Privacy, Security and Online Safety Concerns

Authors criticize a general lack of awareness of women's rights online and offline (e.g. Garcia & Manikan, 2014), and take the view that online threats are not taken as seriously as they should be because of this lack of awareness (Pasricha, 2016; Garcia & Manikan, 2014). Many studies into barriers highlight online harassment, abuse and related threats as significant barriers to women's access (Scott *et al*., 2017; Ya'u & Aliyu, 2017; Chair, 2017; Web Foundation, 2016; IGF BPF, 2015; GMSA, 2015; Pasricha, 2016; IGF BPF 2015; Broadband Commission, 2015; Lyndon *et al*., 2011; Madanda *et al*., 2009), although fewer of them differentiate adequately between these and even broader threats. This lack of clarity is arguably a problem for policymakers and a gap for further research.

Literature does, however, display general acceptance of the notion that online violence is a part of gender-based violence (Briones & Sulathireh, 2016; Chair, 2016; Doria, 2015) that violate the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) and, consequently, limit women's freedoms and human rights (Scott *et al.*, 2017; Khan, 2017a & b; Broadband Commission, 2017; Web Foundation, 2016; Sullivan, 2016; Pasricha, 2016; Dhatta, 2016; Doria, 2015; Garcia & Manikan, 2014; Broadband Commission, 2015; IGF BPF, 2015; GSMA, 2015; APC, 2015d; Dhatta, 2015; Kovacs et al, 2013; APC, 2011; Liddicoat, 2011) .

This may manifest in different ways. For instance, mobility and infrastructure issues may mean that women in poor and remote areas may only be able to access the Internet at public access facilities in unsafe or inaccessible areas. Similarly, consequences of online human rights infringements have roots in offline realities and patriarchal norms (Khan, 2016a; Shephard, 2016). Applications and services designed for promoting women's safety can just as easily be used to track and harm them, for instance (Shephard, 2016; HarrassMap, n.d.).

Recent literature on surveillance has differentiated between state, social and self-surveillance, and has highlighted the growing number of parties involved in women's surveillance (Gurumurthy & Chami, 2017; Ganesh, 2016; Shephard, 2016; Rizk & Othman, 2016; Jensen *et al*., 2012). In a recent mapping activity by APC and IDRC, it is stressed that the ability of women – including women with fewer digital literacy skills – to learn to identify and manage data and surveillance practices by learning skills, privacy, safety and encryption mechanisms should be further supported and amplified (APC & IDRC, 2017, forthcoming).

Literature indicates a growing trend of states actively promoting surveillance practices for reasons ranging from protection from terrorism, to support development, security, and online child protection (Kovacs, 2017; Hosein & Nyst, 2013:9; Liddicoat, 2011). In the context of certain African countries, Chair argues that privacy and security concerns impact the extent of ICT use in particularly urban and peri-urban areas (2017). In northern parts of Nigeria, Ya'u & Aliyu found that women believe the Internet to undermine their privacy (2017). At a global level, however, some have found that privacy concerns are not that significant in discouraging Internet use (A4AI, 2015). IDRC and APC argue that because the literature tends to differ on what the effects of privacy concerns are, more localized studies regarding such privacy concerns are required (2017, forthcoming).

Literature reviewed also shows that more attention is being paid to investigating the growing capabilities of private sector and state stakeholders to restrict women's rights online, also at the intergovernmental level (e.g. UN Human Rights Council, 2015; IGF BPF, 2015). There is similarly a growing focus on the potential of encryption and anonymity to protect women but also to enable potential infringements online (e.g. IGF BPF, 2015).

Besides these protective measures, literature indicates that many countries do not deal with online infringements of human rights adequately. Research by APC in various countries has indicated that not only are national laws often insufficient to deal with online violence, but remedies are similarly inadequate (APC/GenderIT.org, 2016 & 2015 (various); APC & Women's Legal and Human Rights Bureau, 2015; Naranjo/Colnodo, 2013). In 74% of countries studied by the Web Foundation, law enforcement agencies and courts were failing to take 'appropriate' action to address gender-based violence online (Web Foundation, 2016). Defining what is appropriate is often context-specific and challenging when protection from online abuse and gender-based violence might result in limiting women's rights to freedom of expression, for instance (TEDIC, 2017; Sullivan, 2016; IGF BPF, 2015; APC, 2011; Liddicoat, 2011; APC, 2010; OSCE, 2011; Malhotra, 2007).

These and similar issues are discussed below:

- Concerns about data privacy
- Concerns about threats of online harassment including trolling/ threats of gender based violence, cyber-stalking etc. This may include both legislative gaps as well as capacity gaps in law enforcement.
- Gender gaps in awareness about online risks and mitigating/ redressal actions

### 3.7.1. Fear of data privacy violation and surveillance preventing uptake of services

The information collection and subsequent storage of personal information of citizens in the process of awarding digital identification, using digital government services or making open data available may precipitate fears of compromised privacy and security (see discussions on Aadhaar and Open public data architecture). Women (especially of a demographic that is not critically dependent on the state's social protection net) may be disproportionately averse to trading in social benefits for loss of privacy, thus limiting the uptake of digital identity/services. The implications of this would be further exacerbated for women from economically weaker sections who for instance, may choose to not undertake mobile money accounts if the mobile money agent is male, both due to social constraints on interaction between the sexes and fear of privacy violations (i.e., phone number being revealed to the agent).

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Does the country have adequate data privacy laws?*** | |

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|---|---|
| ***Guidance:*** Data privacy laws typically have the following characteristics (Nieuwesteeg, 2017):<br>● Type of collection requirements<br>● Presence of data protection officers<br>● Data breach notification laws<br>● Monetary and criminal penalties<br>The following resources can be accessed to understand the best practices in data privacy legislation and assess whether the target geography is equipped with such resources:<br>1) Privacy International Website<br>2) OECD Work on Privacy<br>3) Data Protection in the European Union<br>In a nutshell, basic principles of data privacy require the following (World Bank, n.d.; Privacy International, n.d.):<br>● Consent for data collection and processing:<br>○ Limits on the amount of data collected<br>○ Should be collected with the individual's consent<br>○ Individuals are informed of when data is collected, purpose, who will use it and for how long.<br>● Purpose limitation<br>○ The purpose for data collection must be pre-defined and shared with the individual whose data is being collected. She must consent to the same.<br>○ There should be no secret purpose to the data collection.<br>○ There should be no 'creeping purpose'- information collected can only be used for the pre-defined purpose and deleted after use.<br>● Data protection<br>○ Reasonable security safeguards are used to protect personal information from loss, use by unauthorized persons, unauthorized use by authorized persons.<br>○ Individuals have control over their data. | ● National laws, discussions with privacy/digital activists, media coverage of salient issues. |

| | |
|---|---|
| Organizations/Data controllers should be held accountable. | |
| For mobile money based G2P Payments | |
| ***Are there social constraints on interaction between the sexes (see section on*** Social constraints on interaction between the sexes***)***<br>***What % of mobile money agents are male?***<br>***Are women afraid of sharing contact details with men? Is harassment over the phone commonly faced by women?***<br>***Do men tend to have multiple mobile connections to their name?*** | • Require MNOs to provide mobile money data as part of administrative reporting.<br>• In countries where mobile services fall under the finance/ banking regulator, use administrative data/ supply side indicators.<br>• FGDs with sampled women from targeted populations. |
| ***Guidance:*** Women may be reluctant to take up mobile services, because it would require revealing their mobile number to local agents, which can facilitate harassment, unwanted phone calls, etc. Presence of social constraints on interaction between the sexes together with mobile money agents being male would be indicative of some issues. FGDs with sampled women could directly reveal whether they prefer not to share contact details with men.<br>Additionally, if men have multiple mobile connections to their name, it could mean that the spare SIMs are used by other members of the family (women specifically). | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Digital Government: G2C/G2B | • Pursue privacy policy<br>• Technological innovation in program design<br>• Open Data Standards while safeguarding privacy: through toolkit design for government agencies implementing open data standards<br>• Open standards of technical architecture to foster transparency in information being collected |
| Identity creation and management | • Pursue privacy policy<br>• Program design to protect privacy |

| | |
|---|---|
| G2P mobile based payments | • Intermediated access: use network of female agents |

### 3.7.2. Gender blind online-safety legislation

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Do the current legislations address specific online safety issues women face (Ex: Cyber-stalking/Sexual threats)?***<br><br>***How many complaints of online gender based violence have been filed under the given law (if it exists) in the past year?***<br><br>***How many people have been charge-sheeted on complaints on online gender based violence under the given legislation in the past year?*** | • Relevant legislation and policy documents<br>• Authority responsible for online security/safety (if at all)<br>• National crime bureau data |
| ***Guidance:*** Women reportedly face disproportionate amounts of harassment online. This could take the form of cyber-stalking/bullying and sexual crimes like rape threats/fake online accounts/release of morphed or private photos and the like. Laws and regulations might not be updated to deal with the issues women face in their online interactions. For example, India's Information Technology Act previously had a clause 66A that held that:<br><br>"Any person who sends, by means of a computer resource or a communication device,—<br>(a) any information that is grossly offensive or has menacing character;<br>(b) any information which he knows to be false, but for the purpose of causing annoyance, inconvenience, danger, obstruction, insult, injury, criminal intimidation, enmity, hatred, or ill will, persistently by making use of such computer resource or a communication device,<br>(c) any electronic mail or electronic mail message for the purpose of causing annoyance or inconvenience or to deceive or to mislead the addressee or recipient about the origin of such messages<br><br>shall be punishable with imprisonment for a | |

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| term which may extend to three years and with fine."<br><br>The Union Minister for Communication, Information and Technology had then argued that this would help counter online abuse disproportionately faced by women (Padte, 2013).<br><br>However, the Supreme Court of India in its judgement held that "Section 66A is cast so widely that virtually any opinion on any subject would be covered by it, as any serious opinion dissenting with the mores of the day would be caught within its net. Such is the reach of the Section and if it is to withstand the test of constitutionality, the chilling effect on free speech would be total." The section was subsequently struck down (Shreya Singhal v. Union of India, 2012).<br><br>Hence, it would be important to assess not just the existence of the laws but also whether they are well-drafted (indicating likelihood that they will pass muster if challenged in the court of law, especially since cyber-laws are relatively new), target the right offenders and are implemented well. The latter can be seen by comparing the complaints filed and the charge-sheets made under the law. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Online safety | • Strengthen legislation for online safety |

### 3.7.3. Lack of law enforcement capacity to handle online gender based violence

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***How many complaints of online gender based violence have been filed under the given law (if it exists) in the past year?***<br><br>***How many people have been charge-sheeted on complaints on online gender based violence under the given legislation in the past year?***<br><br>***Is there a cyber-crimes unit in the present structure of law enforcement?*** | • Internal reports on law enforcement authorities.<br>• Discussions with victims of cyber gender based violence, gender/cyber-experts. |

| | |
|---|---|
| ***Is there a reporting mechanism for gender based online crimes (e.g. hotline/ special police desk)?***<br>***Is the cyber-crimes unit sensitized in dealing with gender based violence?***<br>***Are there reported instances of victim shaming by law enforcement officers?***<br>***Are victims able to report the crime easily?*** | |
| ***Guidance:*** For women to report online threats and security concerns, the reporting mechanism must take into account women's needs and concerns. Relevant local law enforcement must also be aware of types of online concerns women have and react in a manner that address those concerns, which gives a sense of confidentiality and safety for women reporting. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Online safety | • Capacity building of staff through stronger reporting mechanisms and gender sensitization training. |

### 3.7.4. Lack of awareness of cyber-safety/information security/privacy threats

Research has shown that fear among women of intimidation, harassment, defamation, violence, surveillance, and/or illegal data retention (among other types of online gender-based violence) often prevent women from getting online, or results in them going offline after bad experiences, or restricting their online behaviors (e.g., expression of views, self-censorship, etc.). Research has also shown that women and girls are more likely to experience such threats than men and boys (World Wide Web Foundation, 2015). Many women and girls lack full awareness of the threats associated risk-mitigation measures and avenues for redressal. Lack of digital literacy may be one reason for this lack of awareness.

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What proportion of cyber-crime are reported by women?***<br>***What are the types of cyber-crime reported by women by type? [Sexual harassment, versus phishing versus malware etc.]*** | • Cyber-crime data can be accessed from the country's crime bureaus.<br>• FGDs, discussion with cyber-experts would help reveal answers to the qualitative questions. |

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| ***Is there a gender gap in knowledge of how to deal with cyber risks online?***<br><br>***Is there a gender gap in knowledge on how to report cybersecurity and online safety issues to law enforcement officers?*** | |
| ***Guidance***<br><br>Cyber-risks may involve personal security as well as cyber-security. Personal security would be compromised if women were not aware of the need to not reveal personal information online or to others (e.g. revealing address/location on social media sites, telling people passwords to email accounts etc.). Cyber-security would be compromised if they were not aware of protocols like not opening email attachments from unknown addresses (for example). Since a disproportionate number of women may be home users, they may not be aware of common protocols office workers learn during information security training. They may also be unaware of threats such as online frauds and phishing schemes.<br><br>Note that the high incidence of cyber-crime against women (if the data so indicates) should not be solely attributed to lack of awareness among women. This may also betray entrenched misogyny, which makes women disproportionately vulnerable, that needs to be tackled separately, going beyond the domain of ICT interventions.<br><br>It also may need to be examined if low incidence of reported cyber-crimes against women is due to lack of adequate law enforcement capacity that encourages higher reporting. | |
| ***What % of female online users are aware of data consent mechanisms/clauses?***<br><br>***What % of women know what general issues these clauses cover, and are aware of the implications for the security of their personal information?*** | • Surveys of internet users, collecting sex disaggregated data. |
| ***Guidance***: Consent clauses are often neither simple nor concise. Women, who usually have lower levels of literacy (general as well as digital) than men may not fully comprehend the consent clause before accepting it, thus putting themselves at greater risk of privacy | |

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| violations and abuse of the generated by their Internet use. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Online safety (policy) | • Awareness campaigns/trainings programs to increase awareness on cyber-risks. |
| Privacy and data protection policy | |
| Training | |
| Cybersecurity | |

## 3.8. Barrier 8: Lack of financial inclusion

Modernization of cash transfer programs may hinge on making direct transfers to bank accounts of beneficiaries. However, if women are less likely to be a part of the financial sector (by having a bank account/ accessing cash withdrawal services etc.), other alternatives may have to be explored. Moreover, financial inclusion can come from being part of the traditional banking sector, as well as the non-traditional mobile banking sector. This section only concerns itself with the banking sector. (Barriers to using mobile money can be separately found here).

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What proportion of women have bank accounts?***<br>***What proportion of men have bank accounts?***<br>***What proportion of women have accounts in payment banks/ small finance banks?***<br>***What proportion of men have accounts in payment banks/ small finance banks?*** | • World Bank's Global Findex, the FinScope Survey and Financial Inclusion Insight Surveys. |
| ***Guidance*:** Access to bank accounts (sex-disaggregated data) is one indicator of the degree of financial inclusion. However, one must be careful to recognize that bank accounts may not translate into actual use of accounts. For instance, under India's Jan Dhan Yojna, accounts for 234 million people were opened across 27 Public Sector Banks. However, approximately 5% of these accounts had a balance of Re.1 (approximately 16 cents), suspected to be deposited by bank | |

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| staff to avoid having the accounts classified as inactive (Yadav, 2017).<br><br>Even if women do not have access to full-fledged commercial bank accounts, they may have access to payment banks or small finance banks (which often graduate from MFIs or MNOs providing mobile money services), that are adequate for receiving social security transfers. Moreover, they often have the added advantage of being present in places where banks do not reach. | |
| ***What is the ratio of bank branch/ATM to population, divided by rural/urban areas?***<br><br>***Guidance***: Having a bank account may not be a guarantee of financial inclusion, if it is not backed by easy access to a branch/ATM, from which the withdrawal (for a G2P payment for instance) can be made. This measure would help supplement the answer to the previous question. Moreover, if bank branch to population ratio is low in rural areas, it should be combined with questions on women's mobility (which may be constrained because of patriarchal social norms), to get a better idea of additional steps that must be taken, to make financial services available to women. In this case, use of banking correspondents (female, if there are also social constraints on interaction between the sexes) and mobile money may serve the purpose. | • Website of banking regulators of the respective country. |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| G2P payments through bank accounts | • Use banking correspondents/mobile money for last mile access |

## 3.9. Barrier 9: Gender Gap in Skill/ Education

A study of women's ICT use in nine cities across as many developing countries indicated that lack of know-how was the most important reason for lack of ICT use by the urban poor. Moreover, women were 1.6 times more likely to cite lack of digital skills as a barrier to use (World Wide Web Foundation, 2015). This is not surprising given that across the developing world (basic) literacy rates are biased in favor of men (UNESCO, 2017). Lack of basic literacy may also be a challenge in ensuring digital literacy.

A lack of relevant skills means that women are also less able to benefit from the potential of ICTs for development and empowerment. This includes their ability to benefit from

entrepreneurship and business (World Bank, 2016; UNCTAD & ILO; Moyo & Deen-Swarray, 2013). With technology becoming increasingly central to all spheres of life, women who do not have digital skills will risk being doubly excluded from core services (e.g. e-government services) and may even face bigger difficulties in managing their lives than in a pre-digital era (Scott *et al.*, 2017; Cummings & O'Neil, 2015; Galperin *et al*., 2014; Broadband Commission, 2013); and or may be excluded from the potential of digital dividends.

New opportunities proffered by ICTs are accompanied by a demand for more advanced skills which also test the continued relevance of existing skills, employment and earning mechanisms (World Bank, 2016; UNESCO, 2015). The World Bank also warns that ICTs could circumvent rather than eliminate some of the barriers women face and could thereby delay fundamental gender equality reforms (2016):

> For example, home-based work could help connect women to work in environments where social norms or child care responsibilities are a barrier to women working outside the home. But if working outside the home continues to be seen as unacceptable for women or if there is no availability of affordable child care, technology could end up delaying fundamental reforms.

Girls tend to self-select out of STEM courses and are less likely to choose careers in STEM and ICT than men in both developed and developing countries due to entrenched stereotypes (Broadband Commission, 2016; World Bank, 2016; AkiraChix, 2015; APC, 2015d; Microsoft *et al*., 2014). There is similarly a lack of women participating in the governance of ICTs, which impacts effective gender inclusion in policies (APC, 2015). Authors like Nakamura, Gurumurthy and Chami point out that when women do participate in the digital economy, it is often in labor roles that tends to be exploitive at various levels (e.g. Nakamura, 2017; Gurumurthy & Chami, 2017).

### 3.9.1. Lack of digital literacy [proxy measure of assessing gap in digital literacy]

This section highlights proxy measures of collecting data on digital literacy. In case the country has digital literacy surveys or is interested in pursuing long term data collection in the domain, whether in a nationally representative or limited manner (say measuring digital skills of government sector employees), see here.

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What % of women are illiterate relative to men in the target region (rural/urban)? [Proxy measure of assessing gap in digital literacy]*** | • National Census documents, UNESCO database. |
| ***Guidance:*** This is a proxy measure for measuring gender-gap in digital literacy, if there are no official data on digital literacy of the concerned population. | |

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| A marked gender gap in basic literacy is likely to translate into a gender gap in digital literacy, though at relatively early stages of development it is possible that digital literacy is low for both genders. Hence, this must be seen in conjunction with data on the extent of ownership/use of ICT tools and devices.<br><br>Also note that this should be used as an indicator to design training programs suitably, i.e., ensuring that the training program fulfills the needs of the target audience even if illiterate. | |

### 3.9.2. Lack of digital literacy [collected by instituting surveys]

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Are there gender gaps in digital skills [measured at different competency levels]?*** | Primary data collection |
| ***Guidance:*** Developing a framework/set of indicators to measure digital literacy and deploying that to assess digital literacy (or lack thereof) is a valuable starting point to design training programs. For example: evaluating the digital literacy of government employees being readied for the implementation of digital government internally). Once the extent of gap is established (by type of literacy level), specific steps may be taken to address the identified gaps.<br><br>In the long term, it may also be valuable to institute nationally representative digital literacy surveys.<br><br>For more ideas on how to institute this, see Annexures, here. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Improving Device Ownership | Digital training that also includes women |
| Digital government: G2G/ G2E | Digital training that also includes women |
| Digital Government: G2C/G2B | • Digital training that also includes women |

| | |
|---|---|
| | • Intermediated access through Public access centers |
| G2P payments through bank accounts | Digital training that also includes women |
| G2P mobile based payments | Digital training that also includes women |
| IEC | IEC Campaigns that consider women's different situations and needs: using models of intermediated access |

### 3.9.3. Low representation of women in STEM

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What % of students graduating out of ICT engineering courses in the country are women?***<br>***What proportion of the workforce in the IT/ITES sector is female?*** | • Government statistics for official literacy, digital literacy levels of women.<br>• Private sector data to measure women's participation in IT/ ITES workforce.<br>• Local gender experts to determine awareness, skills (technical and non-technical) women need to develop. |
| ***Guidance:*** To find how the significance in gender gap in both STEM education and careers data must be collected and compared. If girls are not entering STEM education fields, local context and barriers to entry must be analyzed. If female STEM graduates are not following STEM careers reasons and issues for this must be analyzed. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Facilitating digital entrepreneurship | • Awareness and sensitization campaigns in educational institutions to encourage girls to enter STEM<br>• Capacity building that considers women's different situations and needs<br>• Enabling environment for women in STEM |

### 3.9.4. Lack of complementary non-ICT skills

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|

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|---|---|
| ***- Do female digital entrepreneurs lack skills such as entrepreneurship development, leadership, communication, design, confidence-building to be successful?***<br>***- How many female digital entrepreneurs participate in tech meetups, networking events, hackathons?*** | • Local gender experts to determine awareness, skills (technical and non-technical) women need to develop.<br>• Targeted interviews with businesses. |
| ***Guidance***: Entrepreneurs need more than just technical skills. Other critical skills include management (to ensure a sustainable business model, adequate Human Resources, communication (for raising finance, connecting to clients, marketing etc.). Gauging this is needed to provide complementary training. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Facilitating digital entrepreneurship | Provide entrepreneurship training that considers the additional challenges faced by female entrepreneurs (for non-technical skills) |

## 3.10. Barrier 10: Lack of trust in modern technology

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What is the extent of digital literacy observed for men/ women? (See Lack of digital literacy)***<br>***What is the penetration of mobile/ internet use by gender?***<br>***What are the self-reported barriers in use of digital tools? [Mistrust of technology may be an option to this question, among others but should not be framed to be leading].*** | • See Lack of digital literacy.<br>• ITU data for gendered ICT statistics.<br>• FGDs/ Surveys with target population. |
| ***Guidance***: Low digital literacy and lack of exposure to ICT usage can cause mistrust of using new technology. This may be especially true in cases of critical government service delivery (for example, cash transfers through mobile money). Strategies to overcome this include intermediation of services, digital | |

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| literacy training – especially demonstrating utility of ICT tools. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Improving Device Ownership | • Intermediated access<br>• Digital literacy training |
| G2P payments through bank accounts | |
| G2P mobile based payments | |

## 3.11. Barrier 11: Gender blind/ male centric environment for digital entrepreneurs

Female entrepreneurs have many enabling environmental issues such as access to finance or capital. Women face a more severe burden than men for financing since they are poorer and have lower capital, due to socio-cultural norms they may inherit less or have lower ability to get loans from financial institutions. There are also issues of registering businesses for women who don't have sufficient documentation, access to markets for women have limited social circles and networking opportunities.

### 3.11.1. Limited access to finance to start or grow businesses

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What proportion of business loans are accessed by female entrepreneurs?***<br>***What proportion of micro-loans go to female entrepreneurs?***<br>***Are there general loan requirements (collateral, documentation) preventing women from accessing business loans?***<br>***Do social norms or inheritance/property laws prevent women from inheriting wealth that can be used as capital or to expand their businesses?***<br>***Are repayment records tracked and do financial institutions share information?*** | • Previous studies on access to finance to male/female entrepreneurs.<br>• Data from banking regulators/sourced from banks/MFIs.<br>• Central bank requirements on loan disbursal, review of private sector loan pre-conditions.<br>• Discussions with female entrepreneurs, banking experts. |
| ***Guidance***: Loan requirements such as high collateral, excess documentation may cause | |

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| extra difficulties for women to access business loans. Women have difficulty finding collateral for loans as they have less assets than men. Some women due may inherit less, earn less limiting their ability to accumulate capital.<br><br>Since most women have a good credit history, if financial institutes track credit information and share financial information, it will enhance women's abilities to obtain loans. | |
| ***Are there any special financial schemes for entrepreneurs in ICT?***<br><br>***What proportion of beneficiaries of these schemes are women?***<br><br>***Are any of these schemes tailor made for female entrepreneurs?*** | • Government websites on MSME development.<br>• Private financial institutions – banks, MFIs.<br>• Central bank requirements. |
| Financial institutions (both public and private) may offer special interest rates, schemes (including longer grace period, cash flow-based lending vs. hard collateral) to female/ male owned SMEs. Analyzing the disaggregation of beneficiaries by sex can reveal their efficacy for women. | |
| ***How many male/female digital entrepreneurs have accessed funds through angel networks, venture funds?***<br><br>***Are there incentives such as tax breaks for corporates investing in female digital entrepreneurs?*** | • Data from private venture funds. |
| Angel investors and venture funds are popular sources of funds for SMEs especially digital entrepreneurs. Analyzing the disaggregation (by sex) of entrepreneurs who accessed funds by this route can reveal if women lack networking opportunities and/or confidence to pitch ideas. | |
| ***Are there government procurement policies that allows for positive discrimination against women?*** | • Government procurement policies. |
| Positive discrimination in procurement contracts in software sector E.g. allowing 10% of 5% of marks in contracts of you are a female entrepreneur can help women win local contracts. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Facilitating digital entrepreneurship | • Connect women digital entrepreneurs to investors<br>• Set up funding mechanisms specifically targeting women entrepreneurs |

### 3.11.2. Lack of access to affordable, convenient early child facilities

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***According to norms who takes primarily responsibility of taking care of children of working mothers?***<br>***Are there child care facilities available near homes, incubator program locations?***<br>***What is the cost of child care facilities per day? Is it subsidized?*** | • FGDs with local women, local gender experts |
| ***Guidance:*** Women need extra support to participate in labor markets. In many countries women are primarily responsible for childcare. Government as well as private sector can play a supportive role to free up women's time and ability to participate in labor markets as entrepreneurs as well workers by providing affordable early childhood care facilities. In some countries, government has policies to provide or promote childcare facilities to encourage women to enter labor markets. However socio-cultural norms, family dynamic might prevent women from using these facilities. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Facilitating digital entrepreneurship | • Policies for the provision or promotion of affordable childcare facilities- state run or private |

### 3.11.3. Unfavorable business climate

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|

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|---|---|
| ***Can the business registration /licensing process be completed online?***<br><br>***Are small businesses or women owned/ managed business exempt from paying the Business Income and Receipts Tax for a stipulated time period such as during the first two years of operations?***<br><br>***Is there a set monthly tax which maybe burdensome for women? (e.g. low turnover businesses of women making it difficult to pay monthly taxes)***<br><br>***How affordable is the cost of registration/licenses? Are there any fee waivers for new businesses for licenses and registrations?***<br><br>***How many female digital entrepreneurs export services or have international buyers?***<br><br>***What are the trade costs, tariff and non-tariff barriers (standards, regulations) faced by digital SMEs and particularly women?***<br><br>***Is information required to register a business, obtain licenses, and pay taxes available online (documents needed, cost, forms to be filled)?***<br><br>***Are the offices centralized/decentralized?***<br><br>***How affordable is the cost of registration /licenses?***<br><br>***What is the average number of visits required in getting license?***<br><br>***Are there female staff in relevant government offices (e.g. registration office)?*** | • Website and staff at government business registration /licensing offices, tax departments, etc.<br>• Female business networks. |
| ***Guidance***: Given the disproportionate mobility and time constraints faced by women, business registration process must be evaluated to see if it burdens female entrepreneurs. Location of the facility to register businesses would be a factor (centralized versus decentralized) in this evaluation. Requirement of multiple visits may also constrain women. Availability of the full service online can indicate ease of access to the service to women (who may be less mobile) and help them avoid government offices that may be hostile to women. Onerous requirements of documentation (especially in | |

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| the context of discriminatory laws and procedures) may also similarly be a barrier for female entrepreneurs. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Facilitating digital entrepreneurship | • Registration, licensing, and taxation processes suitable for women's needs |

### 3.11.4. Lack of access to entrepreneur networks/markets

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Are there associations/networks for digital entrepreneurs and what is the representation of women in them?***<br>***How many women participate in networking events /trade fairs to find potential buyers?***<br>***How many women participate in hackathons and other technology meetups that involve potential buyers and peer collaborators?***<br>***How many female digital entrepreneurs export/import services?*** | • Interviews with active members of formal networks to understand representation of women on them<br>• Interviews with female entrepreneurs |
| ***Guidance:*** Women often lack opportunities to network to find buyers for their digital product or service. Their social circles are limited. Due to social cultural norms and gender interactions as well as private sector decision makers been majority male, may limit the ability of female digital entrepreneurs finding markets for their digital content or service. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Facilitating digital entrepreneurship | • Facilitate markets and networks for entrepreneurship |

## 3.12. Barrier 12: Lack of decision-making processes that promote women's inclusion

'Outdated or ill-conceived policies' (including conservative spectrum allocation policies, poor USAF policies, lack of competition, the inability to use TV white space, onerous licensing requirements, high taxes, and royalty stacking) can become significant barriers to affordable access despite the existence of options for more affordable technology (e.g. Broadband Commission, 2017; A4AI, 2016; APC, 2015).

Literature also shows that not only do broadband and/or development plans neglect to incorporate gender equality (A4AI, 2016; GSMA, 2015; Microsoft, UNESCO, UN Women & ITU, 2015), but many gender strategies and action plans similarly ignore the potential of ICTs for women's development (Broadband Commission, 2013). The Broadband Commission's Working Group on the Digital Gender Divide, for instance, argues that there is therefore not only a need for advocating for research evidence to support the prioritization of gender in ICT access plans and initiatives, but also a related need to raise awareness among gender equality activists and other stakeholders of the need to take due cognizance of the potential ICTs have for promoting gender equality and empowerment (2017).

This section discusses the lack of institutional processes to address gender in ICT policy and vice-versa. Barrier 13: Lack of institutional capacity on gender discusses the lack of institutional capacity to address the same issue.

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Is gender mainstreaming a policy priority?***<br><br>***Are policy consultations with representatives of women's groups held before finalizing policy?***<br><br>***Do expert groups working to finalize legislation/ policy include gender experts?***<br><br>***Number of gender experts in expert group committees finalizing policies***<br><br>***Is there a national ICT strategy in place? How many times does it mention gender? Does it mention gender at appropriate places (universal access, affordability etc.)?***<br><br>***Is gender analysis conducted before policy decisions are taken (for example does context analysis of policy decisions use sex disaggregated data)?***<br><br>***What specific target and goals for gender-based outcomes for the sector have been set in the past policy? For example, on: equitable ICT access within a specified*** | • ICT sector policy documents and planned key stakeholder interviews |

| | |
|---|---|
| ***timeframe; increased female employment in the ICT sector.***<br><br>***Is program monitoring undertaken? Does results framework incorporate collection of sex disaggregated targets and monitoring indicators?***<br><br>***Is*** gender-budgeting ***undertaken?*** | |
| ***Guidance:*** A lack of prioritization of gender at the policy level can lead to the rest of the sector stakeholders following suit. This can stem from a lack of awareness of the developmental benefits of ensuring equitable access to ICTs can lead to this, as well as a lack of political will, or know-how. Designing or updating a national ICT policy provides policymakers and stakeholders with important opportunities to ensure that gender becomes a key policy priority from top-down. It provides opportunities to create awareness on the importance of ensuring equal access to ICTs for women, the potential risks of not doing so and the benefits of doing so. It provides an opportunity, to set consensus on plans and goals, involving multiple stakeholders (including various components of government, the private sector as well as civil society). Policymakers can set clear targets and ways of measuring progress, while identifying lines of responsibility for achieving these targets. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Institutional strengthening | • Capacity-building programs for decision makers<br>• Capacity training for staff implementing policies/ data collection that considers women's different situations and needs<br>• Gender Mainstreaming in policy design |

## 3.13. Barrier 13: Lack of institutional capacity on gender

'Outdated or ill-conceived policies' (including conservative spectrum allocation policies, poor USAF policies, lack of competition, the inability to use TV white space, onerous licensing requirements, high taxes, and royalty stacking) can become significant barriers to affordable access despite the existence of options for more affordable technology (e.g. Broadband Commission, 2017; A4AI, 2016; APC, 2015).

Literature also shows that not only do broadband and/or development plans neglect to incorporate gender equality (A4AI, 2016; GSMA, 2015; Microsoft, UNESCO, UN Women & ITU, 2015), but many gender strategies and action plans similarly ignore the potential of ICTs for women's development (Broadband Commission, 2013). The Broadband Commission's Working Group on the Digital Gender Divide, for instance, argues that there is therefore not only a need for advocating for research evidence to support the prioritization of gender in ICT access plans and initiatives, but also a related need to raise awareness among gender equality activists and other stakeholders of the need to take due cognizance of the potential ICTs have for promoting gender equality and empowerment (2017).

This section discusses the lack of institutional capacity to address gender in ICT policy and vice-versa. Barrier 12: Lack of decision-making processes that promote women's inclusion discusses the lack of institutional processes required to address the same issue.

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***How many employees working in the relevant departments, at different positions, are male/female?***<br>***How many gender experts work in different government organizations?***<br>***Are there gender experts in expert group committees finalizing policy?***<br>***Have employees undergone gender sensitization training in their role?*** | • Organizational data from the government.<br>• Discussions and Key Informant interviews with people working in different places in the organizational hierarchy. |
| ***Guidance:*** Lack of knowledge and expertise on gender prioritization among policymakers can lead to gender considerations being sidelined. This is evidenced by a lack of gender-ICT experts (often, but not necessarily women) participating in the policy making process and in decision making roles in the ICT sector. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Lack of institutional capacity on gender | • Capacity-building programs for decision makers<br>• Capacity training for staff implementing policies/ data collection that considers women's different situations and needs<br>• Capacity building in gender-economics for enabling gender budgeting<br>• Review recruitment procedures in government and other sectors: Ensure presence of gender experts |

## 3.14. Barrier 14: Lack of sex disaggregated data on ICT

A key precursor to any ICT intervention is to identify and understand the need for gender-based interventions through research, to understand the context within which the intended intervention will operate. It is necessary to first understand the levels of access and use of ICTs among women versus men, as well as related services within the realm of which the intended ICT intervention will operate (e.g., health, education, etc.). Identifying any gaps in access and or use will then indicate where specific solutions are needed to ensure the intervention is successful for both male and female beneficiaries. Where gaps exist, it is then necessary to understand *why* these gaps exist, what specific barriers women face compared to men, leading to the identified gender gap. Without understanding the specific context, it is not possible to design appropriate solutions and interventions for gender inclusion. For example, an SMS based alert system to remind pregnant women to go to the health-center for their periodic prenatal check-up may be ineffective if women don't own mobile phones. This information would then be critical for program formulation. The collection of data in this manner is also to provide a basis for monitoring and evaluation of gender outcomes over time.

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***What are the current government/ regulator surveys that collect information on ICT access and usage?***<br>***What are the current government surveys that collect information on industry/ workforce for sectors related to ICT?***<br>***Do these collect information on gender of respondent?***<br>***Are associated aggregate indicators (by gender) available for institutional/public consumption?*** | • Supply-side statistics<br>• National labor force surveys<br>• Nationally representative consumption side surveys.<br>• Nationally representative education sector surveys.<br>• Existing ICT gender gap assessments<br>• Nationally representative demand side surveys on ICT access and use.<br>• Qualitative studies on gender barriers to ICT use.<br>• Qualitative studies on gender inequalities in general. |
| ***Guidance:*** Existing research on gender and ICTs with respect to the country context in question (if any) should be assessed before it is used. Factors that need to be considered are periodicity of data collection, extent of geographical coverage, whether sampling design allows the data to be representative etc.<br>Quantitative data is more important for identifying and measuring the gaps, while qualitative is more useful for understanding the reasons behind the gaps, as well as understanding how gender dynamics play out in society, underlying gender attitudes and perceptions, etc. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Institutional strengthening | • Focus on strengthening the data ecosystem, with emphasis on the use of big data |

## 3.15. Barrier 15: Barriers to exercising Right to Information

### 3.15.1. Lack of awareness

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Do women have significantly lower educational attainment and literacy levels than men?***<br>***Are women aware of RTI/ATI legislation?***<br>***Are women less likely to participate in civic and political activity than men?***<br>***What is the ratio of female to male membership of local political parties?*** | • National census data.<br>• FGDs with women of varying education and income levels.<br>• Membership data from local political parties. |
| ***Guidance:*** Due to lower educational attainment, lack of involvement in civic and political activities, and other reasons, women may not be aware of RTI/ATI issues. Lack of awareness can be at various levels: what the rights of citizens are with respect to access to information, how citizens can exercise these rights (where to go, who to ask, what the procedure is, etc.). | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Right to Information/Access to Information | • Awareness raising that considers women's different situations and needs |

### 3.15.2. Lack of capacity

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|

| | |
|---|---|
| ***Do women have significantly lower educational attainment and literacy levels than men?***<br><br>***Are the RTI/ATI procedures published in a simple and easy-to-understand format which is accessible to women who may not be online or may not be literate (e.g., radio or TV advertisements; posters/pamphlets at local government offices)?***<br><br>***What are the required components of a RTI/ATI request? Are pre-existing forms or templates made available to citizens in local languages?*** | • National census data.<br>• FGDs and key informant interviews with local community leaders, experts, information officers and civil servants.<br>• RTI/ATI legislation (if it exists) and published procedures/ protocols. |
| ***Guidance:*** Due to lower educational attainments, women who may be aware of their rights to information, may not have the capacity to compose a written request for the required information, or may not know what specifically to ask for or they may not have sufficient supporting documents to submit and follow-up on a request. Procedures may be overly complicated (e.g., requiring supporting documents or many details), which can prevent women from exercising their right to access information. Due to lower levels of confidence, social norms and gender discrimination among civil servants, women may not have the capacity to pursue a request and obtain the information required, or women may be derided, embarrassed, or just ignored. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Right to Information/Access to Information | • Procedures that consider women's different situations and needs |

## 3.16. Barrier 16: Lack of awareness and capacity in IPR

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***-Is there a gender gap in the applications for patents, copyrights or trademarks?***<br><br>***-What % of reports of infringements or disputes are originated by women?*** | • National intellectual property office<br>• Data available under Patent Cooperation Yearly Treaty Review, World Intellectual Property Organization (WIPO) |

| | |
|---|---|
| ***-What is the level of awareness among women on intellectual property rights?***<br>***-What is the representation of women in design and development fields?*** | • Surveys of women working in development and design, as well as other creative fields where intellectual property rights are relevant (literary, music, artistic, computer programming etc.).<br>• National labor force surveys<br>• Tertiary educational enrollment data (sex disaggregated) |
| ***Guidance:*** Not knowing how or having the capacity (knowledge, financial, time, etc.) to apply for a patent, copyright or trademark, or to report infringements of intellectual property are both factors which can prevent women in creative fields from securing intellectual property rights for their work. The data on the participation of women in IPR in the ICT sector must be viewed in the context of the actual number of women-owned/run businesses operating in design and development. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Intellectual property rights policy | Awareness raising and financial assistance |

## 3.17. Opportunity 1: Effective gender budgeting

Gender budgeting is a tool to correct resource disparities that women may face, in terms of lower educational attainment, poorer nutritional outcomes, gender pay gap etc. (World Bank, 2012) by ensuring that adequate funds are received by schemes and programs that directly impact women's welfare. The aim of the gender budget is to ensure gender-mainstreaming by taking gender differences into account in every part of the budgeting process (Ministry of Women and Child Development, GoI, 2015). This requires data not only pertaining to women's performance on socio-economic indicators (vis-a-vis men) for scheme prioritization, design and subsequent M&E, but also financial flow data to determine whether the budget performed as planned.

While budgeting data on actual expenditure is available in the natural course of things (even in the absence of digital government), an Integrated Financial Management System (IFMIS) allows for continuous and timely tracking of actual expenditures (on gender) against planned expenditures. This not only allows for monitoring the 'gender budget' better, but also ensures inputs into more effective budgeting in future.

The easy tracking of gender expenditures is made possible by the *integrated* nature of the IFMIS that combines the following:

- core components like 'General Ledger', cash management, commitment control, accounts payable and receivable;
- additional components like budget preparation/planning, payroll management, procurement, revenue administration, debt management, assets management,

project ledger, grants management (e.g., counterpart funds from international assistance).

See here for more information on IFMIS.

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Digital government: G2G/G2E | Ensure provision of functional specifications (in built gender budgeting formats) to vendors |

## 3.18. Opportunity 2: Data for gender planning

Digital government offers the scope for collection of a wealth of sex disaggregated data that can aid further research and policy planning. For example, Human Resource Management Information System (HRMIS) data can be anonymized for personal details and made available (after a time-lapse) to researchers who can study it to assess patterns of discrimination and gender pay gap in government. Similarly, digitized FIR data can be assessed to measure extent and nature of Violence against Women (VAW), areas where gender-based violence has higher probability of occurrence (through use of apps like Safetipin), digitized court records can be accessed to measure the speed at which rape cases are adjudicated etc. Data from 'Smart city' projects can be used to design public transport systems that respond to the needs of women. Call detail records, high resolution satellite data, smart card usage etc. can help identify women's mobility patterns, in terms of peak hours of travel, modes used, duration and distance travelled etc. This can then feed into the analysis for designing transport systems that keep women's interests in mind – including affordability, safety, availability on specific routes etc. (See here for World Bank guidelines on mainstreaming gender in Intelligent Transport Systems).

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Digital government: G2G/G2E | Open Data Standards while balancing privacy |

## 3.19. Opportunity 3: Gender sensitivity in PPP/PPI

Public-Private Partnerships (PPPs) agreement and public-private interplays (PPIs), which are a broader form of collaboration not restricted to investment, are important tools that governments can use to fill the financing gap and improve access to basic infrastructure services. They can have different impacts on women and men. It is therefore crucial that the knowledge and awareness of gender concerns, issues be analyzed and incorporated into every step of the PPP/PPI project cycle.

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Has gender been considered in the current PPP legal framework?*** | • PPP/PPI model agreements |

| | |
|---|---|
| ***Guidance:*** Gender biases and legal constraints and gaps in policies, laws and regulations that may not give equal benefits to men and women must be identified and analyzed for how they can be overcome considering the local context.<br><br>For more information A sample checklist for integrating gender aspects of PPPs in the PPP legal framework<br>Guidelines and procedures for integrating gender in PPP infrastructure projects found in Volume 4 (Annexes) of the National Government Agency PPP Manual | |
| ***Do PPP contracts have provision for mitigating negative impacts and to ensure the inclusion of special conditions directed towards increasing benefits for women and girls (e.g., income generation opportunities, etc.)?*** | |
| ***Guidance***: Ideally contracts should have provision for mitigating negative impacts and to ensure the inclusion of special conditions directed towards increasing benefits for women and girls. This can be opportunities for income generation for women or women's participation in the wider supply chain, working conditions for women etc. (further reading).<br><br>For a comprehensive set of sample assessment questions, see here. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Public-Private Partnership (PPP) design | • Mainstream gender in PPP |

More reading: Gender Impact of Public Private Partnerships - Literature Review Synthesis Report

## 3.20. Opportunity 4: Providing additional source of income to women

As discussed above, lower labor force participation rates and gender wage gaps translate into women having lower disposable incomes and purchasing power (in general, as also over ICT devices and connections). In this scenario, licensing policy could be designed to incentivize MNOs to place mobile towers on the roof of homes with women-headed

households as also buildings housing operations of micro and small women entrepreneurs. Since setting up mobile towers entails financial incentives to the owner of the dwelling (on which the mobile tower is placed), this would afford additional income to the concerned women.

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Licensing policy | Licensing policy that positively discriminates toward women |

## 3.21. Opportunity 5: Ensure QoS indicators account for women's differential usage

Quality of service regulations are issued by telecom regulators to different telecom providers, stipulating standards including:

- Technical quality of service
- Price and nature of subscription
- Customer care and complaint redressal
- Bill payment procedures etc.

These regulations can also be made to better accommodate women's differential ICT usage and encourage ICT access and adoption.

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***Do women use broadband services differently from men?***<br>***What proportion of male/ female users of different broadband services are engaged in different activities:***<br>• ***browsing text or media***<br>• ***downloading transactions***<br>• ***streaming media***<br>• ***VOIP***<br>• ***online games) etc.*** | National surveys of broadband usage among men vs women; surveys of QoS perceptions among men vs women; QoS tests conducted on a random sample of male and female broadband users (including down/upload speeds, jitter, latency, packet loss measurements). |
| ***Guidance:*** If men for instance. are primarily using broadband for browsing and downloading, while women are primarily using broadband for VOIP, then just monitoring down/upload speeds is insufficient to capture the QoS experienced by women. Additional measures of Latency (round trip time, or RTT), jitter and packet loss would be required to capture differential experiences in broadband QoS between genders, since these measures | |

| | |
|---|---|
| are more relevant to VOIP than download speeds (Further reading). | |
| ***What mode (fixed or mobile) do broadband men versus women primarily access broadband?*** | National surveys of broadband usage among men vs women. |
| ***Guidance:*** If QoS regulation focuses only on mobile, stipulating indicators and regulations for mobile broadband only, there is a risk of women being adversely affected if they primarily access services through fixed broadband connections. Often women access broadband through fixed connections in the home, rather than mobile. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Quality of Service Regulation | Use of appropriate indicators of QOS |

## 3.22. Opportunity 6: Increasing representation of women in information security careers

Women account for 11% of the global workforce in information security (Frost and Sullivan, 2017). Hence any intervention in the cyber-security space – especially that targeting capacity building, can increase gender empowerment by targeted capacity building efforts on them.

| How to assess whether this barrier is relevant for you? | Possible data sources |
|---|---|
| ***- What % of students graduating out of engineering courses in the country are women?***<br>***- What proportion of the workforces in the IT/ITES sector is female?***<br>***- What proportion of the workforce working in information security is female?***<br>***- What proportion of employees of government CERT are women?*** | • Education sector data.<br>• Employment data from IT companies/industry association.<br>• Government employment figures. |
| ***Guidance:*** There are many reasons for women not being in information security careers. It may be because they are not encouraged to undertake careers in STEM (see social norms), hence the supply of talent may itself be limited. Moreover, even the demand side is often male dominated | |

| | |
|---|---|
| because of the nature of the industry – with law enforcement, military etc. being seen as such. | |

| Related ICT Interventions | Gender targeted actions |
|---|---|
| Cybersecurity | Awareness and sensitization campaigns in educational institutions to encourage girls to enter STEM |

# 4

SECTION

# Actions and M&E

# 4. Actions and M&E

## 4.1. Program design that considers women's different situations and needs

### 4.1.1. Identity creation and management

#### 4.1.1.1. Balance social objectives with need for due diligence to counter lack of prior documentation

This can be done through:

- Allow people to register themselves with self-asserted attributes (ITU ITU-T Focus Group Digital Financial Services, 2017), supplemented by robust authentication measures like use of biometrics.
- Additionally, it is critical to have a provision for 'introduction' (akin to sponsorship or endorsement) by someone who has the necessary documentation. While in practice, this would often be the male spouse, his endorsement should not be mandatory. This is because women may be widowed, husbands may not perceive identification to be necessary for women or there may be more systemic region-specific issues that make it difficult to get the husband's endorsement (for example, the situation of 'abandoned wives' in Tajikistan). It should also be noted that such identification would essentially have low levels of assurance. Hence, it may not be advisable to use it for all purposes (See section on Aadhaar).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Identity creation and management | Lack of breeder documents | - Males, as a proportion of total male enrollees, getting registered through:<br>○ Requisite documents<br>○ Introducer with requisite documents, and<br>○ Self-attestation<br>- Females, as proportion of total female enrollees, getting registered through:<br>○ Requisite documents<br>○ Introducer with requisite documents, and<br>○ Self-attestation |

#### 4.1.1.2. Reaching remote locations for ensuring enrolment

If the assessment questions seem to indicate constraints on economic/ residential mobility , it may be necessary to take specific actions to reach remote locations -

- **Use mobile enrolment centers**: Pakistan's CNIC system uses mobile vans to reach remote locations (Sardar, 2015).
- **Liaison with local leadership/ NGOs to facilitate the process of mobile enrolment in remote geographies**: While there are some issues in their functioning (delays, errors in data recording etc.), an evaluation report recommends using liaisons who are well versed with local geography and language to smoothen the process. Local NGOs/ leaders can be tapped for this (Explore further).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Identity creation and management | Social constraints on economic/residential mobility | **Input indicators:**<br>- Ratio of number of mobile vans deployed to number of male/female/total enrollees.<br>- Ratio of number of mobile vans deployed to number of male/ female/ total population. |
| | | **Output indicators:**<br>- Number of Males/Females enrolled as a proportion of total enrolment in areas with less than 'x' density of population |

#### 4.1.1.3. Design solutions in enrolment for ensuring women's access

If the assessment questions seem to indicate social constraints on interaction between the sexes, it may be necessary to:

- **Designate and pre-announce/ create publicity around women only days**: Pakistan designated specific days exclusively for women's registration for voter ID (Dahan and Hanmer, n.d).
- **Ensure that enrolment processes are sensitive to social norms**: India's Aadhaar enrolment centers follow guidelines that stipulate 'desired' conditions for them including (Unique Identification Authority of India, 2012) –
    - A separate enclosure to enroll 'purdah-nasheen[5]' women
    - Female operators / volunteers to assist women enrollees
    - At least one station in each enrolment center suitable for physically challenged, pregnant women, women with infants and elderly enrollees. This station is clearly marked with a visible banner. Enrolment center is preferably setup on the ground floor.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Identity creation and management | Social constraints on interaction between the sexes | **Input indicators:**<br>- Number of female enrolment volunteers as proportion of total volunteers, by enrolment center, |
| | | **Output indicators:**<br>- Female enrolment as % of total enrolment in centers with facilities such as -<br>○ female volunteers<br>○ separate enclosure for *purdah-nasheen*[5]/ pregnant women<br>- Number of women enrolled on women-only days (by enrolment center), as proportion of number of women enrolled at the same center in a day, averaged over the year (excluding the women-only days). |

#### 4.1.1.4. Linking identification with tangible benefits

Gender gap in perceived need for identification may be countered by explicitly linking the acquisition of the identity with tangible benefits. For instance, between 2009 and 2012, CNIC enrolment of women in Pakistan almost doubled, because of a collaboration with the Benazir Income Support Program[6] (BISP). In comparison, overall enrolment of all adults went up by 72%.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Identity creation and management | Gender gap in perceived need for identification | - Number of male beneficiaries who availed of the scheme using the ID card, as proportion of total male scheme beneficiaries. |

[5] *Purdah nasheen* are women who keep their faces/ heads covered in the company of men due to social norms.

[6] BISP started in 2008 to provide unconditional cash transfers to the poor. More details can be found here: http://bisp.gov.pk

| | | |
|---|---|---|
| | | - Number of female beneficiaries who availed of the scheme using the ID card, as proportion of total female scheme beneficiaries.<br>- Number of male beneficiaries as proportion of total beneficiaries [before and after the linking to welfare scheme].<br>- Number of female beneficiaries as proportion of total beneficiaries [before and after the linking to welfare scheme]. |

#### 4.1.1.5. Design solutions to protect privacy

The following privacy issues should be considered and debated when planning the design of identity creation and management systems.

- **A centralized database** (see discussion on Aadhaar) may be more susceptible to privacy loss, being an easier target of hacking. Hence, it may be more advisable to have data storage in portable smart cards. This will also enable citizens to have control over their own data, thus assuaging concerns of identity theft (LSE, 2005).
- **Secret/non-secret or published ID**: This hinges on whether the ID number is meant to be an authenticator (hence secret) or an identifier (easily shared). While use of biometrics can reduce the risk of identity theft even when the ID is not secret, this is not fool-proof.
- **Single or multiple identities**: privacy may be compromised if a single identity is used for multiple purposes. On the other hand, if the same identifier can be seeded everywhere to link databases, this can prove to be a critical resource for the state and private sector. Austria strikes a compromise by assigning a random number to each citizen which is confidential. However, this is used as a source pin to generate sector-specific (non-confidential) PINs each time the citizen tries to access a government service. It is not possible to get at the source PIN from the sector-specific PIN.
- **Mandatory or optional scheme**: a mandatory scheme must be far more circumspect about the privacy aspect.
- **Transparency**: can the citizen see who accessed their personal data? Can they view the data collected and ask for it to be updated?

For more information, refer to this.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Identity creation and management | Fear of data privacy violation preventing uptake of services | - Number of male beneficiaries who availed of the scheme using the ID card, |

| | | |
|---|---|---|
| | | as proportion of total male scheme beneficiaries.<br>- Number of female beneficiaries who availed of the scheme using the ID card, as proportion of total female scheme beneficiaries.<br>- Number of male beneficiaries as proportion of total beneficiaries [before and after the linking to welfare scheme].<br>- Number of female beneficiaries as proportion of total beneficiaries [before and after the linking to welfare scheme]. |

## 4.1.2. Design solutions for effective Platforms and Services

### 4.1.2.1. Use of banking correspondents

Lack of financial inclusion creates the need for use of alternatives like Banking Correspondents also see mobile money). Given geographical breadth and remote locations with low density of populations, setting up bank branches may not always make economic sense for private sector entities. Instead, regulatory changes allowing for banking correspondents (BCs) to provide last mile banking access can supplement regular banking operations. This has been done in countries like Brazil and India. These BCs were intended to operate for a commission to provide services like identification of borrowers, collection and preliminary processing of loan applications, post sanction monitoring, receipt and delivery of small value remittances etc. (RBI, 2010). They can help overcome multiple barriers to financial inclusion including: access, lack of confidence in technology, digital/financial literacy etc. (Camara, Tuesta and Urbiola, 2015). Moreover, in case the barrier of social constraints on interaction between the sexes applies, it may be pertinent to aim at increasing the number of female banking correspondents. Also note that setting up BCs require ICT infrastructure as well, including PoS devices, smart cards/other identifiers that can map individuals to her bank account, internet/mobile connectivity (allowing real time transfer of funds) etc.

Further reading:

1) Revised RBI guidelines on Banking Correspondents (2010)
2) BBVA Working paper on database of BCs (2015)

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| | Lack of financial inclusion | **Input indicators:** |

| | | |
|---|---|---|
| G2P payments through bank accounts | | - Ratio of Number of male BCs to total male adult population in the target region<br>- Ratio of Number of female BCs to total female adult population in the target region |
| | | **Output indicators:**<br>- Number of female scheme beneficiaries operating bank account through male/ female BCs as proportion of total female scheme beneficiaries<br>- Number of male scheme beneficiaries operating bank account through male/ female BCs as proportion of total male scheme beneficiaries |

#### 4.1.2.2. Mobile money

Lack of financial inclusion creates the need for use of alternatives, mobile money being one of them (also see banking correspondents). Mobile money is an alternative to provide last mile banking access through the intermediation of a mobile phone. However, it also needs cash-in, cash out infrastructure, using a network of mobile money agents. The main difference between Banking Correspondents (BCs) and mobile money is that the former is bank led while the latter is (more often) led by Mobile Network Operators (MNOs). The deployment of mobile money to make G2P payments, also has a set of gender-specific barriers. See here.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| G2P payments through bank accounts | Lack of financial inclusion | **Input indicators:**<br>- Ratio of Number of male mobile money agent to total male adult population in the target region<br>- Ratio of Number of female mobile money agents to total female adult population in the target region |
| | | **Output indicators:**<br>- Number of female scheme beneficiaries receiving transfer through mobile money account as proportion |

| | | |
|---|---|---|
| | | of total female scheme beneficiaries<br>- Number of male scheme beneficiaries receiving transfer through mobile money account as proportion of total male scheme beneficiaries |

#### 4.1.2.3. Public Access Points/Citizen Service Centers

Subsidized public access to internet/ ICT tools and e-governance services to citizens may help overcome several gender barriers:

- Affordability of services,
- Lack of digital literacy/lack of trust in modern technology bypassed through intermediated access, social norms determined barriers to access (social constraints on economic/residential mobility and constraints on interaction between the sexes)

However, there are several aspects that may have to be kept in mind before using this mode:

- Who will run the public access points?
    - Free public Wi-Fi in public buildings can be managed by the building administration, in policy and in practice in South Africa, Rwanda, and several municipalities across Africa.
    - Private businesses entrepreneurs may run these (see Akshaya telecentres in Kerala). However, other concerns need to be kept in mind under this –
        - Affordability – privately run businesses may end up excluding women if they charge a high user fee. Hence agreements with the private sector may need caps on user fees and/ or subsidy arrangements to ensure accessibility for women.
        - Data privacy – PPP agreements must have data confidentiality clauses to protect user interests.
    - Women SHGs running these services could ensure that female citizens are more comfortable using these (due to female intermediaries) than those run by men (see barriers related to constraint on male-female interaction). For example, between 1990s and early 2000s, Grameen Telephone, Bangladesh, used female and male operators to offer access to shared phones. It was found that where the operators were female, more than 80% of the users were female. With male operators, a little over 5% of the users were female (Hafkin & Taggart, 2001). Some community access initiatives have specifically targeted women as community representatives and network operations personnel to counter the dominance of men traditionally in such initiatives (see Zenzeleni Community Access Network, South Africa).
- Overcome social constraints on physical mobility or residential/economic mobility by choosing appropriate location. This may be a local school, public library or a community center. Research on tele-center use in Bangladesh and Sri Lanka has

shown the importance of physical location of the tele-center in determining awareness and use (further reading). Moreover, ensure that even remote locations enjoy access to public access points.

- Timings: depending on assessment questions on women's time constraints, leisure time etc.
- Design: design of public access centers should be conducive to women's use and comfort. Research has shown that in some countries, one of the highest uses of public access points is to access online pornography. Often the cubicle-type design which allows for privacy, facilitates this kind of use. This can be a discouraging factor for women's use of public access points. Therefore, public access point design is an important aspect which should be considered.
- Even if public access facilities are providing services at a low cost, women still may find it unaffordable.
- Overcome social constraints on interaction between the sexes by keeping the gender of the staff that will operate the public access center in mind. If it is not feasible to have a female-only staff, then an alternate could be to ensure female staff are in place at specific times of the day (considering the times of the day that women would generally make use of public access centers).
    - If the public access centers are to be run by private organizations, stipulating a design suitable for women's needs in license agreements or authorizations would be required. Incentives to female self-help groups or other civil society organizations could be a way of ensuring gender sensitivity. Having female staff will encourage women to visit as well as to ask for support when they need technical assistance.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Universal service policy: public access initiatives | Social constraints on physical mobility<br><br>Social constraints on economic/residential mobility | - Number of women users as proportion of total users of public access point/citizen service centers<br><br>The following can be arrived at through user feedback survey of people using the public access center (Likert scale can be used for gauging satisfaction).<br><br>- Number of women who expressed satisfaction with the location of the public access center (safety/ease of commute) as a proportion of total female users.<br><br>- Number of men who expressed satisfaction with the location of the public access center (safety/ease of |

| | | |
|---|---|---|
| | | commute) as a proportion of total male users. |
| Universal service policy: public access initiatives | Social constraints on interaction between the sexes | The following can be arrived at through user feedback survey of people using the public access center (Likert scale can be used for this):<br>- Number of women users who viewed the intermediary at the Public Access Point/ CSC (male or female) as approachable, as a proportion of total female users.<br>- Number of male users who viewed the intermediary at the Public Access Point/CSC (male or female) as approachable, as a proportion of total male users. |
| Digital Government: G2C/G2B | Lack of last mile network infrastructure<br>Limited device ownership due to unaffordability<br>Unaffordability of Voice/Data services<br>Lack of digital literacy | - Number of women users as proportion of total users of public access point/ Citizen service centers.<br>The following can be arrived at through user feedback survey of people using the public access center (Likert scale can be used for this):<br>- Number of women who expressed satisfaction with the location of the public access center as a proportion of total female users<br>- Number of men who expressed satisfaction with the location of the public access center as a proportion of total male users.<br>- Number of women users who said the service was affordable as a proportion of total female users.<br>- Number of male users who said the service was affordable as a proportion of total male users.<br>- Number of women users who viewed the intermediary |

| | | |
|---|---|---|
| | | at the Public Access Point/ CSC (male or female) as approachable, as a proportion of total female users.<br>- Number of male users who viewed the intermediary at the Public Access Point/CSC (male or female) as approachable, as a proportion of total male users. |
| Last mile connectivity | Social constraints on economic/residential mobility | - Number of women users as proportion of total users of public access point/ Citizen service centers.<br>The following can be arrived at through user feedback survey of people using the public access center (Likert scale can be used for gauging satisfaction):<br>- Number of women who expressed satisfaction with the location of the public access center as a proportion of total female users.<br>- Number of men who expressed satisfaction with the location of the public access center as a proportion of total male users. |

#### 4.1.2.4. Program design to ensure content suitable for women's needs

This can be done through the following:

- **Co-creation**: Can be done through an Innovation Support Program, a competitive financing mechanism for privately designed apps geared to develop pro-poor solutions. Female targeted apps, and participation of female coders can be encouraged by stipulating these as criteria in the call for proposals to receive the grant (see here for an example).
- **Set criteria for prioritizing gender-specific e-government services**: For example, for e-transformation project in Moldova, pre-selection criteria included: (a) low cost and short implementation timeframe (b) targeted citizens or businesses (c) minimal need for back end infrastructure, (d) well defined and functioning business processes. At the selection stage, criteria included: (i) urgency and relevance; (ii) outreach; (iii) existence of key enablers; (iv) back office readiness; (v) level of complexity; (vi) legal and regulatory framework; (vii) leadership and political will; (viii) user readiness, (ix) sustainability, (x) external factors. An additional criterion of 'relevance to women' can be used to generate relevant content.

- **Citizen feedback forums** can also facilitate the process of knowing what female services female netizens would specifically prefer being prioritized. This could be both in the form of generic portals soliciting feedback on different governance initiatives, but also feedback on specific apps and services provided by the government. At the assessment stage itself, discussion with women's groups/ sample of targeted citizens on how to prioritize e-government services, may help ensure relevance of content.

Additionally, relevant content design may further be helped if data is available on women's socio-economic indicators vis-a-vis that of men, to enable policymaking. In the long term, increasing representation of women in STEM and in policymaking may help avoid the pitfalls of male centric program design.

|  Related ICT Interventions |  Barriers/Opportunities |  M&E Indicators |
|---|---|---|
| Digital Government: G2C/G2B | Lack of substantive content suitable for women's needs | **Input indicators:**<br>Innovation Support Programs<br>- Number of women coders/ participants as a proportion of total participants of Innovation Support Programs<br>- Number of digital government service delivery app targeted at women, as proportion of total digital government service delivery apps created through the program<br>Using criteria to ensure digital government services targeted at women<br>- Number of digital government services exclusively targeted at women as proportion of total digital government services created as a result of the project<br>- Number of digital government services with functionality for taking user feedback<br>- Number of digital government services targeted at women, with functionality for taking user feedback |

| | | |
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| | | **Output indicators:**<br>The following can be gauged through a user feedback survey embedded within the digital government service (Likert scale can be used for this):<br>- Number of women users who expressed satisfaction with the digital government service as a proportion of total female users<br>- Number of male users who expressed satisfaction with the digital government service as a proportion of total male users |

#### 4.1.2.5. Program design to ensure comprehensible content

- In cases where language problems are identified, ensure that the applications and services are available in all local languages.
- In cases where literacy problems are identified, ensure that all digital content includes audio and/or visual aid rather than being purely text based.
- RTI/ATI policy and legislation should ensure that there are no requirements made on language of query submission. Moreover, network of CBOs and hotlines (e.g. Kothamale Radio Station in Sri Lanka) may act as intermediaries to ensure that literacy is not a barrier to filing RTI enquiries.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Digital Government: G2C/G2B | Lack of comprehensible content | The following can be gauged through a user feedback survey embedded within the digital government service (Likert scale can be used for this):<br>- Number of female users as a proportion of total users of the digital government service.<br>- Number of female users who expressed satisfaction with the mode of delivery of the digital government service (language/audio/visual etc.), as a proportion. |

| | | |
|---|---|---|
| Right to Information/Access to Information | Lack of comprehensible content | - Number of RTI requests made by women through app CBOs as proportion of total RTI requests made by women.<br>- Number of RTI requests made by men through app/CBOs as proportion of total RTI requests made by men. |

#### 4.1.2.6. Ensure provision of functional specifications (in built gender budgeting formats) to vendors

This would help capitalize on the opportunity of implementing an effective gender-budget.

The IFMIS logical framework and technical architecture are often built by vendors. At the time of procurement/contract negotiation, the partner government will have to issue the necessary functional specifications to the vendor. These would include the need for the system to have in-built formats for preparing the gender budgets for each department and links to details that form the basis of gender budgeting (see here for an example of functional requirements issued by a government to the vendor).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Digital government: G2G/ G2E | Opportunity for effective gender-budgeting | - Number of sub-national governments that have gender budgets.<br>- Expenditures allocated for women specific development (as seen in the gender-budget) as proportion of total expenditures earmarked in the national/sub-national budget.<br>- Actual expenditure as proportion of planned expenditure under different heads of the gender-budget. |

#### 4.1.2.7. Provide Offline Support/Intermediated access

Intermediated access is a confidence building measure in providing digital services to the previously unserved/digitally/financially excluded (Gurumurthy and Chami, 2016). In case of providing cash transfers through conventional or mobile banking channels or use of e-vouchers, this intermediation may take the shape of -

**Mobile money agent or banking correspondent**: Scharwatt and Minischetti (2014) found that a trusted agent network helps attract long term female customers to mobile money. Moreover, 'roving agents' may also help them overcome barriers of mobility, time constraints, cost of commute etc. This implies that for an ICT enabled transfer/e-voucher scheme to be a success, governments must encourage banks/MNOs to adopt a larger network of agents. Moreover, if there are social constraints on interaction between the sexes or there is fear of data privacy violation they may emphasize the on-boarding of female agents and banking correspondents.

**Offline scheme support:**

E-vouchers/cash transfers may be a critical service which, in case of exclusion, may cause considerable hardship to the vulnerable. In this case, it becomes important to ensure:

- A back-up manual process of transfer, at least in the teething stage of using ICT modalities.
- A well-informed agent as the Point of Contact (PoC) for grievance redressal. It must be ensured that such a grievance is filed irrespective of whether the PoC thinks it's critical and communicated to the right authority immediately. This could be done using a web or mobile app, and a manual backup also maintained to avoid data loss. The complainant should be provided a receipt as proof.
- Regular monitoring should be conducted, ideally by non-governmental organizations.
- There should be monthly reviews: complaints and their resolution must also be monitored till resolution internally.

The Philippines Conditional Cash Transfer Mechanism maintains some of these characteristics (Gurumurthy and Chami, 2016).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| G2P payments through bank accounts<br>G2P mobile based payments | Lack of trust in modern technology | - Number of grievances filed by female recipients as proportion of total grievances files<br>- Number of grievances filed by female recipients that were resolved, as proportion of total grievances that were resolved<br>- Number of female beneficiaries who accessed the transfer offline as proportion of total female beneficiaries<br>- Number of male beneficiaries who accessed the transfer offline as proportion of total male beneficiaries |

| | | |
|---|---|---|
| | | The following can be collected through a user satisfaction survey administered through the banking correspondent/ mobile money agent (can use Likert scale):<br>- Number of female beneficiaries who expressed satisfaction with this mode of transfer, as proportion of total female beneficiaries<br>- Number of male beneficiaries who expressed satisfaction with this mode of transfer, as proportion of total male beneficiaries |

#### 4.1.2.8. Technological innovation in program design to protect privacy

For example, South Korea's Sex Offender Alert initiative, requires authentication for data access and restricts creation of local copies of data [apart from having legal restrictions on use of the data] (Gurumurthy and Chami, 2016). This helps protect survivor privacy.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Digital Government: G2C/G2B | Fear of data privacy violation preventing uptake of services<br>Also see:<br>• Pursue privacy policy<br>• Open Data Standards while balancing privacy<br>Open standards of technical architecture to foster transparency in information being collected | The following indicators can be constructed using information from a user-feedback survey (e.g. using Likert scale). Before delivering the survey questions, the privacy protection measures taken (technological or otherwise) can be explained to users in simple language, either through text or audio/visual means, within the app:<br>- Number of female users who expressed satisfaction with the measures taken to protect data privacy, as a proportion of total female users.<br>- Number of male users who expressed satisfaction with the measures taken to protect data privacy, as a proportion of total male users . |

#### 4.1.2.9. Offline backup for e-voucher system

There are technological solutions that may be applied when there is poor connectivity. For example, in Somalia, World Food Program is using a system of encoding machine-readable smart cards with e-vouchers. Point of Sale terminals at vendors do not require network connectivity to read the card at the time of the transaction. The back-end gets updated automatically when network connectivity returns (World Food Programme, 2014).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| G2P mobile based payments | Lack of last mile network infrastructure | - Number of transactions done while system offline as a proportion of total transactions<br>- Number of offline transactions done for female beneficiaries as a proportion of total transactions for female beneficiaries<br>- Number of offline transactions done for male beneficiaries as a proportion of total transactions for male beneficiaries |

#### 4.1.2.10. E-voucher design without need for beneficiary mobile phones

A CARE and Catholic Relief Services program in Haiti provided mobile voucher code and its PIN on two separate scratch cards. Vendors had basic mobile phones, which could be used to feed in the information on the scratch cards and complete the transaction (World Food Programme, 2014).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| G2P mobile based payments | Limited device ownership due to unaffordability<br>Unaffordability of Voice/Data services | **Input indicators:**<br>- Number of e-vouchers delivered, as a proportion of total vouchers/transfer payments |
| | | **Output indicators:**<br>- Number of female beneficiaries as a proportion of total beneficiaries |

#### 4.1.2.11. Use of alternate/complementary media to increase reach of digital services

If network infrastructure (internet/mobile connectivity) is a barrier, the use of more widespread media like radio can be tapped. For example, before mobile and internet connectivity became widespread In Sri Lanka, in the Kothamale area a radio station was used as the link between the community and the internet. Listeners' queries were looked up on the internet and then relayed over the radio in the local language. Hence this not only bypassed connectivity issues but also language and literacy barriers in ICT usage (Thas, Ramilo and Cinco, 2007).

Alternate media could also include hotlines/call-centers/SMS based applications.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Digital Government: G2C/G2B | Lack of last mile network infrastructure<br>Limited device ownership due to unaffordability<br>Unaffordability of Voice/Data services | - Number of female respondents who reported having accessed digital government services through radio/television as a proportion of total female respondents.<br>- Number of male respondents who reported having accessed digital government services through radio/television as proportion of total male respondents. |

#### 4.1.2.12. Data-lite options for service delivery

It can be ensured that government service delivery apps is made as data-lite as possible to reduce expenditures on downloading, using and updating apps.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Digital Government: G2C/G2B | Unaffordability of Voice/Data services | - Number of female beneficiaries accessing digital government services through data-lite app as proportion of total female beneficiaries.<br>- Number of male beneficiaries accessing digital government services through data-lite app as proportion of total male beneficiaries. |
| G2P mobile based payments | Unaffordability of Voice/Data services | - Number of female beneficiaries accessing payment through data-lite app |

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|---|---|---|
| | | as proportion of total female beneficiaries.<br>- Number of male beneficiaries accessing payment through data-lite app as proportion of total male beneficiaries. |

### 4.1.3. Program design to increase women in cyber-security

- **Support programs and scholarships for female students**: to specifically take up courses in the domain could help increase supply of talent. Similarly, a loan scheme for training and certification with could be helpful in converting STEM professionals/ students into information security professionals.
- **Incorporate mentoring schemes** and **improved networking opportunities** can also help retain existing female personnel.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Cybersecurity | Opportunity to increase women in information security | - Number of men/ women who availed of support programs and scholarships to pursue education in information security<br>- Number of male/ female information security professionals connected to mentors/participants of networks<br>- Percentage of female employees in national/ sub-national CERTs |

### 4.1.4. Targeted actions to raise awareness of RTI among women

#### 4.1.4.1. Awareness raising for RTI that considers women's different situations and needs

- **Spread awareness about rights of access to information through easily accessible channels**. These may include, as an example, information kiosks at local markets or other gathering places of women, appropriately-designed posters in local clinics, hospitals, schools, etc. pamphlet distribution, creatively designed messaging disseminated through social media, TV and radio.
- The **inclusion of RTI in school curriculum** and textbooks can also be an effective way to raise awareness from an early stage.

- **Engage with CSOs with female interests and constituencies** to raise awareness through multiple channels and approaches (e.g., face to face meetings and workshops; posters; school education campaigns; etc.).

(Further reading)

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Right to Information/ Access to Information | Lack of awareness | **Input indicators:**<br>- Number of public advertisements issued through different channels (social media, TV, radio)<br>If awareness workshops were gender-neutral:<br>- Number of community meetings, workshops, campaigns, etc. completed by CSOs on RTI/ATI<br>If awareness workshops were exclusively held for women:<br>- Number of community meetings, workshops, campaigns, etc. completed by CSOs on RTI/ATI for women |
| | | **Output indicators:**<br>- Number of RTI requests raised by women, as a proportion of total requests raised<br>- Number of RTI answers provided to requests raised by women, as a proportion of requests answered<br>If awareness workshops were gender-neutral:<br>- Number of women trained on RTI through meetings/ workshops as proportion of total people trained<br>- Number of women who attended training on RTI expressing satisfaction with the training, as a proportion of total women who attended the training |

| | | |
|---|---|---|
| | | - Number of men who attended training on RTI expressing satisfaction with the training, as a proportion of total men who attended the training<br>If awareness workshops were exclusively held for women:<br>- Number of women trained on RTI through meetings/ workshops<br>- Number of women who attended training on RTI expressing satisfaction with the training, as a proportion of total women who attended the training |

#### 4.1.4.2. Raising government staff's awareness of the different challenges that women face

- This may include following steps:
  - Designating specific times of the day when only women will be entertained
  - Ensuring presence of female officers
  - Wherever staff training on RTI is conducted, special segments on gender sensitivity should be included. Additional training for designated officers and local representatives should focus on matters of gender sensitivity, customer service and support for requests from illiterate citizens.
  - Public awareness campaigns on government efforts to make government offices women-friendly could be useful to encourage women to approach government offices.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Right to Information/ Access to Information | Social constraints on physical mobility | **Input indicators:**<br>- Number of female information officers (with public interface) as a proportion of total information officers<br>- Number of officers trained in gender sensitivity with respect to RTI/ATI |
| | | **Output indicators:**<br>- Number of RTI requests raised by women, as a |

| | | |
|---|---|---|
| | | proportion of total requests raised<br>- Number of RTI answers provided to requests raised by women, as a proportion of requests answer<br>- Number of RTI requests made by women through physical submission as a proportion of total RTI requests made by women<br>- Number of RTI requests made by men through physical submission as a proportion of total RTI requests made by men |

#### 4.1.4.3. Simple procedures to overcome time constraints

Though time constraints plague both sexes, women may be more affected since they often must bear the double burden of economic activity as well as domestic chores. Moreover, child rearing in traditional societies continues to be the primary responsibility of women. Hence it is critical that RTP processes are as simplified as possible.

- **Provision of simple templates and forms** which can be quickly adopted by women could also help alleviate women's time constraints.
- **Make available clear guidance on procedures:**
  - Clear guidance on request procedures and requirements should be published through multiple channels in easily accessible formats).
  - Support centers and hotlines can be useful to provide extra support and guidance to women with poor literacy, in addition to other support mechanisms provided through CSOs.
  - The Tottho Appa program implemented in Bangladesh is an example of empowering women to disseminate information to women at the community level, extending the reach of government and other information.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Right to Information/ Access to Information | Time constraints | - Average time taken for RTI application to be filed and resolved.<br>- Number of female users of support centers/hotlines as a proportion of total users.<br>- Number of RTI requests raised by women, as a proportion of total requests raised. |

| | | |
|---|---|---|
| | | - Number of RTI answers provided to requests raised by women, as a proportion of requests answered. |

#### 4.1.4.4. Make available alternative methods of lodging information requests.

- **Make available alternative methods of lodging information requests**. This may include:
  - Online RTI applications through centralized website or apps
  - Intermediaries such as CSOs or other community intermediaries (Tottha Appa example in Bangladesh).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Right to Information/ Access to Information | Social constraints on physical mobility<br>Social constraints on economic/ residential mobility<br>Time constraints | - Number of RTI requests made by women through app/CBOs as proportion of total RTI requests made by women.<br>- Number of RTI requests made by men through app/CBOs as proportion of total RTI requests made by men. |

### 4.1.5. Actions to provide affordable electricity infrastructure

Associated with availability and affordability of electricity infrastructure, these solutions may be outside the scope of the TTL working to plan ICT related projects. However, we briefly discuss some general solutions for the sake of completeness. M&E indicators are not included for these sections as the target TTL may not be responsible for implementing such projects.

Firstly, expansion of base infrastructure is the responsibility of national governments. Many developing countries are embarking on these programs. However, donor agencies and philanthropic organizations are also in the fray now to provide subsidies to private Energy Service Companies and provide mini-grid access to village clusters. These mini-grids mostly run on renewable energy, and may or may not be connected to the national grid.

At a more decentralized level, subsidies to consumers or partnerships with the private sector can help provide standalone household power generators to increase affordable access to electricity (for more details, see here).

Lastly, donor agencies may be involved in investment support programs, providing support to innovators in devising the necessary solutions. Chargers operated through solar power may be one such solution.

Privately owned shops in rural areas of developing countries often provide charging infrastructure in return for a fee. However, these may be located at a distance, which may

restrict women (due to social norms on mobility, social constraints on interaction between the sexes, time constraints etc.). Hence, as a solution, the government (with donor support) could help provide access to public charging facilities. Ideas on setting these up in a manner that promotes women's usage can be derived from the section on public access.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Last mile connectivity | Lack of affordable access to electricity and charging infrastructure | N/A (outside of ICT) |
| Improving Device Ownership | | |
| Digital Government: G2C/G2B | | |
| G2P mobile based payments | | |

## 4.1.6. Program design to address lack of affordable ICT infrastructure

### 4.1.6.1. Encouraging private MNOs and retail sellers to pursue innovative pricing models for SIM cards

Develop and market bundled family SIM cards that include one SIM intended to be used by a woman. Example: Indian operator Uninor developed a sales pack of two paired SIMs and offered a special tariff plan to the owners, aimed at encouraging male household heads to see the value of women owning mobile phones (USAID, 2017).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Improving Device Ownership | Unaffordability of Voice/Data services | The following indicators can be computed through a survey administered in areas where programs for last mile connectivity/improving device ownership was introduced:<br>- Number of women with personal mobile + data connection as a proportion of total female respondents.<br>- Number of men with personal mobile + data connection as a proportion of total male respondents. |

| | | |
|---|---|---|
| | | - Average number of talk time minutes spent by women in a month<br>- Average number of talk time minutes spent by women in a month.<br>- Average data usage by women in a month.<br>- Average data usage by men in a month. |
| Last Mile Connectivity | Unaffordability of Voice/Data services | The following indicators can be computed through a survey administered in areas where programs for last mile connectivity/ improving device ownership was introduced:<br>- Number of women with personal mobile + data connection as a proportion of total female respondents.<br>- Number of men with personal mobile + data connection as a proportion of total male respondents<br>- Number of women using mobiles (irrespective of ownership) as a proportion of total female respondents.<br>- Number of men using mobiles (irrespective of ownership) as a proportion of total male respondents.<br>- Number of women accessing the internet (by mode) as a proportion of total female respondents.<br>- Number of men accessing the internet (by mode) as a proportion of total male respondents.<br>- Average number of talktime minutes spent by women in a month<br>- Average number of talktime minutes spent by women in a month |

| | | |
|---|---|---|
| | | - Average data usage by women in a month<br>- Average data usage by men in a month |
| Digital Government Service: G2B/G2C | Unaffordability of Voice/Data services | - Number of female users accessing government service delivery through the mobile app as proportion of total female users<br>- Number of male users accessing government service delivery through the mobile app as proportion of total male users |

#### 4.1.6.2. Encouraging private MNOs and retail sellers to pursue innovative pricing models for devices

Offer devices (smartphones, tablet computers, etc.) on installment plans, to help women obtain a device without a large up-front cost. This strategy has been successfully used by retail phone shops in Myanmar, at helping women (with limited disposable income) get connected for the first time through smartphones (LIRNEasia and GSMA, 2015).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Improving Device Ownership | Limited device ownership due to unaffordability | - Average price of each type of phone (basic, feature, smart), as a percentage of annual disposable income for women (before and after intervention)<br>- Hirschman Herfindahl index of device manufacturers in the country[7]. |
| Digital Government: G2C/G2B | Limited device ownership due to unaffordability | - Number of female users accessing government service delivery through the mobile app as proportion of total female users<br>- Number of male users accessing government service delivery through the |

[7] Refer to this for an explanation of the Hirschman Herfindahl index https://fraser.stlouisfed.org/files/docs/publications/FRB/pages/1990-1994/33101_1990-1994.pdf

| | | |
|---|---|---|
| | | mobile app as proportion of total male users |
| G2P mobile based payments | Limited device ownership due to unaffordability | - Number of female beneficiaries accessing transfer through personal mobile as a proportion of total female beneficiaries<br>- Number of male beneficiaries accessing transfer through personal mobile as a proportion of total male beneficiaries |

#### 4.1.6.3. Encourage R&D in cheap handsets

Supporting development of low cost devices which meet customer preferences. (E.g. Aakash tablets, or Simputer promoted by the Indian government).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Improving Device Ownership | Limited device ownership due to unaffordability | - Number of devices successfully supported<br>- Percentage difference in price between supported device and cheapest device in the market closest to the supported device in functionalities |

### 4.1.7. Awareness and capacity building; financial assistance for Intellectual Property Rights

- Awareness and training campaigns on intellectual property rights targeted specifically at women working and studying in design and development in the ICT sector.
- Financial and legal assistance to women seeking intellectual property rights and redress for infringements.

(Further reading)

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Intellectual property rights policy | Lack of awareness | - Number of patents, copyrights and trademarks applied for by women as proportion of total patent, copyrights and trademark applications. |

| | | |
|---|---|---|
| | | - Number of women supported in seeking redressal against IPR infringements. |

## 4.2. Policy formulation/research/advocacy that promotes women's inclusion

### 4.2.1. Risk-based due diligence for identification

To address lack of ID cards for KYC/due diligence for mobile money/ low value bank accounts, **Risk-based due diligence** may be followed. Financial Action Task Force (FATF, 2011) recommends the use of Risk Based Approach for regulating Anti-Money Laundering (AML) and Countering Financial Terrorism (CFT). This means that in certain circumstances, it may be logical to relax strict KYC/identity proofing requirements. Specifically:

"When a financial activity is carried out by a natural or legal person on an occasional or very limited basis (having regard to quantitative and absolute criteria) such that there is a low risk of money laundering or terrorist financing, a country may decide that the application of AML/CFT measures is not necessary, either fully or partially".

- This "limited basis" can be achieved by placing adequate checks in place to counteract money laundering/ terror financing by individual customers (Solin and Zerzan, 2010)-
    - Limits on size, frequency and volumes of transactions overall and within a pre-specified time period
    - Systemic monitoring of transactions which alerts the regulator about suspicious transaction patterns.
- As an example, Fiji's Financial Intelligence Unit allows mobile network operators (MNOs) to use 'referee letters' as identity proof. This is also true for Vodacom in Tanzania (Castri, 2013).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| G2P mobile based payments | Lack of prior identification documents | - Number of female beneficiaries getting the transfer through mobile money, as a proportion of total female beneficiaries.<br>- Number of male beneficiaries getting the transfer through mobile money , as a proportion of total male beneficiaries. |
| G2P payments through bank accounts | | - Number of female beneficiaries getting the transfer into their bank |

| | | |
|---|---|---|
| | | account, as a proportion of total female beneficiaries.<br>- Number of male beneficiaries getting the transfer into their bank account, as a proportion of total male beneficiaries. |

### 4.2.2. Policy advocacy to prevent/remove discriminatory rules and procedures

In case of discriminatory laws and procedures, a successful project to increase device ownership or establish a new identification regime, would require a component for policy advocacy to be included. This will require policy research to identify the root of the discriminatory procedure (for example, is it legislative/executive/judicial/regulatory policy), and devise ways on how to counter these. Depending on the policy-maker a policy advocacy strategy may need stakeholder identification, mobilization of affected members of the community (primarily women in this case), and identification of media through which advocacy can be impacted.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Improving Device Ownership | Discriminatory laws and procedures | - Change in monthly mobile registration rates for women (annual basis) after abolition of discriminatory laws.<br>- Change in monthly mobile registration rates for men (annual basis) after abolition of discriminatory laws. |
| Identity creation and management | | - Number of discriminatory procedures identified in current ID procedure (if already in place)/prior identification documents.<br>- Number of discriminatory procedures overturned in current ID procedure (if already in place)/prior identification documents.<br>The following would indicate whether the lack of breeder documents is a potential issue:<br>- Males, as a proportion of total male enrollees, registered through |

| | | |
|---|---|---|
| | | ○ Requisite documents<br>○ Introducer with requisite documents, and<br>○ Self-attestation<br>- Females, as proportion of total female enrollees, registered through<br>○ Requisite documents<br>○ Introducer with requisite documents, and<br>○ Self-attestation |

## 4.2.3. Privacy and security

### 4.2.3.1. Pursuing privacy policies

To ensure privacy, TTLs may have to include components for policy advocacy, Open Data standards and preparation of toolkits that can guide government agencies on how to balance privacy concerns with the need for open data.

The following resources can be accessed to understand the best practices in data privacy legislation and assess whether the target geography is suitably equipped:

1) Privacy International Website
2) OECD Work on Privacy
3) Data Protection in the European Union

In a nutshell, basic principles of data privacy require the following (World Bank, n.d.; Privacy International, n.d.):

- Consent for data collection and processing:
  - Limits on the amount of data collected
  - Should be collected with the individual's consent
  - Individuals are informed of when data is collected, purpose, who will use it and for how long.
- Purpose limitation
  - The purpose for data collection must be pre-defined and shared with the individual whose data is being collected. She must consent to the same.
  - There should be no secret purpose to the data collection.
  - There should be no 'creeping purpose'- information collected can only be used for the pre-defined purpose and deleted after use
- Data protection
  - Reasonable security safeguards are used to protect personal information from loss, use by unauthorized persons, unauthorized use by authorized persons
  - Individuals have control over their data
  - Organizations/ Data controllers should be held accountable

Open Data Standards released by governments should also incorporate these principles. Moreover, standards and principles must be accompanied by toolkits that can guide government departments on how these principles translate into actions when releasing data.

See here, here and here, for examples of some toolkits.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Digital Government: G2C/G2B | Fear of data privacy violation and surveillance preventing uptake and use of services | The following indicators can be computed using information collected through a user-feedback survey (e.g. using Likert scale). Before delivering survey questions, the privacy protection measures taken (policy or otherwise) can be explained to users in simple language, either through text or audio/ visual means, within the app.<br>- Number of female users who expressed satisfaction with the measures taken to protect data privacy, as a proportion of total female users.<br>- Number of male users who expressed satisfaction with the measures taken to protect data privacy, as a proportion of total male users . |
| Identity creation and management | Fear of data privacy violation preventing uptake of services | The following indicators may be measured through a user feedback survey (e.g. using the Likert scale), administered upon enrolment. Users can be informed in simple language about the measures taken (policy or otherwise) to protect data privacy:<br>- Number of male enrollees as proportion of total male enrollees who expressed satisfaction with the measures taken to protect data privacy<br>- Number of female enrollees as proportion of total female enrollees who expressed satisfaction with the |

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|---|---|---|
| | | measures taken to protect data privacy<br><br>The following indicators may be measured through a survey administered randomly to enrollees and non-enrollees:<br><br>- Number of male non-enrollees as proportion of total sampled male non-enrollees who cited privacy concerns as a reason for not enrolling themselves in the digital ID system<br><br>- Number of female non-enrollees as proportion of total sampled female non-enrollees who cited privacy concerns as a reason for not enrolling themselves in the digital ID system<br><br>- Number of male enrollees as proportion of total male enrollees who expressed satisfaction with the measures taken to protect data privacy |

#### 4.2.3.2. Strengthen legislation for online safety

The gaps in policies and regulations that govern ICTs with respect to ethics, privacy, security and safety and which create significant risks for women and girls, such as public information act and cybersecurity policies with limitations on internet surveillance, need to be reviewed. In particular, access to information, freedom of expression, and right to know policy need to be reviewed to see if they cover the online environment. Protection measures and reporting mechanisms need to be strengthened, through legal and policy frameworks. Care must be taken to keep definitions precise, and ensure protection of free speech.

|  Related ICT Interventions |  Barriers/Opportunities |  M&E Indicators |
|---|---|---|
| Online safety policy | Gender blind online safety legislations | - Number of complaints filed by women on account of online gender-based violence<br><br>- Number of complaints resolved as a proportion of complaints filed by women on account of online gender-based violence |

#### 4.2.3.3. Pursue open standards of technical architecture

Open standards are technical specifications to keep technologies 'open'. The definition of open standards, according to the Free Software Foundation Europe (n.d) are as below:

- subject to full public assessment and use without constraints in a manner equally available to all parties;
- without any components or extensions that have dependencies on formats or protocols that do not meet the definition of an Open Standard themselves;
- free from legal or technical clauses that limit its utilization by any party or in any business model;
- managed and further developed independently of any single vendor in a process open to the equal participation of competitors and third parties;
- available in multiple complete implementations by competing vendors, or as a complete implementation equally available to all parties.

In terms of digital government this translates into the following (Gurumurthy & Chami, 2016):

- interoperability of software platforms or applications;
- enhances citizen autonomy with respect to their choice of software and provides protection from state surveillance, as anyone can download the source code in the back-end and spot attempts to download personal data (or any other unintended bugs).

While both men and women would be beneficiaries of such openness, since women's concern for privacy rises from the additional threat of gender based violence, openness in technical architecture, becomes especially critical for them.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Digital Government: G2C/G2B | Fear of data privacy violation preventing uptake of services | - Number of digital government services where source code is publicly available |

## 4.2.4. Policies to promote affordable infrastructure

- Defining the most appropriate way to develop market completion in the supply of infrastructure services (e.g., infrastructure sharing, open access, regulation of wholesale prices, etc.) at affordable prices with acceptable quality, to encourage investment in infrastructure and innovation by competitors.
    - Allow and encourage more infrastructure sharing among private sector telecom players. Example: Countries like Mauritius, Brazil, New Zealand, US, UK among others, allow for spectrum trading, allowing for cheaper telecom infrastructure availability (Foster, 2008).
- **Encourage the development of Mobile Virtual Network Operators (MVNOs)** companies, which purchase services from major telecom operators in bulk and re-bundle to tailor to rural needs. Example: India's Aerovoyce (Medianama,2017).

- The allocation of spectrum to far more cost effective technologies than GSM outside of major centers. For example, using secondary or dynamic spectrum technologies—which are generally at a fifth of the cost of GSM using 900MHz spectrum in rural areas, and making available unutilized GSM licensed spectrum in remote areas for community access networks.
- **Consider providing capital grants or subsidies through Universal Service/ Access Funds** (USAF). Other ideas and experiences with the application of USAF can be seen here.
- Where it is commercially non-viable for private sector operators to roll out networks, an option that could be considered **is direct public investment in backbone by the government** (using universal service funds) to reduce the costs of backhaul for private sector service providers (e.g., as the Indian government has done in its national fiber optic network project).
- The government can additionally encourage **state/local governments to piggyback on national fiber backbone through wi-fi.** Example: The Indian state of Karnataka is banking on the national fiber optic network to provide last mile connectivity in all villages (Business Standard, 2016).
- **Regulatory policies favoring universal access** may be encouraged in consultation with stakeholders like internet and media activists, NGOs (For example, see the debate on Facebook's zero rated app, 'Free Basics' and net neutrality in India: here, here and here. At the same time, the provision of women's health app, Maya through Free Basics has been reported to have been effective in that 71% of the app's traffic comes through the Free Basics platform.
- Release of spectrum at affordable costs.
- If infrastructure is provided by a monopoly supplier, then the regulator should set performance rules for the provider, and incorporate alternative access strategies, such as utilizing unused MVNO spectrum, the **"freemium" model**, and **"bring your own device" model** to provide at least basic access. The freemium model provides free, slow internet (on 2G networks widely available in most countries) to ensure that citizens in remote areas and the poor would be able to access data services at least for emergency, government and other basic communications when they could not afford to buy data. Similar to the freemium model, the "bring your own device" model provides free open wifi at public places that are already connected to broadband networks (such as schools), thereby allowing citizens to access government services, perform limited web searches, and download software upgrades (Geerdts and Gillwald, 2017)

A caveat is worthwhile here - mere provision of infrastructure does not guarantee uptake of ICT tools. Barriers of affordability, social norms, digital literacy, safety/privacy may still have to be surmounted for that to happen (see example of South Africa Telecom Policy).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Infrastructure policy | Unaffordability of Voice/Data services | **Input indicators:**<br>- Annual amount of USF funds disbursed for the implementation of |

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|---|---|---|
| | | infrastructure policy that suits women's needs (i.e., public access centers; targeted vouchers and subsidies)<br>- Number of service ready areas connected through optical fibers (as provided by the government)<br>- Average price of spectrum released in the previous round |
| | | **Output indicators:**<br>- Number of telecom operators sharing infrastructure.<br>- Number of MVNOs operational.<br>- Price of voice call/minute offered by MVNO.<br>- Price of voice call/minute offered by largest telecom operator, by market share.<br>- Price of 1 GB data offered by MVNO.<br>- Price of 1 GB data offered by largest telecom operator/internet service provider, by market share.<br>- Number of women using mobile phones, as proportion of total women in the country.<br>- Number of men using mobile phones, as proportion of total men in the country.<br>- Average number of minutes women use mobile phones for talking/messaging.<br>- Average number of minutes men use mobile phones for talking/messaging.<br>- Average number of minutes women use mobile phones for internet browsing/download.<br>- Average number of minutes men use mobile phones for internet browsing/download. |

| | | |
|---|---|---|
| | | - Number of women accessing the internet (through different modes), as proportion of total women in the country.<br>- Number of men accessing the internet (through different modes), as proportion of total men in the country.<br>- Cost of 500MB (or 1GB) data as a proportion of average monthly income of males/females.<br>- Hirschman Herfindahl index of telecom operators in the area. |
| Spectrum Management policy | Opportunity to overcome unaffordability of Voice/Data services | **Input indicators:**<br>- Average price of spectrum released in the previous round . |
| | | **Output indicators:**<br>- Price of voice call/minute offered by largest telecom operator, by market share.<br>- Price of 1 GB data offered by largest telecom operator/internet service provider, by market share.<br>- Number of women using mobile phones, as proportion of total women in the country.<br>- Number of men using mobile phones, as proportion of total men in the country.<br>- Average number of minutes women use mobile phones for talking/messaging.<br>- Average number of minutes men use mobile phones for talking/messaging.<br>- Average number of minutes women use mobile phones for internet browsing/download.<br>- Average number of minutes men use mobile phones for internet browsing/download. |

| | | |
|---|---|---|
| | | - Number of women accessing the internet (through different modes), as proportion of total women in the country.<br>- Number of men accessing the internet (through different modes), as proportion of total men in the country.<br>- Cost of 500MB (or 1GB) data as a proportion of average monthly income of males/females.<br>- Hirschman Herfindahl index of telecom operators in the area. |
| Last mile connectivity | Unaffordability of Voice/Data services<br>Social Constraints on Economic/ Residential Mobility | Same as above for spectrum management policy. |
| Digital Government: G2C/G2B | Lack of last mile network infrastructure<br>Unaffordability of Voice/Data services | The following indicator can be collected through a survey:<br>- Number of women accessing digital government service as proportion of total female respondents<br>- Number of men accessing digital government service as proportion of total male respondents<br>- Number of women using digital government service through personal mobile/ internet connection as proportion of total female respondents accessing digital government<br>- Number of men using digital government service through personal mobile/ internet connection as proportion of total male respondents accessing digital government |
| G2P mobile based payments | Lack of last mile network infrastructure | - Number of men using digital government service through personal mobile/ internet |

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|---|---|---|
| | Unaffordability of Voice/Data services | connection as proportion of total male respondents<br>- Number of women using digital government service through personal mobile/ internet connection as proportion of total female respondents |

### 4.2.5. Competition and pricing policy for affordability

- **Encourage policies which enhance competitiveness in the ICT sector** (and ultimately affordability of services) such as infrastructure sharing, open access to backbone etc. where they do not disincentivize investment, inhibit investment, and distort markets—which can sometimes be the case (Gillwald et. al., 2016).
- **Similarly, promoting competition by allowing Mobile Number Portability** (i.e., change in telecom operator without changing the phone number) could help increase competition and thus reduce prices.
- **Device affordability may be promoted** similarly by encouraging greater market entry.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Competition and pricing policy | Opportunity to overcome unaffordability of Voice/Data services | - Cost of 500MB (or 1GB) data as a proportion of average monthly income of males and females (using rates for telecom player with largest market share)<br>- Herfindahl-Hirschman index of telecom players by market share and spectrum share |
| Improving Device Ownership | Limited device ownership due to unaffordability | - Herfindahl-Hirschman index (HHI) in the telecom sector of device manufacturers |

### 4.2.6. Gender Mainstreaming in policy design

#### 4.2.6.1. Integrate gender into relevant strategies, policies, plans and budgets.

- **Set clear measurable targets for ICT sector outcomes:** Access, female employment, female enrollment in STEM education, etc. across sectors, plans and so on.
- Further, s**et clear accountability structures** for achieving targets and implementing gender strategies (Further reading).
- **Identify leadership to prioritize gender at the highest level of government.** The ITU encourages the identification of a ‘gender champion’ to ensure commitments to

gender equality are followed through (further reading). The prioritization of gender in this way as well as awareness raising, can help to signal its importance to stakeholders.

#### 4.2.6.2. Constitute gender committees and expert groups:

A committee of gender and ICT experts (female or male) could be established with a mandate to ensure gender sensitivities are considered at all levels of policy design and implementation. Such committees could be made accountable/answerable to the highest level of government. Their mandate should include monitoring and evaluating progress in gender equality indicators in ICT over time, with defined targets and timeframes. This requires expertise in gender studies/ intersectionality, and not simply the appointment of women to gender committees and an assessment of numbers of women and men using a service or device. There is a need to move beyond indicator to analysis of factors of inequality that descriptive indicators can mask.

#### 4.2.6.3. Enhance cooperation between stakeholders

Many ICT interventions require the cooperation of multiple government and non-government entities. For example, a digital literacy initiative might require the cooperation of commercial developers as well as government ICT as well as education ministries. Therefore, policy makers should ensure cooperation between parties through sharing of information and expertise, as well as clearly outlining the relevant responsibilities of each party (further reading).

#### 4.2.6.4. Procurement requirements for gender allocations

Public procurement has a great potential to promote gender equality. Current legislation and public contracts related especially to ICT contracts must be analyzed and recommendations or new legislation made to ensure or mandate gender equality. Further when evaluating bids and proposals gender equality criteria should be considered. Bids can be evaluated using criteria such as if gender issues have been considered, whether bidding organization has gender expertise, gender balance, opportunities for income generation for women, women's participation in the wider supply chain etc. These can be ICT infrastructure contracts, contracts to conduct training, run telecentres etc.

Further Reading: Equal opportunities for men and women in public procurement contracts

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Institutional strengthening | Lack of decision-making processes that encourage women's inclusion | - Number of measurable targets set (by department/ Ministry) on ICT outcomes that include addressing women's needs.<br>- Number of gender focused policy committees in government. |

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| | | - Number of procurement notices issued in the past year that incorporate gender.<br>- Number of policy and program proposals vetted by gender experts, as proportion of total policy and program proposals. |

### 4.2.7. Mainstream gender in PPP/PPI

This would help capitalize on the opportunity of ensuring Gender sensitivity in PPP/PPI.

- **Conduct thorough gender assessment of the PPP legal framework**: including PPP legislation directly, as well as laws and regulations governing the ICT sector that may impact PPPs. Identify and work to revise laws that promote gender bias or restricts equal benefits.
- **Establish performance-based indicators to secure benefits for females:** as local labor or as participants of supply chain as part of contracts.

For more information A sample checklist for integrating gender aspects of PPPs in the PPP legal framework
Guidelines and procedures for integrating gender in PPP infrastructure projects found in Volume 4 (Annexes) of the National Government Agency PPP Manual

More reading Gender Impact of Public Private Partnerships - Literature Review Synthesis Report

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Public-Private Partnership (PPP) and Public-Private Interplay (PPI) design | Opportunity to promote women's inclusion in PPP/PPI | **Input indicators:**<br>- Number of revisions recommended to legislation to make PPP/PPI contracts gender transformative<br>- Number of revisions made in model PPP/PPI contracts to make them gender transformative |
| | | **Output indicators:**<br>- Number of contracts that secure benefits for females (as local labor or as participants of supply chain) as proportion of total PPP/PPI contracts signed in past year |

### 4.2.8. Re-engineer processes to increase accessibility for women

Analyze current business registration process to make the process easy for women from the perspective of:

- Location of offices [to account for barrier of mobility, social constraints on interaction between the sexes, cost of commute, lack of time]: If the process requires applicants to go physically it should be located conveniently (in town with access to public transport) and should have female office staff to encourage women to clarify/ discuss any issues they might have over the process.
- Documentation required [due to lack of prior identification documents].
- Cost of registration or licensing (encourage governments to provide waivers for new SMEs).
- Number of times applicant must be visited, ability to do business registration online or by post etc. Information required for registration should be available online clearly and accurately to avoid unnecessary multiple visits. [especially in lights of social norms constraining mobility, cost of commute, lack of time].
- Consider assigning mobile workers to reach out to women's businesses and enabling on-field registration.
- Encourage governments to consider special tax rates that encourage women-owned/managed SMEs to develop. Promote governments to consider exempting them from paying the Business Income Tax for a stipulated time period such as for the first two years of operations.
- Streamline the trade process to reduce costs, non-tariff barriers and time which disproportionately affect SMEs and therefore female entrepreneurs through processes such as single-window.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Facilitating digital entrepreneurship | Unfavorable business climate | - Number of female users of the online business registration process as a proportion of total female users.<br>- Number of male users of the online business registration process as a proportion of total male users.<br>- Number of visits to government offices required to register business.<br>- Percentage of female digital entrepreneurs engaged with international clients. |

### 4.2.9. Pursue open public data architecture with adequate privacy checks

Open Data refers to data "which anyone can use for any purpose, without restrictions" (UN, 2013). This is critical to capitalize on the opportunity of data for gender planning. In turn, it enables a 360-degree view of women's socio-economic development through grouping and inter-linking of multiple databases. This database would then not only help policymaking, program design and the content of relevant services, but would also highlight where data collection is lacking, and needs supplementing (Gurumurthy & Chami, 2016) (See Girl Impact Map, Rwanda for an example of how open data can lead to a tool to aid development planning).

However, providing so much data online can be problematic in terms of privacy and raise concerns of surveillance possibilities (which, while important to both men and women, pose an additional risk of gender based violence to women). This could be true even when traditional steps like anonymization are undertaken before making data public. For example, Sweeny, Abu and Winn (2013) showed that linking 'anonymized' data from the Personal Genome Project (which did not include names but had information on date of birth, gender and zip code) with data from electoral rolls enabled them to identify up to 97% of the profiles.

To guard against this, government agencies need to be alert to the need to address privacy concerns. This could involve steps like conducting a risk-benefit analysis before implementing an open data program, incorporating privacy concerns in each step of the data cycle (collection, maintenance, release and deletion), codifying operational structures for data management and maintaining transparency about data management policies (Green et. al, 2017).

The first step would be to devise Open Data Standards and then developing toolkits for operationalizing the same.

See here, here and here, for examples of some toolkits.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Digital government: G2G/ G2E | Fear of data privacy violation preventing uptake of services | **Input indicators:**<br>- Number of trainings held in the previous year to sensitize government staff on privacy safeguards while making data open . |
| | | **Output indicators:**<br>- Number of government departments that have a manual for operationalizing open data standards. |
| Digital Government: G2C/G2B | Data for gender planning | - Number of reported instances of privacy violations in a year on account of |

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| | | government data being leaked.<br>- Number of datasets available online, with gender disaggregated information.<br>- Number of variables on which data for the country's women are available. |

### 4.2.10. Reduction and removal of taxes and duties

In the formulation or review of ICT sector taxation policy, the following actions can be considered:

- **Reduce (or remove) sector-specific taxes to increase affordability:** The GSM Association has argued for the removal and reduction of sector-specific taxes to promote affordability of services for women who face greater affordability constraints than men. For example, the Sri Lankan government removed a 10% levy imposed on internet services in 2017, in recognition of the potential to increase internet penetration.
- **Exempt ICT devices from value-added tax (VAT):** The exemption of mobile handsets from VAT in Kenya in 2009 was shown to have led to an increase in handset purchases by more than 200% (Deloitte and GSMA, 2011). It is likely that many of the new handset owners would have been women, since women rarely get connected first in a household; once the household can afford a second or third handset, the female members may get connected (LIRNEasia & GSMA, 2015).
- **Reductions in import taxes on network equipment can promote affordability** of end services (Deloitte and GSMA, 2011).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Taxation policy | Opportunity to overcome limited device ownership due to unaffordability | - Tax rate on mobile devices.<br>- Percentage reduction on tax rate imposed on mobile devices. |
| Taxation policy | Opportunity to overcome unaffordability of Voice/Data services | - Tax rate imposed on Voice/Data services on a monthly basis.<br>- Percent reduction in tax rate imposed on Voice/Data services.<br>- Import duty on network equipment import. |
| Improving Device Ownership | | **Input indicators:** |

| | | |
|---|---|---|
| | Limited device ownership due to unaffordability | - Tax rate on mobile devices<br>- Percentage reduction on tax rate imposed on mobile devices |
| | | **Output indicators:**<br>- Percentage of population owning mobile devices, female<br>- Percentage of population owning mobile devices, male |

### 4.2.11. USAF to reduce device cost

USAF can be used to hand out subsidies for devices. Caution needs to be exercised in the case of device vouchers/subsidies to prevent or minimize system leakage (i.e., male household/family members taking control of the device, either for their own use or for resale), corruption, cost of allocation exceeding benefits, and misdirection of subsidies.

### 4.2.12. Policies to ensure affordable international termination rates and efficient international data transmission

Regulators should be empowered with tools and information to ensure international termination rates offered by domestic operators are reasonable, and calculated according to some transparent basis, for example, cost-based. This is especially important with respect to international termination rates from countries where significant proportions of the population have migrated for work. Besides voice calls, this could also include international IP transit and peering policy to make international data transmission over the internet easier and faster.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Interconnection policy | Unaffordable international connectivity | - Cost of a three-minute call from destination country to home country.<br>- Aggregate monthly number of incoming call minutes from destination countries. |

### 4.2.13. Licensing policy that positively discriminates in favor of women

As discussed above, lower labor force participation rates and gender wage gaps translate into women having lower disposable incomes and purchasing power (in general, as also over ICT devices and connections. In this scenario, licensing policy could be designed to incentivize MNOs to place mobile towers on the roof of homes with women-headed

households as also buildings housing operations of micro and small women entrepreneurs. Since setting up mobile towers entails financial incentives to the owner of the dwelling (on which the mobile tower is placed), this would afford additional income to the concerned women.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Licensing policy | Opportunity to provide additional source of income to women | - Number of towers placed on buildings owned by female-headed households or female-owned micro and small businesses as proportion of total towers placed<br>- Value of financial incentives to dwelling-owners for setting up mobile towers in homes of female headed households or female owned micro and small businesses as proportion of total incentives |

### 4.2.14. Use of appropriate indicators of QOS

QOS testing and regulations should apply to a broad range of indicators on QOS, recognizing if and where women's use may differ from that of men. Where use is limited to downloading and browsing, down/upload speeds (kbps) is the key indicator to monitor. Where use also includes transactions, streaming, VOIP, or playing online games, measures such as Latency (round trip time, or RTT), Jitter and Packet Loss become important measures of QOS, to understand if women are differently affected by quality than men. Similarly, QOS regulation and monitoring should consider the types of access (fixed or mobile) that is primarily used by women in a particular country.

Since women often have lower levels of digital literacy, it would be beneficial to complement QOS regulation with targeted trainings that make them aware of different technologies and service levels, such as the things for which they could use 2G  Free slow internet (basic communications/emergency services) and for which they would require more bandwidth. This training could help women purchase suitable data packages and maximize their usage of available data using all sources.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Quality of Service Regulation | Opportunity to ensure QoS indicators account for women's differential usage | - Number and type (down/upload speeds; Latency, Jitter, Packet Loss) of measures of broadband QOS stipulated and monitored by regulator. |

## 4.3. Focus on strengthening the data ecosystem

### 4.3.1. Building institutional capacity to mainstream gender in data collection

Data is key for decisions making at any level, as well planning, monitoring and evaluation. In their ICT policies, sex disaggregated data collection should be made a priority. Rather than enforcing service providers to supply sex disaggregated data on subscribership and use (which would require service providers to collect gender data from customers, which has privacy implications), sex disaggregated data on access and use should come from demand-side research. This can be through stand-alone surveys or through questions tacked on to nation-wide socio-economic surveys. For instance, if the national consumption survey has questions on whether any household member has access to use internet facility, it can be adapted to allow better understanding of the challenges that women face, by asking whether the household member is male or female. Similarly, questions can be inserted on computer/phone ownership/ability to use

Resources on gender and ICT survey design and implementation can be found here. Sex disaggregated skills and employment data for the ICT sector can be collected through national labor force surveys, national digital literacy surveys as well as directly from ICT sector players.

As recommended by the Broadband Commission, data should be collected in accordance with international guidelines to ensure comparability across time (and country). Furthermore, the Broadband Commission recommends the sharing of research among stakeholders in a 'safe and secure manner, within the limits of data protection requirements, privacy considerations, and commercial confidentiality' (further reading).

All data should be made publicly available for stakeholders to take into consideration in their decision making.

To summarize, this would require the following activities:

- **Enumeration of areas where gendered data is required** – note that gender data is critical for all policy-making, though we are only talking about ICT use here.
- **Mapping of data gaps** – i.e. areas where gendered data is currently not being collected – either because of lack of any survey in that domain or because of lack of gender reporting.
- **Design of research instruments to ensure gendered response.** This would also involve designing a results framework, and design of summary KPIs for institutional and public consumption.
- **Capacity strengthening to analyze the data**.
- **Publishing M&E indicators data (disaggregated by gender) consumption**.

### 4.3.2. Use Big Data to understand how women and girls use the Internet

Another emergent opportunity is to make use of big data to understand how women and girls use the internet. While behavioral big data such as pseudonymized call detail records of a population often contains no demographic or gender characteristics associated with it,

techniques are emerging that can potentially provide sex disaggregated insights. These techniques involve the use of targeted surveys that generate both the requisite gender and related demographic surveys along with detailed call detail record behavior for this sample. This set is then utilized to infer gender and other demographic characteristics of large scale pseudonymized call detail records (See for example Blumenstock, Cadamuro & On, 2015).

The Broadband Commission encourages the sharing of research among stakeholders, in a 'safe and secure manner, within the limits of data protection requirements, privacy considerations, and commercial confidentiality' (further reading).

Gender targeted steps in this would be to increase capacity of statistical organizations to do this. This would involve:

- Infusion of fresh talent, namely GIS experts and data analysts with requisite qualifications and experience. They should also have expertise in handling the necessary software.
- Purchase of requisite software: for GIS Mapping, web-scraping, and other big data analytics/modeling.
- Capacity building/training of existing resources on analyzing big data and GIS mapping

|  Related ICT Interventions |  Barriers/Opportunities |  M&E Indicators |
|---|---|---|
| Institutional strengthening | Lack of actionable sex disaggregated data | **Input indicators:**<br>- Number of GIS Experts/ Big data analysts employed in government statistical organizations.<br>- Number of training sessions held in a year to train staff on GIS mapping/big data analysis/modeling. |
| | | **Output indicators:**<br>- Number of nationally representative indicators on ICT use/ownership, available by gender, in the public domain.<br>- Number of female staff who attended training held on GIS Mapping, Big data analysis and modeling in the past year as a proportion of total female employees in the technical domain.<br>- Number of male staff who attended training held on GIS mapping, big data analysis and modeling in the past year as a proportion of total male |

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| | | employees in the technical domain.<br>- Number of female training attendees who expressed satisfaction with training (on Big data analysis and modeling) as a proportion of total female attendees.<br>- Number of male training attendees who expressed satisfaction with training (on Big data analysis and modeling) as a proportion of total male attendees.<br>- Number of employees of statistical organizations using Big Data and Modeling in their regular work as proportion of total technical staff.<br>- Number of Big data projects implemented in the past year to collect information on gendered use/access of ICT. |

Additionally, if the country is at a relatively advanced stage of implementing digital government, there exists the additional avenue for sex disaggregated data.

## 4.4. Capacity building

### 4.4.1. Institutional Capacity Building

#### 4.4.1.1. Capacity-building programs for decision makers

Capacity building programs for decision makers in government (top ranking civil servants working in the relevant ministries and regulatory bodies) can help to develop gender expertise in ICTs. This kind of training need not be limited to those in the ICT sector only, but in all relevant sectors that will play a role in the implementation of ICT policy (e.g., health and education departments; population registry departments).

The aim of this training would be to help them understand the following:

- Identifying pertinent issues of gender inequality: For example, (using sex disaggregated data collected by the government or non-governmental sources), they must be able to identify whether women have access to internet. If not, they should be able identify the gender barriers – affordability, lack of last mile coverage combined with constraints on their economic/residential mobility or social norms that cause this imbalance.

- Setting objectives and measurable targets for gender equality: This would not only aid M&E but also prioritize programs and policies.
- Accounting for gender when planning and implementing policies: for example, while undertaking regulatory reform in terms of increasing prices of VoIP services (over and above internet charges), they must be able to identify concerns related to affordability (if applicable). This would help them identify solutions or experts to contact for support.
- M&E of programs through design of result frameworks that incorporate women's different situations and needs, collection of sex disaggregated data, processing and analyzing the data to draw actionable consequences.

See here for further understanding.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Institutional strengthening | Lack of institutional capacity on gender<br><br>Lack of decision-making processes that promote women's inclusion | **Input indicators:**<br><br>- Number of gender sensitization training sessions held in a year. |
| | | **Output indicators:**<br><br>- Number of female staff who attended gender sensitization training as proportion of total female staff, in the past year.<br><br>- Number of male staff who attended gender sensitization training as proportion of total male staff, in the past year.<br><br>- Number of female training attendees who expressed satisfaction with training attended, as a proportion of total female staff who attended the training.<br><br>- Number of male training attendees who expressed satisfaction with training attended, as a proportion of total male staff who attended the training.<br><br>- Number of female training attendees who reported using the training in their daily operations x months after the training, as a proportion of total female staff who attended the training. |

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| | | - Number of male training attendees who reported using the training in their daily operations x months after the training, as a proportion of total male staff who attended the training. |

#### 4.4.1.2. Capacity training for staff implementing policies/ data collection that considers women's different situations and needs

Training programs must be conducted for staff actually responsible for implementing plans and programs. This would require conducting an organizational training needs assessment first, mapping designations and jobs roles to the nature of training required (in line with gender equality objectives (European Union, 2016). For example, it may be necessary to train data collectors of National Statistical Organizations on the new survey instruments developed, how to speak to women respondents especially in culturally **conservative contexts etc.**

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Institutional strengthening | Lack of institutional capacity on gender<br>Lack of decision-making processes that promote women's inclusion | **Input indicators:**<br>- Number of gender sensitization training sessions held in a year. |
| | | **Output indicators:**<br>- Number of female staff who attended gender sensitization training as proportion of total female staff, in the past year.<br>- Number of male staff who attended gender sensitization training as proportion of total male staff, in the past year.<br>- Number of female training attendees who expressed satisfaction with training attended, as a proportion of total female staff who attended the training.<br>- Number of male training attendees who expressed satisfaction with training attended, as a proportion of total male staff who attended the training. |

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| | | - Number of female training attendees who reported using the training in their daily operations x months after the training, as a proportion of total female staff who attended the training.<br>- Number of male training attendees who reported using the training in their daily operations x months after the training, as a proportion of total male staff who attended the training. |

#### 4.4.1.3. Review recruitment procedures in government and other sectors: Ensure gender experts

Important to ensure that there are gender experts in all relevant organizations. These experts should also be well-versed with specific ICT sector issues. Moreover, the decision-making process must incorporate the expert's views at an early stage of the process itself, so that this does not remain an administrative check only. These experts can also provide inputs into the M&E process.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Institutional strengthening | Lack of institutional capacity on gender | **Input indicators:**<br>- Number of recruitment notices for gender experts, as a proportion of total annual recruitment notices, by department/ministry. |
| | | **Output indicators:**<br>- Number of gender experts by department/ministry. |

#### 4.4.1.4. Institute gender economics courses in national universities

Important to ensure that there is a talent pool for the government to tap, especially to institute policies for opportunity for effective gender-budgeting.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Institutional strengthening | Lack of institutional capacity on gender | **Input indicators:**<br>- Number of courses instituted |
| | | **Output indicators:** |

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|---|---|---|
| | | - Number of male enrollees of gender economics courses in the past year<br>- Number of female enrollees of gender economics courses in the past year<br>- Number of government employees from a gender-economics background as proportion of total economists in the government<br>- Number of departments with a gender budget |

#### 4.4.1.5. Capacity building for tackling cyber-crimes against women

- Design or strengthen an appropriate and confidential mechanism for women to report complaints (special police desk/hotline/online crime reporting platform) in consultation with gender experts and women.
- Capacity building of law enforcement officers on 2 aspects:
    - **Tackling cyber-crime:** by training officers on the latest developments on technological and legal aspects of cyber-crime investigation. Training would include cyber-forensic tools that empower law enforcement officers to investigate using digital evidence.
    - **Providing enabling environment to women to seek legal redressal against crimes:** this would help increase reporting of gender based violence, irrespective of where it is encountered – online or otherwise. Some aspects to be addressed include victim shaming, aggressive/sexist interrogation, not taking crimes such as cyber-bullying or cyber-stalking seriously.
- Introduce mechanisms to recruit more women law enforcement officers, trained in dealing with cyber-crime as women survivors may be more comfortable with female interface at the time of reporting crime.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Online safety | Lack of law enforcement capacity to handle online gender based violence | **Input indicators:**<br>- Number of officers (male/female) trained in dealing with gender based violence in online communication. |
| | | **Output indicators:**<br>- Number of cases of online gender-based violence reported to authorities in the past year as a proportion of |

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| | | total cases reported on cyber-crimes.<br>- Number of cases of online gender-based violence reported to authorities in the past year as a proportion of total cases reported on gender based violence.<br>- Number of reported cases of online gender-based violence where charge sheet was filed dealt with in the past year, as a proportion of total cases reported on cyber-crimes/<br>- Number of reported cases of online gender-based violence where charge sheet was filed dealt with in the past year, as a proportion of total cases reported on gender based violence/ |

## 4.4.2. Individual Capacity Building

### 4.4.2.1. Digital literacy/STEM training/Govt. capacity building that considers women's special needs

Training that also includes women would have to be cognizant of the following factors:

- Social constraints on women's physical mobility or economic/ residential mobility: if there are social norms that constrain women's mobility, it may be important to ensure that digital training (in so far it aims to achieve limited functions of enabling women to have operational and formal internet/ICT skills required for availing digital government services) is provided at the local level. This can be done by providing the training in an easily accessible location in the village, or over the radio/television, depending on the mode of mass media most commonly used. For example, in Philippines, a local govt. is providing free literacy training to women entrepreneurs within the barangay (smallest administrative division) (Philippine Commission on Women, 2012).
- Social constraints on interaction between the sexes: if the digital training is to be provided physically, and there are social norms constraining interactions between men and women, it may be necessary to have sex-segregated training sessions. Likewise, the instructor may also have to be female. The idea is not to perpetuate segregation of women here, but foster 'safe spaces' that provide a conducive space for learning.
- Women's lack of time/cost of commute: This assessment is necessary to ascertain training time and location. For example, it would be necessary to hold the trainings (whether physical classroom sessions or modules relayed over radio/television) at a time convenient for women (should not clash with compulsory work or domestic

responsibilities). Even if there are no social constraints on mobility, it may be necessary to hold the training (if in a classroom session) close to the village to reduce the cost/ time incurred in travelling.
    - In case of female employees in the government sector, it may be necessary to ensure such digital literacy training happens within the office premises and within office hours if lack of time to attend trainings or commute to a separate training center seem to be barriers.
    - Alternatively, if location is distant, and cost of commute is seen as an issue the following steps may be taken:
        - Reimbursement of travel costs for short term training programs.
        - Provision of free transport to short training programs.
        - Provision of travel allowances for long term training courses.
- Basic literacy levels (or lack thereof) that would influence the mode of training - learning by doing, audio and visual aided classes having more efficacy than text based learning (see example of Mahiti Manthana Initiative).
- Opportunities for women's empowerment: should be considered when devising the training (see example of Mahiti Manthana Initiative).
- Relevant content for the training can also be generated by first assessing the degree of digital skills that the target population has. Ideas for this measurement can be seen here.
- Support different and specific investment required of women to enable them to fully participate in project/training (childcare on training location, safe accommodation, travel costs if required).
- Provide continued support even after end of training program, if required: For example:
    - Participants may be linked with female role models or to a mentorship program with women in STEM. This can be done in collaboration with academia/industry.
    - Industry support can be sought to provide women with lower levels digital skills, take up online freelancing jobs such as data entry. Similarly, placement of women with more advanced skills in areas such as design, translation, coding, accounting etc. may be facilitated.
    - Organize networking events for women (or with a minimum quota for women) such as meetups, hackathons, conferences for women to engage, support, collaborate with other women in STEM.
    - Facilitate linkages between STEM graduates and tech companies and encourage a supportive work environment for women in tech at networking events.
    - All of the above can be facilitated by leveraging on partnerships with the private sector, ICT hubs and universities. Hence, it may require the program to recruit a coordinator who would be responsible for forging partnerships with the relevant private sector participants, academia to ensure classroom skilling translates into job experience. The Digital Malawi Program Phase I: Malawi Digital Foundations Project (P160533) is an example of a program that included this aspect.
- South Korea's digital outreach efforts towards female residents are seen as a successful measure since women as proportion of all internet users increased from

7.7% (1998) to 57.8% (2001) [Gurumurthy & Chami] on the back of its 'Ten Million People Internet Education' Plan in 2000. It aimed at homemakers' digital literacy with the government providing subsidies to private internet and computer training facilities to reduce price of courses for target demographic.

- It is also critical to overcome lack of trust in modern technology through a digital literacy module to address safety, privacy and dependability. This can be done by staggering the training process through time, especially if all targeted beneficiaries live in a close geographical proximity. Once the first batch is through with its training, and starts using ICT tools (such as a digital government service), others might come to trust to use the tools through others' positive experience. Alternatively, trainers can get in touch with influential people in the area (say school-teacher or representative in local government), and conduct intensive training with them. Once they start using ICT tools, demonstration effect may propel others to use it as well.

More reading of STEM programs through examples Mozilla Clubs, Girls In ICT Day

(Further reading on Changing The Game for Girls in STEM)

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Training | Social constraints on economic/residential mobility<br>Social constraints on physical mobility | - Number of women trained as a proportion of total number of people trained.<br>- Number of women trained who expressed satisfaction with location of training (commute time and money, safety etc.) as a proportion of total female attendees of training.<br>- Number of men trained who expressed satisfaction with location of training (commute time and money, safety etc.) as a proportion of total male attendees of training. |
| Training | Social constraints on interaction between the sexes | **Input indicators:**<br>- Number of female trainers as a proportion of total trainers (summed over all training programs held in the past year).<br>- Number of gender-segregated training programs as a proportion of total training programs. |

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| | | **Output indicators:**<br>- Number of women trained as a proportion of total number of people trained (summed over all training programs held in the past year).<br>- Ratio of number of female to number of male enrollees (averaged over all training programs in the past year) when instructor was female.<br>- Ratio of number of female to number of male enrollees (averaged over all training .programs in the past year) when instructor was male<br>- Ratio of number of female to number of male enrollees (averaged over all training programs in the past year) when training program was gender segregated<br>- Ratio of number of female to number of male enrollees (averaged over all training programs in the past year) when training program was mixed gender.<br>- Number of women trained who expressed satisfaction with instructor (in terms of knowledge/ approachability) as a proportion of total female training attendees<br>- Number of men trained who expressed satisfaction with their instructor (in terms of knowledge/approachability) as a proportion of total male training attendees. |
| Improving Device Ownership | Lack of digital literacy<br>Lack of trust in modern technology | - Number of female training attendees as a proportion of total attendees.<br>- Number of female training attendees as a proportion of total female attendees (question can use Likert scale) who, in a student |

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| | | feedback survey expressed satisfaction with the training, in terms of:<br>o increased knowledge of device functionalities<br>o intention to use greater device functionalities than before<br>- Number of male training attendees as a proportion of total male attendees (question can use Likert scale) who, in a student feedback survey expressed satisfaction with the training, in terms of:<br>o increased knowledge of device functionalities<br>o intention to use greater device functionalities than before<br>- Number of female training attendees as a proportion of total female attendees (question can use Likert scale) who, in a follow up reassessment 3 months post-training, were able to demonstrate familiarity with x number of device functionalities (for example for mobile phones: calling, SMS, internet browsing etc.).<br>- Number of male training attendees as a proportion of total male attendees (question can use Likert scale) who, in a follow up reassessment 3 months post-training, were able to demonstrate familiarity with x number of device functionalities (for example for mobile phones: calling, SMS, internet browsing etc.). |

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| Digital government: G2G/ G2E | Lack of digital literacy<br>Lack of trust in modern technology | - Number of female training attendees as a proportion of total female employees.<br>- Number of male training attendees as a proportion of total male employees.<br>- Number of female training attendees, as a proportion of total female attendees, who expressed satisfaction with the training on parameters of:<br>o relevance of course content<br>o instructor knowledge and approachability<br>o location and timing of training.<br>- Number of male training attendees, as a proportion of total male attendees, who expressed satisfaction with the training on parameters of:<br>o relevance of course content<br>o instructor knowledge and approachability<br>o location and timing of training.<br>- Number of female training attendees as a proportion of total female attendees who reported that training helped them in work x days after the training.<br>- Number of male training attendees as a proportion of total male attendees who reported that training helped them in work x days after the training.<br>- Number of female govt. employees using non-mandatory aspects of digital govt. platform, as proportion of total female govt. employees x days after the training.<br>- Number of male govt. employees using non- |

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| | | mandatory aspects of digital govt. platform, as a proportion of total male govt. employees x days after the training. |
| Digital Government: G2C/G2B<br><br>G2P payments through bank accounts | Lack of digital literacy<br><br>Lack of trust in modern technology | - Number of female training attendees as a proportion of total population trained.<br><br>- Number of female training attendees, as a proportion of total female attendees, who expressed satisfaction with the training on parameters of:<br>○ relevance of course content<br>○ instructor knowledge and approachability<br>○ location and timing of training.<br><br>- Number of male training attendees, as a proportion of total male attendees, who expressed satisfaction with the training on the relevance of course content. |
| G2P mobile based payments | Lack of digital literacy<br><br>Lack of trust in modern technology | - Number of female training attendees as a proportion of total population trained.<br><br>- Number of female training attendees, as a proportion of total female attendees, who expressed satisfaction with the training on parameters of:<br>○ relevance of course content<br>○ instructor knowledge and approachability<br>○ location and timing of training.<br><br>- Number of male training attendees, as a proportion of total male attendees, who expressed satisfaction with the training on parameters of:<br>○ relevance of course content<br>○ instructor knowledge and approachability |

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| | | ○ location and timing of training.<br>- Number of female beneficiaries, as a proportion of total female beneficiaries who reported accessing training on digital literacy by the govt.<br>- Number of male beneficiaries, as a proportion of total male beneficiaries who reported accessing training on digital literacy by the govt. |
| IEC | Lack of digital literacy<br>Lack of trust in modern technology | - Number of women who received digital literacy training as a proportion of total population trained.<br>If IEC campaigns are administered through different media (radio/TV/internet), the following indicators can be constructed using surveys:<br>- Number of female respondents who said they were able to access the IEC module online as a proportion of total female respondents.<br>- Number of male respondents who said they were able to access the IEC module online as a proportion of total male respondents.<br>- Number of female respondents who said they could not access the IEC module online due to lack of digital literacy, as a proportion of total female respondents.<br>- Number of male respondents who said they could not access the IEC module online due to lack of digital literacy, as a proportion of total male respondents.<br>- Number of female respondents who said they accessed the IEC module through radio/ television as a |

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| | | proportion of total female respondents.<br>- Number of male respondents who said they accessed the IEC module through radio/ television as a proportion of total male respondents. |

#### 4.4.2.2. Non-technical skills

- Devise holistic training for women by identifying technical and non-technical skill gaps after understanding how the local context affects women.
- Non-technical skills training needed maybe communication, leadership, management etc. (Examples: Mozilla Clubs, GirlsGoIT)

#### 4.4.2.3. Capacity building for entrepreneurs

- Provide holistic training for women by identifying technical and non-technical skill (entrepreneurial, leadership, communication, design, financial gaps after understanding how the local context affects women and the type of digital entrepreneurship or IT job.
- Social norms constraining women's mobility: if there are social norms that constrain women's mobility, it may be important to ensure that entrepreneurship training programs are provided at the local level. This can be done by providing the training in an easily accessible location in the village/ central location of the city/ virtually etc.
- Social constraints on interaction between the sexes: if the training is to be provided physically, and there are social norms constraining interactions between men and women, it may be necessary to have safe spaces for women. This may require sex-segregated training sessions. Likewise, the instructor may also have to be female. Even if not, special targets for female participation should be set to give it special attention.
- Women's lack of time/cost of commute: This assessment is necessary to ascertain training time and location. For example, it would be necessary to hold the trainings (whether physical classroom sessions or modules relayed over radio/ elevision) at a time convenient for women (should not clash with compulsory work or domestic responsibilities). Even if there are no social constraints on mobility, it may be necessary to hold the training (if in a classroom session) close to the village to reduce the cost/ time incurred in travelling. Support different and specific investment required of women to enable them to fully participate in project/training (childcare on training location, safe accommodation, travel costs if required).
- Provide continued support even after end of training program, if required: For example:
    - Participants may be linked to other entrepreneurs through entrepreneurship networks.
    - Can facilitate networking events for participants to access key stakeholders in the market such as buyers, suppliers, since women who have limited social circles and limited access to tech and business circles.

- Link up with digital business incubators with special mentoring for female entrepreneurs to get advice and guidance.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Facilitating digital entrepreneurship | Lack of complementary non-ICT Skills | - Number of female trainees in entrepreneur development programs/ incubator programs/ non-technical skill development programs as proportion of total trainees |

#### 4.4.2.4. Training to address lack of awareness of cyber-risks

Awareness can be raised through:

- Public campaigns conducted in a manner that suit women's needs, intermediated through ICT can help target existing users. For example, a video on how to defend again online harassment can be shared through social media to increase awareness.
- Awareness on cybersecurity/online risks can also be incorporated as a module on online security at digital literacy training.
- Cybersecurity and online safety modules can also be integrated into school curricula or through school ICT clubs.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Privacy and data protection policy | Lack of awareness of information-security/cyber-risks threats | - Number of female trainees as a proportion of total trainees in programs created to impact awareness on cyber-risks<br>- Number of female trainees who expressed satisfaction with quality of training (relevance of content, usability of content, instructor approachability and knowledge etc.) as a proportion of total female trainees<br>- Number of male trainees who expressed satisfaction with quality of training (relevance of content, usability of content, instructor approachability and knowledge etc.) as a proportion of total male trainees |
| Online Safety | Lack of awareness of information-security/cyber-risks threats | |
| Training | Opportunity to overcome lack of awareness of information-security/ cyber-risks threats | |
| Cybersecurity | Lack of awareness of information-security threats | |

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| | | x months post training, a re-assessment questionnaire may be administered to trainees to calculate the following -<br>- Number of female trainees reported having put training principles in practice in the intervening months, as a proportion of total female trainees<br>- Number of male trainees reported having put training principles in practice in the intervening months, as a proportion of total male trainees |

#### 4.4.2.5. IEC Campaigns that consider women's different situations and needs

- **Build ICT intermediated IEC campaigns to help overcome** social constraints on physical mobility **or** economic/residential mobility: This may include use of medium such as radio/ television or SMS based alerts. For example, door to door campaigns in Cambodia, to spread awareness about ante-natal care within the first month of missing a period were complemented by national advertising through television and radio (besides newspapers and magazines) (UNICEF, 2013). In locations where most women already have access to mobile devices and high speed wi-fi, consider recording training sessions and uploading onto social media platforms where women can download and view the videos whenever most convenient.
- In remote places with low mobile phone ownership especially among women, or where digital literacy is a barrier, modes such as radio and organized video showing can be more effective at reaching large groups of women. There have been many initiatives to organize women-only groups for both radio and video showing, often followed by discussions to reinforce the message and encourage women's active participation. For example:
    - Sustainable Tree Crops Program trained predominantly illiterate and semiliterate women cocoa farmers through farmer field schools and video viewing clubs, where 10-15-minute videos on agricultural knowledge were shown, accompanied by discussions (further reading).
    - FAO's Dimitra Clubs organize groups of women, men, and youth (women-only and mixed) and connect them to rural radio through solar powered radios. The clubs bring local people to face challenges and find solutions together (further reading).
- Alternatively, digital literacy may be included as program component.
- **Overcome** social constraints on interaction between the sexes**: If the (ICT enabled) IEC campaign requires human intermediation,** female trainers can help overcome

this barrier. Women's community led initiatives for training could be an important solution in this respect. For example, Mahiti Manthana initiative in Karnataka can be seen as an attempt to spread awareness about governance and political rights through women led centers. Use of ICT as mode of dissemination can also help overcome this issue.

- Time constraints: ICT modes of message delivery can be a blessing. Repeat telecast at convenient times for women (say afternoon slot when they may be through with household chores, but before the other members of the household return from work) could overcome the time constraints.
- To ensure relevant substantive content suitable for women's needs for women, before an IEC campaign is rolled out a sector, conduct a needs assessment. For example, before launching an intervention to increase agricultural awareness, it may be critical to conduct a gender analysis with (men and women's) farmer groups, documenting differences in value chains, role in value chain, literacy level, etc. Moreover, they can be quizzed about their exact needs (in terms of extension services) such that pertinent content can be covered (World Bank, 2017).
- To prevent lack of comprehensible content, limitations in literacy and language, can be covered through audio/ visual messages in local languages. This would be more effective at reaching women than text messages. For example: Farmerline's Women Advancing Agriculture initiative delivers educational voice messages in local languages directly to the mobile phones of female agricultural workers (further reading).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| IEC | Opportunity to overcome time constraints | If the training material is accessed online or through mobile apps, a question on gender can be asked before allowing access to the material.<br>- Number of women who accessed the ICT-intermediated IEC campaign as a proportion of total users.<br>If the IEC campaign is provided through radio or television where there is no mutual interaction between the end-user and the service provider, a survey may be required:<br>- Number of female respondents reported having accessed the IEC module first-hand through the relevant ICT mode through which it was delivered (e.g., number |

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| | | of female respondents who reported hearing program on agriculture techniques over the radio) as proportion of total female respondents.<br>- Number of male respondents reported having accessed the IEC module first-hand through the relevant ICT mode through which it was delivered, as a proportion of total male respondents.<br>- Number of female respondents who demonstrated awareness of programs delivered through the IEC module, as a proportion of total female respondents. |
| IEC | Lack of substantive content suitable for women's needs | - Number of female users who expressed satisfaction towards the coverage of the specific IEC modules as a proportion of total female users (Survey or information requested at the time of accessing online materials).<br>- Number of female users who expressed satisfaction towards the coverage of the specific IEC modules as a proportion of total female users (Survey or information requested at the time of accessing online materials).<br>If survey is administered, additional information on the following can be collected:<br>- Number of female non-users who cited lack of relevant content as a reason for not accessing the IEC module, as a proportion of total female non-users. |
| IEC | Lack of comprehensible content | **Input indicators:**<br>- Number of modules where audio/ visual aids were used as a proportion of total number of IEC modules. |

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| | | - Number of languages in which the IEC training modules are available as a proportion of languages spoken in the target geographical regions. |
| | | **Output indicators:**<br>- Number of female users who accessed the content in local language as a proportion of total female users (Survey or information requested at the time of accessing online materials).<br>- Number of male users who accessed the content in local language as proportion of total male users (Survey or information requested at the time of accessing online materials).<br>- Number of female users who found the content easy to understand as proportion of total female users (Survey or information requested at the time of accessing online materials).<br>- Number of male users who found the content easy to understand as proportion of total male users (Survey or information requested at the time of accessing online materials). |
| IEC | Opportunity to overcome social constraints on physical mobility or economic/residential mobility | If the training material is accessed online or through mobile apps, a question on gender can be asked before allowing access to the material.<br>- Number of women who accessed the ICT-intermediated IEC campaign as a proportion of total users.<br>If the IEC campaign is provided through radio or television where there is no mutual interaction between |
| IEC | Opportunity to overcome social constraints on interaction between the sexes | |

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|---|---|---|
| | | the end-user and the service provider, a survey may be required:<br>- Number of female respondents reported having accessed the IEC module first-hand through the relevant ICT mode through which it was delivered (e.g., number of female respondents who reported hearing program on agriculture techniques over the radio) as proportion of total female respondents.<br>- Number of male respondents reported having accessed the IEC module first-hand through the relevant ICT mode through which it was delivered, as a proportion of total male respondents.<br>- Number of female respondents who demonstrated awareness of programs delivered through the IEC module, as a proportion of total female respondents. |
| IEC | Lack of digital literacy | - Number of women who received digital literacy training as a proportion of total population trained.<br>If IEC campaigns are administered through different media (radio/ TV/ internet), the following indicators can be constructed using surveys:<br>- Number of female respondents who said they were able to access the IEC module online as a proportion of total female respondents.<br>- Number of male respondents who said they were able to access the IEC module online as a proportion of total male respondents. |

| | | |
|---|---|---|
| | | - Number of female respondents who said they could not access the IEC module online due to lack of digital literacy, as a proportion of total female respondents.<br>- Number of male respondents who said they could not access the IEC module online due to lack of digital literacy, as a proportion of total male respondents.<br>- Number of female respondents who said they accessed the IEC module through radio/television as a proportion of total female respondents.<br>- Number of male respondents who said they accessed the IEC module through radio/ television as a proportion of total male respondents. |

## 4.5. Targeted actions to influence behavior change

Social norms may often prevent women's access and usage of ICT, their presence in STEM, and consequently their entry into digital entrepreneurship.

### 4.5.1. Awareness and sensitization campaigns in educational institutions to encourage girls to enter STEM

May be done through activities like:

- "Girls in ICT day" to create awareness (Read more here: Girls in ICT day toolkit).
- Encourage girls through school clubs, holiday camp trainings for STEM exposure.
- Collaborating with tech companies and mobile operators to hold workshops in schools (For more information, read: Changing The Game for Girls in STEM).
- Build active partnership with parents and teachers: Should have a program with regular meetings to sensitize them to advantages of studying STEM, address their concerns about girls studying or joining STEM careers.
- Use female role models seen using technology to break the stereotyping of technology being seen as a male domain. For example, career guides may be prepared with profiles of women working in cyber-security/STEM. Similarly, career fairs could be organized, and care taken to invite female professionals working in STEM careers.

In addition to pure STEM fields, women and girls can also be encouraged to pursue multidisciplinary public policy degrees following their economics, law or politics

undergraduate degrees, and subsequently more motivated to get into senior management positions.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Cybersecurity | Opportunity to increase women in information security | **Input indicators:**<br>- Number of schools reached with campaigns to encourage participation in STEM (through clubs, Girls in ICT days, parent teacher meetings to exhort them to encourage daughters to enter ICT fields etc.). |
| | | **Output indicators:**<br>- Number of female students graduating from engineering courses (with a gap of the number of years required to graduate, post inauguration of awareness programs), as a proportion of total graduating students in the same year.<br>- Number of female employees in national/ sub-national CERTs, as proportion of total employees. |
| Training | Social norms against women in STEM | - Number of schools reached with campaigns to encourage participation in STEM (through clubs, Girls in ICT days, parent teacher meetings to exhort them to encourage daughters to enter ICT fields etc.) |
| Facilitating digital entrepreneurship | Low representation of women in STEM<br>Social norms against women in STEM | **Input indicators:**<br>- Number of schools reached with campaigns to encourage participation in STEM (through clubs, Girls in ICT days, parent teacher meetings to exhort them to encourage daughters to enter ICT fields etc.) |
| | | **Output indicators:** |

| | | |
|---|---|---|
| | | - Number of women students graduating out of engineering courses (with a gap of x number of years post inauguration of awareness programs), as a proportion of total graduating students in the same year<br>- Number of female employees in national/ sub-national CERTs, as proportion of total employees |

### 4.5.2. Target local communities' awareness of ICT use

- **Engage with local CBOs** to address cultural norms by interacting with community based organizations (CBOs) to understand their concerns with women empowerment and how to mitigate any conflicts. Get their support to push forward girls and ICT agenda.
- **Collaborate with tech companies and mobile operators** to design awareness programs highlighting specific benefits for women by gaining digital literacy, including access to information and job opportunities.
- Basic digital literacy can be provided to women locally and its utility demonstrated in-
    - Accessing digital government services.
    - Achieving employment through online freelancing for low skilled digital jobs such as data entry. Support can be given to set up, do practice jobs, information on how to get their payments etc.
- **Campaigns can also highlight how women's use of ICT may be tied to tangible benefits** (for example, mobile money accounts allowing for quick access to government cash transfers/subsidies). This may also help engage men and boys who may identify their self-interest in women's use of ICT tools.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Training | Social norms against women using ICT | **Input indicators:**<br>- Number of awareness programs conducted in the community to support digital inclusion for women.<br>**Output indicators:**<br>The following indicators can be collected through a survey, administered before and after a program intervention:<br>- Number of women in the community in different age cohorts who use phones for |
| Improving Device Ownership | Social norms against women using ICT | |

| | | |
|---|---|---|
| | | calling and services[8] as a proportion of women respondents in corresponding age cohorts.<br>- Number of men in the community in different age cohorts who view women's digital inclusion positively as a proportion of total male respondents in corresponding age cohorts.<br>- Number of women in the community who view women's digital inclusion positively as a proportion of total female respondents. |

### 4.5.3. Innovative campaigns to encourage Women's Device Ownership

- Oxfam's Pink Phone Project in Cambodia colored the phones in pink to signal that they belong to women, circumventing men's control of the device. The project trains local women to become community leaders (further reading).
- A women's goat rearing project in the Theni district of Tamil Nadu in India includes a mobile phone together with goats in the package, and delivers 5 voice messages on goat rearing techniques daily. To ensure women's ownership of the devices, women carried their mobile phones in surukku pai, which is a small pouch culturally associated with women's identity and objects (World Bank, 2017). (further reading)

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Training | Social norms against women using ICT | **Input indicators:**<br>- Number of awareness programs conducted in community to support digital literacy for women. |
| | | **Output indicators:**<br>- Number of women using mobile/ internet in target region (before and after roll-out of program). |

[8] In a qualitative study done on local expectations of an mHealth project in Burkina Faso, women widely reported that their husbands took away their SIM cards (both the phone and the SIM are paid by the women themselves) once they found out, so even though the women still have the phones, they can only listen to music with it but not actually use it for calling & other services.

# 4.6. Creating an enabling environment

## 4.6.1. Enabling environment for women in STEM

### 4.6.1.1. Facilitate linkages between female STEM graduates and tech companies

This is important to counter Social norms against women in STEM as well as Gender Gap in Skill/Education.

- Prevent policy hurdles in hiring female STEM graduates: Assess policies to ensure that the law is not inadvertently biased against women in STEM. For instance, a law preventing night shifts for women (for 'safety purposes') can end up discouraging their recruitment. Instead, policy makers must be sensitized to the need to strengthen law and order, adopt digital government services (through safety apps) etc. that can help address safety issues.

### 4.6.1.2. Linking with potential mentors/role models for women

- Create linkages with local tech firms to identify female mentors for STEM: these may be employees of the concerned tech firms whose profiles can be used to make career guides for use by schools/ higher educational institutions to encourage girls to enter STEM.
- Create linkages with women in STEM abroad to provide online mentorship, guidance.

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Facilitating digital entrepreneurship | Low representation of women in STEM | - Number of female role models/mentors identified to be included in career profiles.<br>- Number of women entrepreneurs connected to female mentors in the past year. |

## 4.6.2. Enabling environment for female digital entrepreneurs

### 4.6.2.1. Set up of funding mechanisms specifically targeting women entrepreneurs

Understanding that women's need for finance to develop their enterprises might be higher than men, promote financial schemes, subsidies, grants that especially support women's start-ups and scale-ups/entrepreneurial activities (low collateral needs/low interest rates etc.). Encourage financial institutes to target female entrepreneurs pro-actively whilst providing extra services such as financial literacy. Further encourage financial institutes to keep and track credit payment records and share information with other financial institutes possibly though credit bureaus. Women often have a good repayment records which might

encourage firms to lend to women who often lack sufficient collateral. For more information read Strengthening Access to Finance for Women-Owned SMEs in Developing Countries. In addition to establishing new funding mechanisms, women entrepreneurs can be referred to existing assistance schemes provided by WBG partners as well as those by other multilateral development banks (See also Section 4.6.2.4).

#### 4.6.2.2. Connect women digital entrepreneurs to investors

- Link women entrepreneurs to angel investors, venture funds by facilitating the creation of women specific entrepreneur networks and through special networking events.
- Provide support and encourage special venture funds that specifically invest in female entrepreneurs.
- Attract more women investors into traditional male centered venture capital and angel networks.
- Consider facilitating the formation of women's venture capital funds supporting women-owned enterprises.
- Encourage governments to provide incentives such as tax breaks to those who invest in female entrepreneurs.

#### 4.6.2.3. Affirmative action policies

Help government develop, revise government contracts that allow for positive discrimination of women. e.g. evaluation criteria of bids for government contracts allowing some % of marks to be allocated for women-owned businesses

#### 4.6.2.4. Develop legal environment that increases women's access to property and assets

Encourage governments to ensure non-discrimination in areas of marriage, property, and inheritance laws for women. Remove provisions requiring a male guardians such as fathers, husbands signatures to obtain loans.

#### 4.6.2.5. Mechanisms that facilitate and encourage women-centric networks to develop; hosting "meet-ups", creating membership organizations, hosting of events for women

- Facilitate or strengthen the development of networks for female digital entrepreneurs. Ensure existing networking events /trade fairs for digital entrepreneurship have quotas for females to encourage female participation and to create marketing opportunities for women.
- Organize specific women digital entrepreneurs only meetups, hackathons, and conferences (example).
- Facilitate awareness and linkages between local and international buyers and entrepreneurs/ female entrepreneur networks or technical training institutes.
- Facilitate connections with MFIs and other commercial banks and financial institutions (including those partnering with WBG/IFC and other multilateral development banks) which offer tailored financial and non-financial (e.g., training, business advisory, etc) services for women entrepreneurs.

#### 4.6.2.6. Subsidy schemes for child care facilities

Promote policies to encourage women into labor markets such as provision or promotion of affordable childcare facilities. This can be state sponsored centers as well as giving incentives for private run centers to keep costs affordable to women.

Consider subsidy/voucher schemes for women entrepreneurs.

#### 4.6.2.7. Encourage communication between government and private sector on areas of difficulty for women digital entrepreneurs to develop appropriate solutions

In order to provide an enabling environment (with regard to policy, regulation, taxation, import/export regulations etc.) for women entrepreneurs to flourish, governments need to understand the specific barriers faced by women digital entrepreneurs. Establishing mechanisms for governments to gather information on these barriers can be a solution in this regard. An example of this kind of gender-targeted action with positive results was the coordination by IFC of a government-private sector forum in Cambodia to facilitate communication specifically on the concerns of women entrepreneurs in relation to dealing with government (e.g., paperwork, regulation, discrimination, etc.), to enable the development of appropriate solutions (Further reading).

| Related ICT Interventions | Barriers/Opportunities | M&E Indicators |
|---|---|---|
| Facilitating digital entrepreneurship | Limited access to finance to start or grow businesses | **Input indicators:**<br>- Number of networking events organized for female digital entrepreneurs. |
| | | **Output indicators:**<br>- Number of female digital entrepreneurs supported through specialized support schemes.<br>- Number of women entrepreneurs who attended organized networking events as a proportion of total entrepreneurs who attended. |
| Facilitating digital entrepreneurship | Lack of access to entrepreneur networks/ markets | **Input indicators:**<br>- Number of networking events organized for female digital entrepreneurs. |
| | | **Output indicators:** |

| | | |
|---|---|---|
| | | - Number of women entrepreneurs who attended organized networking events as a proportion of total entrepreneurs who attended (where event was “mixed”). |
| Facilitating digital entrepreneurship | Lack of access to affordable, convenient early child facilities | **Input indicators:**<br>- Number of subsidized child care centers providing affordable facilities.<br>- Expenditure on subsidies to private childcare providers/ vouchers to mothers to provide affordable childcare to women. |
| | | **Output indicators:**<br>- Number of children enrolled in subsidized childcare facilities |

# 5. References

A4AI (2015). *Women's Rights Online: Translating Access into Empowerment.* http://webfoundation.org/docs/2015/10/womens-rights-online21102015.pdf.

A4AI (2016, February). ***The 2015-2016 Affordability Report***. http://1e8q3q16vyc81g8l3h3md6q5f5e.wpengine.netdna-cdn.com/wp-content/uploads/2016/04/A4AI-2015-16-Affordability-Report.pdf.

ADB. (2014). ***Institutional Strengthening Framework A Guidance Note***. https://www.adb.org/sites/default/files/publication/42830/institutional-strengthening-framework-guidance-note.pdf

AFI. (2016). ***Policy frameworks to support women's financial inclusion***. https://www.afi-global.org/sites/default/files/publications/2016-08/2016-02-womenfi.1_0.pdf

AkiraChix (2015, May). ***Women in STEM: Attitudes and motivations for women using technology & entering technology careers in Kenya***. https://drive.google.com/file/d/0B3Epr0-LCzppaGdNeHJIZnMwWDQ/view.

Alliance for Affordable Internet (A4AI). (2016). ***Affordability Report 2015/16***. http://1e8q3q16vyc81g8l3h3md6q5f5e.wpengine.netdna-cdn.com/wp-content/uploads/2016/04/A4AI-2015-16-Affordability-Report.pdf

Alliance for Affordable Internet (A4AI). (2017). ***Affordability Report 2017***. http://1e8q3q16vyc81g8l3h3md6q5f5e.wpengine.netdna-cdn.com/wp-content/uploads/2017/02/A4AI-2017-Affordability-Report.pdf

APC (2016). ***Ending digital exclusion: Why the access divide persists and how to close it*****.** https://www.apc.org/en/pubs/issue.

APC/GenderIT.org. (2015). ***Bosnia and Herzegovina: Exploring technology-related violence against women*****.** Johannesburg: APC. http://www.genderit.org/edition/bosnia-and-herzegovina-exploring-technology-related-violence-against-women.

APC/GenderIT.org. (2015). ***Colombia: Exploring technology-related violence against women***. Johannesburg: APC. www.genderit.org/edition/colombia-exploring-technology-related-violence-against-women.

APC/GenderIT.org. (2015). ***Mexico: Exploring technology based violence against women.*** **Johannesburg**: APC. www.genderit.org/edition/mexico-exploring-technology-related-violence-against-women.

APC/GenderIT.org. (2015). ***Pakistan: Exploring technology-related violence against women***. Johannesburg: APC. www.genderit.org/edition/pakistan-exploring-technology-related-violence-against-women.

APC/GenderIT.org. (2015). ***Philippines: Exploring technology-related violence against women and children***. Johannesburg: APC. www.genderit.org/edition/philippines-exploring-technology-related-violence-against-women-and-children.

APC/GenderIT.org. (2016). ***Democratic Republic of Congo: Exploring technology-related violence against women*****.** Johannesburg: APC.

www.genderit.org/edition/democratic-republic-congo-exploring-technology-related-violence-against-women.

APC/GenderIT.org. (2016). ***Kenya: Exploring technology-related violence against women.*** Johannesburg: APC. www.genderit.org/edition/kenya-exploring-technology-related-violence-against-women.

Armytage, R., & Fiaz, S. (2017). ***Why Are 10 Million Women Missing from Pakistan's Electoral Rolls?*** Asia Foundation. https://asiafoundation.org/2012/04/04/why-are-10-million-women-missing-from-pakistans-electoral-rolls/

Association for Progressive Communications (APC). (2015). ***How technology issues impact women's rights : 10 points on Section J***. https://www.genderit.org/sites/default/upload/sectionj_10points_apc.pdf

Bhardwaj, K. (2017). ***Explainer: Aadhaar is vulnerable to identity theft because of its design and the way it is used. Scroll.in.*** https://scroll.in/article/833230/explainer-aadhaar-is-vulnerable-to-identity-theft-because-of-its-design-and-the-way-it-is-used

Blumenstock, J., Cadamuro, G. & On, R. (2015). ***Predicting poverty and wealth from mobile phone metadata***. Science 350 (1073). http://www.unhcr.org/innovation/wp-content/uploads/2016/11/blumenstock-science-2015.pdf

Borker, G. (2017). Avoiding #MeToo: ***Harassment Risk and Women's College Choice -- Guest post by Girija Borker***. World Bank Development Impact Blog. http://blogs.worldbank.org/impactevaluations/avoiding-metoo-harassment-risk-and-women-s-college-choice-guest-post-girija-borker

Brief description of Tottho Apa. (n.d.) http://www.totthoapa.gov.bd/en/node/1401

Briones, I. & Sulathireh, T. (2016). ***Security in Contentious Contexts: Exploring Digital Resilience for Organisations Serving Sexual and Gender Minorities*** (Monitoring Regional and Global Activities chapter). In Arrow for Change (2016). *Sexuality, Sexual and Reproductive Health and Rights, and the Internet*. Asian-Pacific Resource & Research Centre for Women. www.arrow.org.my/wp-content/uploads/2016/08/AFC22.1-2016.pdf.

Broadband Commission for Sustainable Development. (2013). ***Gender in national broadband policies: Discussion paper by the Broadband Commission Secretariat***. http://www.broadbandcommission.org/Documents/publications/bbcand%20gender__A3__v3.pdf

Broadband Commission for Sustainable Development. (2017). Working Group on the Digital Gender Divide. ***Recommendations for action: bridging the gender gap in Internet and broadband access and use.*** http://broadbandcommission.org/Documents/publications/WorkingGroupDigitalGenderDivide-report2017.pdf

Business Standard (2016). ***Karnataka to use fibre network for digital inclusion***. http://www.business-standard.com/article/news-ians/karnataka-to-use-fibre-network-for-digital-inclusion-116112801339_1.html

Cámara. N., Tuesta, D and Urbiola, P. (2015). ***Extending access to the formal financial system: the banking correspondent business model***. BBVA Working Paper. Madrid.

https://www.bbvaresearch.com/wp-content/uploads/2015/04/WP15-10_Banking_correspondents.pdf

Chair, C. (2017). ***Internet Use Barriers and User Strategies: Perspectives from Kenya, Nigeria, South Africa and Rwanda.*** Beyond Access Policy Paper No.1. 2017. https://researchictafrica.net/publications/Other_publications/2017_INTERNET%20USE%20BARRIERS%20AND%20USER%20STRATEGIES-%20KENYA,%20NIGERIA,%20SOUTH%20AFRICA%20AND%20RWANDA%20.pdf

Chair, C. (2017). ***Internet use barriers and user strategies: perspectives from Kenya, Nigeria, South Africa and Rwanda***. RIA Policy Paper: Beyond Access series. http://www.researchictafrica.net/docs/RIA%202016%20Comparative%20FGD%20study_Final_Web%20version.pdf.

Chair, C., Deen-Swarray, and Khan, S. (2016). ***Taking the Microscope to ICT Gender Gaps in Sub-Saharan Africa.*** Conference presentation, CPRsouth2016: Zanzibar. https://researchictafrica.net/publications/Conference_Publications/2016_Chair_Deen-Swarray_Khand_Taking_a_microscope_to_ICT_gender_gaps_in_Africa_CPRsouth_Best_Paper.pdf

Cummings, C. & O'Neil, T. (2015). ***Do digital information and communication technologies increase the voice and influence of women and girls?*** A rapid review of the evidence. ODI. https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9622.pdf

Cummings, C. & O'Neil, T. (2015***). Do digital information and communication technologies increase the voice and influence of women and girls? A rapid review of the evidence.*** ODI. https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9622.pdf.

Dahan, M., & Gelb, A. (2017). ***The Role of Identification in the Post-2015 Development Agenda.*** World Bank. http://pubdocs.worldbank.org/en/149911436913670164/World-Bank-Working-Paper-Center-for-Global-Development-Dahan-Gelb-July2015.pdf

Dahan, M., & Hanmer, L. ***THE IDENTIFICATION FOR DEVELOPMENT (ID4D) AGENDA: Its Potential for Empowering Women and Girls***. World Bank. http://documents.worldbank.org/curated/en/859071468190776482/The-identification-for-development-ID4D-agenda-its-potential-for-empowering-women-and-girls-background-paper

Deen-Swarray, M. Gillwald, A. & Morrell, A. (2012). ***Lifting the veil on ICT gender indicators in Africa***. Evidence for ICT policy Action: Policy paper 13. www.researchictafrica.net.

Deloitte and GSMA. (2011). ***Mobile telephony and taxation in Kenya***. https://www.gsma.com/publicpolicy/wp-content/uploads/2012/03/mobiletelephoneandtaxationinkenya.pdf

Dhatta, B. (2016, August 30*). **Belling the trolls: free expression, online abuse and gender. OpenDemocracy*** (article). https://www.opendemocracy.net/bishakha-datta/belling-trolls-free-expression-online-abuse-and-gender.

Di Castri, S. (2013). ***Mobile Money: Enabling regulatory solutions***. GSMA. https://www.gsma.com/publicpolicy/wp-

content/uploads/2013/02/GSMA2013_Report_Mobile-Money-EnablingRegulatorySolutions.pdf

Doria, A. (2015, Nov). ***Women's rights, gender and Internet governance*.** APC. http://www.genderit.org/sites/default/upload/issue_womenrights_digital.pdf.

European Union. (2015) ***Opinion on gender equality and the digital society in Europe: opportunities and risks.*** http://ec.europa.eu/justice/gender-equality/files/opinions_advisory_committee/151126_final_digital_opinion_en.pdf

FATF. (2011). ***FATF Guidance on Anti-money laundering and terrorist financing measures and Financial Inclusion***. http://www.fatf-gafi.org/media/fatf/content/images/AML%20CFT%20measures%20and%20financial%20inclusion.pdf

Financial Inclusion Insights. (2014). ***Digital Pathways to Financial Inclusion, Tanzania.*** InterMedia. http://finclusion.org/uploads/file/reports/FII-Tanzania-Wave-One-Wave-Report.pdf

Financial Inclusion Insights. (2014). ***Digital Pathways to Financial Inclusion, Uganda***. InterMedia. http://finclusion.org/uploads/file/reports/FII-Uganda-Wave-One-Wave-Report.pdf

Financial Inclusion Insights. (2015). ***Mapping the Gender Gap Tracking movement and identifying causes for the male/female divide in financial inclusion.*** InterMedia. http://finclusion.org/uploads/file/reports/InterMedia%20FII%20Gender%20Report.pdf

Foerster, S. and Rigby, V. (2016). ***Examining public-private partnership projects through a gender lens***. http://ppp.worldbank.org/ppp/examining-public-private-partnership-projects-through-a-gender-lens

Foster, A. (2008). ***Discussion Paper on Spectrum Sharing, 8th Global Symposium of Regulators, Pattaya, Thailand, 11-13 March 2008.*** Geneva: International Telecommunication Union. https://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR08/discussion_papers/Spectrum_Sharing_web.pdf

Ganesh, M.I. (2016). ***The New Green: The Landscapes of Digital Activism (Editorial).*** In Arrow for Change (2016). *Sexuality, Sexual and Reproductive Health and Rights, and the Internet.* Asian-Pacific Resource & Research Centre for Women. www.arrow.org.my/wp-content/uploads/2016/08/AFC22.1-2016.pdf.

Garcia, L.S. & Manikan, F.Y. (2014, December). ***Gender Violence on the Internet: The Philippine Experience.*** APC/FMA/Dutch Ministry of Foreign Affairs. http://www.genderit.org/resources/gender-violence-Internet-philippine-experience.

Gartner. (2016, 26 May). ***When less becomes more: the journey to digital government.*** https://www.gartner.com/smarterwithgartner/when-less-becomes-more-the-journey-to-digital-government/

Geerdts, C., Gillwald, A. (2017). ***Developing Smart Free Public Wi-Fi in South Africa: Can Public Wi-Fi Help Redress Digital Inequality, and If So, How? Emerging Lessons from South Africa's Diverse Implementations.*** https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3043690

Gillwald, A. (1999). ***Telecommunication Policy and Regulation for Women and Development.*** Link Centre, University of Witwatersrand. https://idl-bnc-

idrc.dspacedirect.org/bitstream/handle/10625/42084/129625_2000_no2.pdf?sequence=1&isAllowed=y

Gillwald, A., Mothobi, O., and Schoentgen, A. (2017). ***What is the State of Microwork in Africa? A View from Seven Countries.*** #afteraccess Policy Paper Series, no.2. https://researchictafrica.net/wp/wp-content/uploads/2017/12/Microwork_WorkingPaper_FINAL.pdf

Gillwald, A., Odufuwa, F., Rademan, B., and Esselaar, S. (2016). ***An Evaluation of Open Access Broadband Networks in Africa: The Cases of Nigeria and South Africa.*** Research ICT Africa. https://researchictafrica.net/publications/Other_publications/2016_Integrated_Policy_Paper_-_Open_Access_Broadband_Networks_in_Africa.pdf

Gomberts, R. (2016). ***Apps, Drones, and iTunes: Opportunities and Challenges in Using New Technologies for Safe Medical Abortion Services.*** (Spotlight chapter). In Arrow for Change (2016). Sexuality, Sexual and Reproductive Health and Rights, and the Internet. Asian-Pacific Resource & Research Centre for Women. www.arrow.org.my/wp-content/uploads/2016/08/AFC22.1-2016.pdf.

Green, Ben, Gabe Cunningham, Ariel Ekblaw, Paul Kominers, Andrew Linzer, and Susan Crawford. (2017). ***Open Data Privacy (2017). Berkman Klein Center for Internet & Society Research Publication.*** https://dash.harvard.edu/bitstream/handle/1/30340010/OpenDataPrivacy.pdf?sequence=5

GSMA and Cherie Blair Foundation for Women. (2010). ***Women & Mobile: A Global Opportunity: A Study on the mobile phone gender gap in low and middle-income countries.*** https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/01/GSMA_Women_and_Mobile-A_Global_Opportunity.pdf

GSMA. (2014). ***Disaster Response: Mobile Money for the Displaced.*** https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/01/Disaster-Response-Mobile-Money-for-the-Displaced.pdf

GSMA. (2015). ***Bridging the gender gap: Mobile access and usage in low and middle-income countries***. GSMA. https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/02/GSM0001_03232015_GSMAReport_NEWGRAYS-Web.pdf

GSMA. (2017). ***Understanding the Identity Gender Gap***. GSMA. https://www.gsma.com/mobilefordevelopment/programme/digital-identity/understanding-identity-gender-gap

Gupta, G. Sierra K. (2017). ***Working together to prevent sexual exploitation and abuse: recommendations for World Bank investment projects***. Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/482251502095751999/pdf/117972-WP-PUBLIC-recommendations.pdf

Gurumurthy A., Chami, C. (2014). ***Digital Technologies and Gender Justice in India - An analysis of key policy and programming concerns***. Input to the High-Level Committee on the Status of Women in India. IT for Change. http://www.itforchange.net/sites/default/files/ITfC/MahitiManthana_final_draft.pdf

Gurumurthy, A., Nandini Chami. (2016). ***E-Government for Women's Empowerment in Asia and the Pacific***. Social Development Division, UNESCAP. Bangkok.

http://www.unescap.org/resources/e-government-women%E2%80%99s-empowerment-asia-and-pacific

Hafkin, N., & Taggart, N. (2001). ***Gender, Information Technology, and Developing Countries: An Analytic Study, Academy for Educational Development.*** USAID. http://www.mujeresenred.net/zonaTIC/IMG/pdf/Gender_Book_NoPhotos.pdf

Hijab, N., Zambrano R. (2008). ***Gender Responsive E-governance: Exploring the Transformative Potential. UNDP Primers in Gender and Democratic Governance.*** http://www.undp.org/content/undp/en/home/librarypage/womens-empowerment/primers-in-gender-and-democratic-governance-4.html

Hosein, G. & Nyst, C. (2013). ***Aiding Surveillance: An exploration of how development and humanitarian aid initiatives are enabling surveillance in developing countries***. London: Privacy International. www.privacyinternational.org/sites/default/files/Aiding%20Surveillance.pdf.

IFC. (2012). ***Gender Impact of Public-Private Partnerships – Literature Review Synthesis Report.*** http://www.pidg.org/resource-library/results-monitoring/pidg-ifc-gender-impact-of-private-public.pdf

IGF (BPF) (2016). Best Practice Forum Gender: Gender and Access. ***Overcoming barriers to enable women's meaningful Internet access***. http://www.intgovforum.org/multilingual/index.php?q=filedepot_download/3406/437.

IGF (CENB). (2015). ***Policy Options for Connecting and Enabling the Next Billion(s) – Phase II***. http://www.intgovforum.org/multilingual/index.php?q=filedepot_download/3416/412.

Independent Evaluation Group. (2014). ***Social Safety Nets and Gender: Learning from Impact Evaluations and World Bank Projects.*** World Bank. https://openknowledge.worldbank.org/bitstream/handle/10986/21365/938960WP0Box3800see0also08980700BR0.pdf?sequence=1&isAllowed=y

Institute for the Equality of Women and Men. (2007). ***Equal opportunities for men and women in public procurement contracts: A few recommendations***. http://igvm-iefh.belgium.be/sites/default/files/downloads/20%20-%20Public%20procurement%20contracts.pdf

International Finance Corporation. (2011). ***Strengthening Access to Finance for Women-Owned SMEs in Developing Countries.*** https://www.ifc.org/wps/wcm/connect/a4774a004a3f66539f0f9f8969adcc27/G20_Women_Report.pdf?MOD=AJPERES

International Foundation for Electoral Systems. (2013). ***Survey Assessing Barriers to Women Obtaining Computerized National Identity Cards (CNICs).*** IFES and German Federal Foreign Office. http://aceproject.org/electoral-advice/archive/questions/replies/277728362/962062828/IFES-PK-Survey-Assessing-Barriers-to-Women.pdf

IT for Change. (N.d.). ***FAQ on Mahiti Manthana for Mahila Samakhya***. http://www.itforchange.net/sites/default/files/ITfC/Mahiti%20Manthana%20Project%20FAQ.pdf

ITU. (2016). **How can we close the digital gender gap? *ITU News Magazine***, 04/2016. http://www.itu.int/en/itunews/Documents/2016-04/2016_ITUNews04-en.pdf

ITU. (2017). ***Organizing a Girls in ICT Day event Toolkit***. https://www.itu.int/en/ITU-D/Digital-Inclusion/Women-and-Girls/Girls-in-ICT-Portal/Documents/International%20Girls%20in%20ICT%20Day%202017%20Toolkit_E_Final.pdf

ITU-T Focus Group Digital Financial Services. (2016). ***Review of National Identity Programs. International Telecommunications Union.*** https://www.itu.int/en/ITU-T/focusgroups/dfs/Documents/09_2016/Review%20of%20National%20Identity%20Programs.pdf

ITU-T Focus Group Digital Financial Services. (2017). ***Identity and Authentication. International Telecommunications Union***. http://www.itu.int/en/publications/Documents/tsb/2017-DFS-TechInnovationCompetition/mobile/index.html#p=46

Jensen, H.; sm Kee, J.; Venkiteswaran, G.; Randhawa, S. (2012). ***Sexing the Internet: Censorship, Surveillance, and the Body Politic(s) of Malaysia.*** In: Deibert, R., Palfrey, J., Rohozinski, R. & Zittrain, J. (Eds.). (2012). *Access Contested: Security, Identity, and Resistance in Asian Cyberspace.* https://www.idrc.ca/en/book/access-contested-security-identity-and-resistance-asian-cyberspace.

Jouhki, J. (2013). **A Phone of One's Own? Social Value, Cultural Meaning and Gendered Use of the Mobile Phone in South India. *Journal of the Finnish Anthropological Society***, 38 (1), 37 – 58.

Jouhki, J. (2013). ***A Phone of One's Own? Social Value, Cultural Meaning and Gendered Use of the Mobile Phone in South India***. Journal of the Finnish Anthropological Society, 38(1), 37–58.

Khan, S. (2016a). ***Surveillance as a Feminist Issue***. Privacy International/ Digital Rights Foundation (online article). https://privacyinternational.org/node/1007.

Khan, S. (2016b, April 6). ***Do Gender Gaps in ICTs Close in Urban Areas First? Evidence from 12 African Countries***. *The RIA Rap*. Weblog. https://goo.gl/xAcM64.

Kovacs, A. (2017). ***Reading Surveillance through a Gendered Lens: Some Theory***. Gendering Surveillance (website). www.genderingsurveillance.Internetdemocracy.in/theory/.

Kovacs, A., Richa, K. & Shobha, SV. (2013, April). ***'Don't let it stand!' An Exploratory Study of Women and Verbal Online Abuse in India.*** Internet Democracy Project. https://Internetdemocracy.in/wp-content/uploads/2013/12/Internet-Democracy-Project-Women-and-Online-Abuse.pdf.

Liddicoat, J. (2011, Sept). ***Internet rights are human rights, freedom of expression, freedom of association and democracy: new issues and threats.*** APC. https://www.apc.org/en/system/files/APC_IRHR_FOEandFOAissuepaper_2012_web_EN.pdf

Lindsey, D. (2017). ***A framework for mobile operators to close the gender gap.*** https://www.gsma.com/mobilefordevelopment/programme/connected-women/framework-mobile-operators-close-gender-gap

LIRNEasia & GSMA (2015). ***Mobile phones, Internet, and gender in Myanmar***. http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/02/GSMA_Myanmar_Gender_Web_Singles.pdf

LIRNE*asia* & GSMA (2015). ***Mobile phones, Internet, and gender in Myanmar*.** http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/02/GSMA_Myanmar_Gender_Web_Singles.pdf.

LIRNEasia. (2013). ***Delivering Public Services to the Bottom of the Pyramid: Different modes for different folk***. http://lirneasia.net/wp-content/uploads/2014/07/BDLK_TelecenterMobileEGov_Final_17Jan2013_forComments.pdf

London School of Economics. (2005). ***The Identity Project: An Assessment of the UK Identity Cards Bill and its Implications.*** London. LSE. http://www.lse.ac.uk/management/research/identityproject/identityreport.pdf

Lyndon, A., Bonds- Raacke, J. and Crattty, A. (2011), ***College students' Facebook stalking of ex- partners***, Cyberpsychology, Behavior and Social Networking, Vol. 14 No. 12, pp. 711- 716.

Madanda, A, Ngolobe, B and Amuriat, G Z (2009). ***Uganda: Violence against Women and Information and Communication Technologies.*** Association for Progressive Communications (APC). https://www.genderit.org/sites/default/upload/uganda_APC_WNSP_MDG3_VAW_ICT_ctryrpt_2.pdf

Microsoft, UNESCO, UN Women & ITU (2014). ***Girls in STEM and ICT Careers: The Path toward Gender Equality*.** http://www2.tku.edu.tw/~tfstnet/upload/file/20130704153742d38d9.pdf.

Ministry of Finance. 2016. Spreading JAM across India's Economy. ***Economic Survey*** (2015-16). New Delhi. http://indiabudget.nic.in/es2015-16/echapvol1-03.pdf

Ministry of Planning and Investment, Government of LAO. (2014). ***Guidelines and checklists for gender in public-private partnerships in Lao PDR Grant 0309***. https://www.investlaos.gov.la/images/sampledata/pdf_sample/Lao_PPP_Gender_Guidelines-Checklists_Ver_1_Eng.pdf

Ministry of Women and Child Development. (2015). ***Gender Budgeting Handbook***. Govt. of India. http://wcd.nic.in/sites/default/files/GB%20-%20Handbook%20October%202015.pdf

Mirani, L. (2015, February 9). ***Millions of Facebook users have no idea they're using the Internet*.** Quartz. https://qz.com/333313/milliions-of-facebook-users-have-no-idea-theyre-using-the-Internet/

Moyo, M. & Deen-Swarray, M. (2013***). Gender and Entrepreneurship in the Informal Sector: An African Perspective;*** *In the CPR South 8/CPRafrica 2013 Conference on Innovation & Entrepreneurship in ICT: Changing Asia/Africa, Mysore, India*; September 2013. https://www.google.com/search?client=safari&rls=en&q=Gender+and+Entrepreneurship+in+the+Informal+Sector:+An+African+Perspective&ie=UTF-8&oe=UTF-8.

Nakamura, L. (2017). ***Racism, Sexism, and Gaming's Cruel Optimism.*** N/A. www.lnakamur.files.wordpress.com/2015/02/racism-sexism-and-gamings-cruel-optimism.pdf.

Naranjo, D.C.C./Colnodo. (2013, March). ***Baseline study: Legal and regulatory framework in Colombia on VAW and ICT, Executive Summary*****.** APC. at: http://www.genderit.org/resources/baseline-study-legal-and-regulatory-framework-colombia-vaw-and-ict-executive-summary.

Nepelski, D., Bogdanowicz, M., Biagi, F., Desruelle, P., De Prato, G., Gabison, G., Piroli, G., Pesole, A., Thumm, N. and Van Roy, V. (2017). 7 ways to boost to support digital innovation and entrepreneurship in Europe. Key messages from the European innovation policies for the digital shift project. ***JRC Science for Policy Reports***. JRC 28305 EN, doi:10.2791/019397 http://publications.jrc.ec.europa.eu/repository/bitstream/JRC104899/jrc104899_formatted_final_20170426.pdf

OECD and WTO (n.d.). ***Aid‐for‐Trade: Case Story World Bank***. https://www.oecd.org/aidfortrade/47803414.pdf

OECD. (2017). ***Strengthening Women's Entrepreneurship in ASEAN: "Towards increasing women's participation in economic activity".*** http://www.oecd.org/southeast-asia/regional-programme/Strengthening_Womens_Entrepreneurship_ASEAN.pdf

OSCE (2016). ***New Challenges to Freedom of Expression: Countering Online Abuse of Female Journalists***. at: http://www.osce.org/fom/220411?download=true.

Padte, RK. (2013). ***Keeping women safe? Gender, online harassment and Indian law***. Internet Democracy Project. https://internetdemocracy.in/reports/keeping-women-safe-gender-online-harassment-and-indian-law/

Panoply Digital and GIZ. (2017). ***Women's Pathways to the Digital Sector: Stories of Opportunities and Challenges.*** Bonn: Federal Ministry for Economic Cooperation and Development (BMZ). https://www.enterprise-development.org/wp-content/uploads/GIZ_WEE-digital-sector_2017.pdf

Pasricha, J. (2016). ***"Violence" Online in India: Cybercrimes Against Women & Minorities on Social Media.*** Feminism in India. Com. http://feminisminindia.com/wp-content/uploads/2016/05/FII_cyberbullying_report_website.pdf.

Philippine Commission on Women. (2012). ***Convergence for Women's Economic Empowerment***. Official Magazine of the GREAT Women Project. http://www.pcw.gov.ph/sites/default/files/documents/resources/GWP_magazine_2012_August_issue.pdf

Privacy International. (N.d.). ***Data Protection***. https://www.privacyinternational.org/node/44

Rajshekhar M. (2016). ***What Happens to Privacy when companies have your Aadhaar number?*** Scroll.in. https://scroll.in/article/824874/what-happens-to-privacy-when-companies-have-your-aadhaar-number

Ramilo, C.G., Jorge, S. and Hermawati, W. (2007). ***Engendering rural information systems in Indonesia.*** https://www.genderit.org/resources/engendering-rural-information-systems-indonesia

Rea, L and Parker, R. (2014). ***Designing and Conducting Survey Research: A Comprehensive Guide.***

Reserve Bank of India. (2010). ***Guidelines for engaging of Business Correspondents (BCs)***. https://rbidocs.rbi.org.in/rdocs/notification/PDFs/CPC28092010.pdf

Rizk, V. & Othman, D. (2016). ***Quantifying Fertility and Reproduction through Mobile Apps: A Critical Overview***. Arrow for Change. Sexuality, Sexual and Reproductive Health and Rights, and the Internet. Asian-Pacific Resource & Research Centre for Women. www.arrow.org.my/wp-content/uploads/2016/08/AFC22.1-2016.pdf.

Salman, SH. (2017). ***In a competitive telecom market, how India's first MVNO Aerovoyce plans to create its own space.*** https://www.medianama.com/2017/05/223-mvno-aerovoyce/

Sammet, K. & Kekelis, L. (2016). ***Changing the Game for Girls in STEM: Findings on High Impact Programs and System-Building Strategies***. https://www.itu.int/en/ITU-D/Digital-Inclusion/Women-and-Girls/Girls-in-ICT-Portal/Documents/changing-the-game-for-girls-in-stem-white-paper.pdf

Samuel Hall and Norwegian Refugee Council. (N.d.). ***Access to Tazkera and other civil documentation in Afghanistan.*** Norwegian Refugee Council. https://www.nrc.no/globalassets/pdf/reports/af_civil-documentation-study_081116.pdf

Sardar T. (2015). ***Report on the functioning of the National Database and Registration Authority.*** Ombudsman NADRA. http://www.mohtasib.gov.pk/wafaqimoh/userfiles1/file/Final%20NADRA%20ASSIGNMENT.pdf

Scharwatt, C. (2014). ***Reaching half the market: women and mobile money, the example of UBL in Pakistan***. https://www.gsma.com/mobilefordevelopment/programme/connected-women/reaching-half-of-the-market-women-and-mobile-money-the-example-of-ubl-in-pakistan

Scharwatt, CP, Minischetti, E. (2014). ***Reaching half of the market: Women and mobile money Findings based on the State of the Industry Report.*** GSMA Connected Women. https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/10/2014_DI_Reaching-half-of-the-market-Women-and-mobile-money.pdf

Scott, S. & Balasubramanian, S. & Ehrke, A. (2017). ***Ending the Gender Digital Divide in Myanmar: A Problem-Driven Political Economy Assessment***. IREX. https://www.irex.org/sites/default/files/node/resource/gender-digital-divide-myanmar-assessment.pdf.

Shephard, N (2016a). ***Big data and sexual surveillance (APC issue paper).*** APC. https://www.apc.org/en/system/files/BigDataSexualSurveillance_0.pdf.

Shreya Singhal v. Union of India. (2015). ***WP NO. 167/2012***. http://www.thehindu.com/migration_catalog/article10549810.ece/BINARY/SC%20Judgement%20on%20Section%2066A%20of%20the%20Information%20and%20Technology%20Act

Solin, M., Zerzan, A. (2010). ***Mobile Money: Methodology for Assessing Money Laundering and Terrorist Financing Risks.*** GSMA Discussion Paper. https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/03/amlfinal35.pdf

Sullivan, D. (2016, May). ***Business and digital rights: Taking stock of the UN Guiding Principles for Business and Human Rights in the ICT sector***. APC. https://www.apc.org/en/system/files/BusinessAndDigitalRights_full%20report.pdf.

Sustainabledevelopment.un.org. (2017). ***Goal 16: Sustainable Development Knowledge Platform***. https://sustainabledevelopment.un.org/sdg16

Sweeney L, Abu A, and Winn J. (2013). ***Identifying Participants in the Personal Genome Project by Name***. Harvard University. Data Privacy Lab. White Paper 1021-1. April 24, 2013. https://dataprivacylab.org/projects/pgp/

TEDIC (2017, March 7). TEDIC could be censored for publishing about gender-based violence. *TEDIC*. Weblog. at: https://www.tedic.org/tedic-could-be-censored-for-publishing-about-gender-based-violence/.

Thas, A. M. K., Ramilo, C. G., Cinco, C. (2007). ***Gender and ICT***. United Nations development programme–Asia-Pacific development information programme. India: Elsevier. http://www.apdip.net/publications/iespprimers/eprimergender.pdf

The Carter Center. (2016). ***Women and the right of access to information in Bangladesh: Executive summary***. https://www.cartercenter.org/resources/pdfs/peace/ati/bangladesh-exec-summ-women-ati.pdf

The World Bank. ***Identification for Development (ID4D) Integration Approach***. Washington DC: World Bank. http://pubdocs.worldbank.org/en/205641443451046211/ID4D-IntegrationAproachStudyComplete.pdf

UN Commission on Science and Technology for Development (CSTD), Gender Working Group (1995). ***Gender Missing Links: Equity in Science and Technology for Development.*** https://www.idrc.ca/en/book/missing-links-gender-equity-science-and-technology-development.

UNCTAD & ILO. (2014). ***Empowering Women Entrepreneurs Through Information and Communication Technologies: A Practical Guide***. http://unctad.org/en/PublicationsLibrary/dtlstict2013d2_en.pdf

UNESCO & Intel (2014). ***Towards Gender Equality in Education Policies and ICTs: An Action Brief and Toolbox.*** http://www.intel.nl/content/dam/www/public/us/en/documents/corporate-information/gender-equality-education-ict-unesco-girl-rising.pdf.

UNESCO (2015). ***CONNECTing the dots: Options for Future Action*** **(Outcome document).** http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/outcome_document.pdf.

UNESCO. (2017, 1 September). ***International Literacy Day 2017***. http://uis.unesco.org/en/news/international-literacy-day-2017

UNICEF. (2013). ***EVERY CHILD'S BIRTH RIGHT Inequities and trends in birth registration.*** New York: UNICEF. https://www.un.org/ruleoflaw/files/Embargoed_11_Dec_Birth_Registration_report_low_res.pdf

UNICEF. (2013). ***Innovative Approaches to Maternal and Newborn Health: Compendium of Case Studies.*** New York. https://www.unicef.org/health/files/Innovative_Approaches_MNH_CaseStudies-2013.pdf

Unique Identification Authority of India. (2012). ***Setting up and Managing an Enrolment Centre***. Unique Identification Authority of India. http://www.nictcsc.com/images/Aadhaar%20Project%20Training%20Module/English%20Training%20Module

Unique Identification Authority of India. (2017). ***Aadhaar Dashboard***. https://uidai.gov.in/aadhaar_dashboard/

University of Chicago. Believing stereotype undermines girls' math performance: Elementary school women teachers transfer their fear of doing math to girls, study finds. ***ScienceDaily***, 26 January 2010. www.sciencedaily.com/releases/2010/01/100125172940.htm

UNSD. (2008). ***Designing Household Surveys Samples: Practical Guidelines***. United Nations, New York. https://unstats.un.org/unsd/demographic/sources/surveys/Series_F98en.pdf

UNWOMEN and CDC. (2013). ***Study on Ways and Methods to Eliminate Sexual Harassment in Egypt, Results / Outcomes and Recommendations Summary***. http://www.dgvn.de/fileadmin/user_upload/DOKUMENTE/English_Documents/Sexual-Harassment-Study-Egypt-Final-EN.pdf

USAID. (2017). ***Gender and Information Communication Technology (ICT) Survey Toolkit.*** https://www.usaid.gov/documents/15396/gender-and-ict-toolkit

Van Deursen, A., Helsper, EJ., Eynon, R. (2014). ***Measuring Digital Skills: From Digital Skills to Tangible Outcomes project report***. London School of Economics and Political Science, University of Twente and Oxford Internet Institute. http://www.lse.ac.uk/media-and-communications/assets/documents/research/projects/disto/Measuring-Digital-Skills.pdf

Van Welsum, D. (2016). ***Enabling Digital Entrepreneurs.*** **World Development Report.** http://pubdocs.worldbank.org/en/354261452529895321/WDR16-BP-Enabling-digial-entrepreneurs-DWELSUM.pdf

Wang, H. Y., & Wang, S. H. (2010). User acceptance of mobile Internet based on the unified theory of acceptance and use of technology: Investigating the determinants and gender differences. ***Social Behavior and Personality***, 38 (3), 415-426.

Wang, H. Y., & Wang, S. H. (2010). ***User acceptance of mobile Internet based on the unified theory of acceptance and use of technology: Investigating the determinants and gender differences.*** Social Behavior and Personality: an international journal, 38(3), 415-426.

Web Foundation (2016). ***Beyond gender commitments: OGP needs to 'walk the talk'***. http://webfoundation.org/2016/12/beyond-gender-commitments-ogp-needs-to-walk-the-talk/

World Bank and IEA (International Energy Agency). (2015). ***Progress Toward Sustainable Energy: Global Tracking Framework Report***. World Bank: Washington. http://trackingenergy4all.worldbank.org/

World Bank. (2012). ***Gender Equality and Development: World Development Report 2012***. https://siteresources.worldbank.org/INTWDR2012/Resources/7778105-1299699968583/7786210-1315936222006/Complete-Report.pdf

World Bank. (2014). ***National government agency public-private partnership manual: Volume 4: Annexes***. http://ppp.worldbank.org/public-private-partnership/library/national-government-public-private-partnership-manual-draft

World Bank. (2017). ***ICT in Agriculture (Updated Edition) : Connecting Smallholders to Knowledge, Networks, and Institutions***. Washington, DC: World Bank. https://openknowledge.worldbank.org/handle/10986/27526

World Bank. (2017). ***The State of Social Safety Nets 2017: "Safety nets where needs are the greatest".*** http://documents.worldbank.org/curated/en/811281494500586712/pdf/114866-WP-PUBLIC-10-5-2017-10-41-8-ClosingtheGapBrochure.pdf

World Food Programme. (2015). ***E-Vouchers for Food Security - A Potential for India's Social Safety Nets? Delhi***. http://socialprotection.org/discover/publications/e-vouchers-food-security-potential-indias-social-safety-nets

World Health Organization. (2000). ***Information, Education and Communication: A Guide for AIDS Programme Managers.*** http://apps.searo.who.int/PDS_DOCS/B0224.pdf

World Wide Feb Foundation. (2015). ***Women's Rights Online: Translating Access into Empowerment***. World Wide Feb Foundation & SIDA. http://webfoundation.org/docs/2015/10/womens-rights-online21102015.pdf

Yadav, S. (2017, January 11). ***1-rupee Jan Dhan trick: Some banks admit, others vow tighter vigil***. Indian Express. http://indianexpress.com/article/business/banking-and-finance/1-rupee-jan-dhan-trick-some-banks-admit-others-vow-tighter-vigil-zero-banalnce-modi-4468763/

Ya'u, Y.Z. & Aliyu, M.A. (2017**). *Internet for Men? Overcoming Gender-based Digital Exclusion in Northern Nigeria: A Strategy Document***. Centre for Information Technology and Development. http://www.citad.org/download/overcoming-gender-based-digital-exclusion-in-northern-nigeria-a-strategy-document/.

Zuhyle, S. (2012). ***Broadband QoSE: Measurability, Comparability & Practicality***. http://lirneasia.net/wp-content/uploads/2012/10/EGTI-2012_Shazna-Zuhyle.pdf

# 6. Annexures

## 6.1. Examples Used

### 6.1.1. Aadhaar

Aadhaar (the Hindi word for foundation), was started in 2009 to provide a unique, portable identifier to the country's residents. Accordingly, the Unique Identification Authority of India (UIDAI), a now-statutory body, collects limited demographic and biometric information (fingerprints, iris and facial scan) and stores it in a centralized database.

The primary success of Aadhaar has been its high enrolment. As per UIDAI figures, more than 118 crore people residing in India (not necessarily citizens) have Aadhaar (UIDAI, 2017). This was done by taking different measures including:

- Mass awareness campaigns using multiple media like TV, Radio, print, inter-personal communication. (Further reading)
- In urban areas, online pre-enrolment is possible. However, recognising issues of limited internet access and digital literacy, physical centers were set up in rural areas.
- Where individuals lack proof of identity or address (breeder documents required for Aadhaar enrolment), head of family who has own identity documents and proof of relationship, can validate their identity. Similarly, there is a provision for 'introducer', an individual already enrolled in Aadhaar, to validate the identity for someone lacking breeder documents (GSMA, 2017).

However, Aadhaar's manner of implementation and the associated civil society protest against it also provides important insights into aspects to consider before launching an identification program. Some issues to consider include:

- Relaxing the need for breeder documents to get an Aadhaar number implies that the level of assurance is relatively low. This also means that Aadhaar should be used for authentication carefully. Banks in India currently allow Aadhaar to be used as proof of residence (see: here) even though address proof is not mandatory for Aadhaar to be issued (see GSMA, 2017 and enrolment form for Aadhaar).
- Aadhaar stores the data collected (biometric and demographic) in a centralised database called the Central Identities Data Repository. This was done since a primary objective of Aadhaar was to limit leakages in subsidy transfers by removing ghost beneficiaries. This is because a central database of biometric data allows authorities to ensure there is no duplication. However, as seen above, this entails higher risks of data theft and privacy loss (Bhardwaj, 2017). While use of biometrics can reduce the risk of identity theft even when the ID is not secret, this is not fool-proof as well.
- Aadhaar received statutory backing only in 2016, seven years after it started collecting information. Hence, for the interim years, Aadhaar effectively functioned outside the regulatory purview.
- Aadhaar is used by private companies as well (Rajshekhar, 2016). This can be for identity verification (when applying for a bank account or mobile SIM card for example) or building customer profiles – by (legally) downloading the demographic

information on an Aadhaar enrollee. Moreover, companies can also share information among themselves with the Aadhaar number being the way to link data from disparate sources, to create one 360-degree profile of the customer. Note that the Aadhaar Act mandates that an individual's consent be taken before her demographic information is used for authentication, though enforcement mechanisms are unclear at present.

- While Aadhaar was initially meant to be voluntary, the government of India has been increasingly making it mandatory to receive welfare benefits. In 2017, it was also made mandatory to link PAN cards with Aadhaar. These further raise privacy concerns, since it takes away the choice of individuals to submit their personal and biometric data.
- In 2017, the Supreme Court of India ruled that Right to Privacy was a fundamental right. It is still to decide whether Aadhaar violates this right. See this for further understanding.

### 6.1.2. South Africa Telecom Policy

White Paper on Telecommunications and the Telecommunications Act of 1996 states the its aim as addressing 'inequalities of the past'. These inequalities refer to Historically Disadvantaged Individuals (HDI) along the lines of race, ***gender*** and disablement. Some of the ways in which the policy addressed gender included the following -

- Participatory legislation: organized labor, women and disabled people's groups found representation in the consultation process.
- Attempted to increase representation of women in the ICT sector by –
    - Mandating that incumbent telecom firms share data on number of employees at each level by race and sex, periodically
    - New spectrum license preferentially given to organizations demonstrating ownership and control by women and other HDI
    - Also attempted to expand access by mandating that incumbent firms
        - adhere to universal access policy
        - increase service to underserved areas
        - Provide services to priority customers like schools, hospitals, libraries and local authorities
    - Price regulation

In implementation however, infrastructural access has not translated into actual uptake for reasons like affordability, social norms, digital literacy (or lack thereof) etc. Hence policy needs to account for more than just network expansion (Gillwald, 1999).

### 6.1.3. Mahiti Manthana initiative

Sanghas are collectives of marginalized women set up under the Government of India's Mahila Samakhya program to educate rural women. In Mysore district, a special project called *Mahiti Manthana* was started looking to provide a resource support structure to sanghas for sustainability. IT for Change collaborated in this project, to use ICT tools to build up Resource Centers (IT for Change, n.d.). This involved a three-pronged strategy to get women acquainted with necessary ICT tools (Gurumurthy and Chami, 2014)-

- Community radio strategy: weekly broadcast of local issues as seen/ understood by women
- Community video strategy: stock of videos with information, biographies of sangha women etc.
- Information center strategy: with a telecentre run by a female intermediary (called sakhi or friend), that addresses information needs of the village through constant interactions with the local government. Also acts as the center to impart audio/ video based training to women around gender and governance issues.

Major successes of the program include:

- Helping women 'learn by doing'- use of non-textual learning resources being critical to address (basic) literacy barriers.
- Aiming at women's empowerment issues by talking about patriarchy, governance etc. and not reinforcing stereotypical norms for women (see this and Gurumurthy and Chami, 2014 for a discussion on Google's 'Helping Women Get Online' initiative).

See here for more on the Mahila Manthana Scheme.

### 6.1.4. GirlsGoIT

GirlsGoIT is a joint program by UN Women, eGovernment Center, Novateca and TEKEDU to empower girls and young women with digital, IT and entrepreneurial skills and encourage them to pursue ICT careers. They facilitate STEM workshops and advocate for women and girls in technology. They conduct summer Camps that gives girls opportunities to learn about web development, human rights for internet users, network neutrality, as well as skills such as project management, teamwork entrepreneurial and leadership skills since the goal of the program is to encourage entrepreneurship and innovation in Moldova through the empowerment of women and girls in ICT. See here.

### 6.1.5. Girls in ICT Day

Girls in ICT Day, an ITU initiative, aims to raise awareness among girls and young women about the need for their full and equal access to ICT education and to encourage them to consider ICT careers. A toolkit on organizing a Girls in ICT Day event is found here.

### 6.1.6. Mozilla Clubs

Mozilla Clubs is a joint initiative by UN Women and the Mozilla Foundation that supports girls and women to enhance their digital literacy, skills, to collaborate online through digital literacy clubs in Africa. It provides a space for women to learn in a gender bias free environment. Mozilla clubs meet regularly and in person to learn about web design, content creation, coding, privacy, security and how to make use of opportunities for empowerment and leadership. These clubs can be for schools, for small business owners etc. Teaching resources including activity ideas for web literacy, leadership, combatting cyber violence as well as how to design safe and inclusive events for women and girls can be found here.

## 6.2. Measurement of gender gap in digital literacy (primary data collection)

Since there is no standardized indicator for measuring digital literacy, it may be a good idea to encourage countries to institute the same. This may also be used to assess digital literacy (or lack thereof) of a smaller group, say for instance, government employees being readied for the implementation of digital government internally. Once the extent of gap is established (by type of literacy level), specific steps may be taken to address the identified gaps.

Digital literacy may be measured in different ways (see here for a brief description). Van Deursen, Helsper and Eynon (2014) provide a helpful classification of types of digital skills as given below. The assessment of whether the target population has the specific skills can be done through a self-assessment questionnaire where a sample of men and women are shown statements asserting different skills and asked to rate how true the statement is for them, by choosing an option a Likert scale (see examples below). Note that this is only indicative, and there may be other ways of measuring digital literacy with their own pros and cons (see here for brief discussion).

| Type of skill | Explanation | Examples of activities corresponding to skill type |
|---|---|---|
| Operational | Skills to operate digital media | Operating mobile internet:<br>● I know how to connect to a WIFI network<br>● I know how to download apps to my mobile device<br>● I know how to turn my mobile phone off<br>Operating the internet environment:<br>● I know how to open a new tab in my browser<br>● I know how to go to the previous page when browsing the Internet<br>● I know how to use the refresh function |
| Formal | Skills to handle special structure of digital media such as menus and hyperlinks | ● I tend to have no problems finding my way around a website<br>● I know where to click to go to a different web-page |
| Information | Skills to search, select and evaluate information in digital media | ● I know how to use a wide range of strategies when searching for information<br>● I feel confident in my evaluation of whether a website can be trusted<br>● I generally compare different websites to decide if information is true |

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| | | ● I carefully consider the information I find online |
| Strategic | Skills to employ the information contained in digital media as a means to reach a particular personal or professional goal | (Not required under this framework - can be measured by looking at sex disaggregated data of students in STEM Courses/ employed in the IT sector etc.) |
| Communication | Skills to construct, understand and exchange meaning with others through chat, e-mail or instant messaging | ● I know when I should and shouldn't share information online<br>● I am careful to make my comments and behaviors appropriate to the situation I find myself in online<br>● I know how to change who I share content with (e.g. friends, friends of friends or public) |
| Content | Skills to create content of acceptable quality (textual, music and video, photo or image etc.) to be published on the internet | ● I would feel confident putting video content I have created online<br>● I would feel confident writing and commenting online<br>● I know how to create something new from existing online images, music or video |

## 6.3. Summary of data points and potential sources

The following table is based on the data sources currently in the Toolkit. This will be augmented at the time of the dissemination workshop, in consultation with the TTLs.

| Associated Barrier/ Opportunity | Data Required | Data Source | |
|---|---|---|---|
| | | Primary | Secondary |
| Lack of last mile infrastructure | • Intended services to be rolled out for digital government service delivery<br>• Potential internet data consumption of intended services | Discussions with partner government | |
| • Lack of last mile infrastructure<br>• Lack of digital literacy<br>• Lack of trust in modern technology | • Use of ICT modes segregated by sex | | • International Telecommunication Union (ITU) data on ICT data by gender (see here). Has data on internet use by sex.<br>• GSMA also has had two surveys (2010 and 2015) to measure gender gap in mobile ownership and usage. |
| • Lack of last mile infrastructure | • Presence of last-mile coverage of telecom/ internet coverage | | Private sector: Example - Airtel's Open Network database<br>Government databases: Example - BBNL's mobile app for monitoring of BharatNet project |
| • Lack of electricity infrastructure | • Presence of electricity infrastructure | | Government databases. For example, see here |
| • Affordability of Voice/Data services | • Tariffs of data/ voice services | | • Tariffs of 500 MB/1 GB data consumption, offered by largest |

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| | | | telecom service provider, by market share. |
| • Affordability of Voice/Data services<br>• Affordability of electricity<br>• Device affordability<br>• Cost of commute | • Per capita income by sex | | • National Statistics Organizations of respective countries or other limited surveys done to calculate the average monthly incomes of males and females respectively. |
| • Affordability in International Connectivity | • Number of women working abroad as proportion of total labor force<br>• Number of men working abroad as proportion of total labor force | | • National labor force surveys<br>• Labor force surveys in destination countries<br>• International Labor Organization (ILO) surveys or databases |
| • Affordability in International Connectivity | • International call termination rates | | • International termination rate benchmark studies |
| • Affordability of electricity | • Power tariffs | | • State/ private electricity utility data |
| • Affordability of electricity | • Power consumption by households | | • Sales data from private companies that sell standalone household power generators |
| • Device affordability | • Device prices | | • Prices of largest mobile manufacturers, by market share<br>• Periodic studies released by organizations like GSMA. |

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| • Cost of commute, time of commute | • Transportation methods, per km travel cost and popularity of modes for women | • Surveys on the target population<br>• | • Digital maps such as Google maps<br>• Local transportation authorities and/or companies |
| • Time constraints<br>• Gender blind/ male centric environment for digital entrepreneurs (childcare facilities) | • Details of typical women's lifestyle: economic activities, reproductive tasks, flexible and rigid times for activities, primary and secondary responsibilities for child care | • Surveys of the target population<br>• Focus group discussions with small groups of women representatives of the target population | • Previous studies done on the same or similar communities<br>• |
| • Time constraints (childcare) | • Fertility rates | • Surveys of the target population<br>• Focus group discussions with small groups of women representatives of the target population<br>• Previous studies done on the same or similar communities | • Census/ National Statistical organizations |
| • Time constraints (commute time) | • Commute time by mode of transportation | • Surveys of the target population | • Digital maps such as Google maps |
| • Lack of relevant content | • Priority of women in terms of digital government service delivery or other ICT interventions; services that have the highest ability to improve women's lives | • Focus group discussions with small groups of women representatives of the target population | • Previous studies done on the same or similar communities |

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| • Lack of relevant content | • Current usage of digital government services, by sex | • Primary data collection through FGDs with targeted citizens | • Government data of e-service delivery users (if available)<br>• Previous studies done in the same or similar communities |
| • Lack of relevant content | • Current usage of offline government services, by type of service and sex | • Focus group discussions with groups of women representatives of the target population | • Government data (if available)<br>• Previous studies done on the same or similar communities. |
| • Lack of comprehensible content | • Average number of languages known by men and women; and name of languages most commonly known | | • Census |
| • Lack of comprehensible content<br>• Lack of digital literacy<br>• Barriers to accessing RTI | • Female and male literacy rates | | • Census |
| • Lack of breeder/ prior identification documents<br>• | • Gender gap in documentation | • Representative survey of target population | • Civil registries/ national databases (if sex disaggregated data is available) |
| • Social constraints on economic/ residential mobility<br>• Social constraints on interactions between the sexes | • Male and Female LFPR | | • International Labor Organization, ILOSTAT Database (Further reading)<br>• Country Census databases<br>• Data from surveys done by National |

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| | | | Statistical organizations |
| • Social constraints on interactions between the sexes<br>• Social constraints on economic/ residential mobility | • Social constraints on economic/ residential mobility | • FGDs/ IDIs with representatives of women groups/ gender experts | |
| • Social constraints on economic/ residential mobility | • Population distribution in rural/ urban areas by sex | | • Census databases |
| • Social constraints on physical mobility | • Issues such as:<br>• Who bears the primary 'responsibility' for dealing with issues requiring interface with government/ people outside the home?<br>• Women's role in the domestic/ social/ economic sphere<br>• Are women free to leave the home without a male chaperone or permission?<br>• Is there discrimination against women who visit government offices?<br>• What is the ratio of female-male employment in government offices? | • FGDs with women of varying education and income levels<br>• FGDs and key informant interviews with local community leaders, experts, information officers and civil servants<br>• Observation and interviews with government office visitors | • Sociological studies from the country in question (or comparable country based on location, level of development, HDI rank etc.<br>• Public sector employment data |
| • Gender gap in perceived | | • FGDs with women/local communities | • Previous studies/ surveys on existing identity |

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| need for identification? | | could be done to understand perceptions. | cards or surveys on national identity done in comparable countries. |
| • Social constraints on interactions between the sexes<br>• Fear of data privacy violation preventing uptake of services | • Can women leave the home without a chaperone?<br>• Is sexual harassment in public spaces common?<br>• Is it common for women to work outside the home in non-family based employment? | • FGD/ IDIs with target women and gender experts | • Previously conducted studies on mobility and sexual harassment |
| • Social norms against women's ICT use | • Attitudes in local communities on women's ICT use | • FGDs; attitude surveys of the target population | • Previous studies done on the target communities |
| • Gender bias against women pursuing STEM education and ICT related employment<br>• Low representation of women in STEM | • Percentage enrolment of women in engineering courses in the country | | • Education sector statistics by gender |
| • Gender bias against women pursuing STEM education and ICT related employment<br>• Low representation of women in STEM<br>• Opportunity to increase | • Number of women working in the IT/ ITES domain as a proportion of total employees in the sector | | • Data from IT/ ITES provider companies |

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| representation of women in the information security domain | | | |
| • Gender bias against women pursuing STEM education and ICT related employment | • Are teachers aware of the need to encourage girls actively to pursue careers in STEM?<br>• Do schools conduct any awareness programs for parents on girls and STEM?<br>• Do families and local community (men, women, authorities, etc.) have negative perceptions towards women and girls pursuing education and jobs in ICT fields or STEM subjects? | • Interviews and FGDs with Local gender experts, school parent-teacher organizations, community based organizations | • Previous studies done in the target geographies |
| • Discriminatory laws and procedures | • Presence of discriminatory laws and procedures | • | • Government documents on procedures for obtaining identification; policies of mobile network operators |
| • Fear of data privacy violation preventing uptake of services | Adequacy of privacy laws | • Discussions with privacy/ digital activists | • National laws, media coverage of salient issues |
| • Fear of data privacy violation preventing uptake of services | • % of mobile money agents who are male, prevalence of practice of men having multiple mobile connections to their name | | • Data from MNOs |
| • Fear of data privacy | • Information if women are afraid of | • FGDs with women in | |

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| violation preventing uptake of services | sharing contact details with men and prevalence of sexual harassment over the phone | target communities, discussions with local gender experts | |
| • Gender blind online safety legislation | • If the current legislation adequately addresses online gender based violence | • Discussions with local cyber/ gender experts | • Relevant legislation and policy documents |
| • Gender blind online safety legislation<br>• Lack of enforcement capacity to handle online gender based violence<br>• Lack of awareness of cyber-safety/ information security/ privacy threats | • Prevalence of complaints against online gender based violence and their resolution (as reflected by number of people charge-sheeted)<br>• Proportion of cyber-crime reported by women<br>• Types of cyber-crime reported by women by type? [ Sexual harassment, versus phishing versus malware etc.] | | • National crime bureau data |
| • Lack of enforcement capacity to handle online gender based violence | • Presence of cyber-crimes unit; reporting mechanism for gender based online crimes (e.g. hotline/ special police desk); ability of staff to deal with gender based violence, ease with which victims are able to report the crime | • Discussions with victims of cyber gender based violence, gender/ cyber-experts | • Internal reports on law enforcement authorities |
| • Lack of awareness of cyber-safety/ information | • Ascertaining the prevalence of a gender gap in knowledge of how to deal with cyber | • FGDs, discussion with cyber-experts would help reveal | |

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| security/ privacy threats | risks online, gender gap in knowledge on how to report cybersecurity and online safety issues to law enforcement officers | answers to the qualitative questions. | |
| • Lack of awareness of cyber-safety/ information security/ privacy threats | • % of female online users who are aware of data consent mechanisms/clauses; % of women who know what general issues these clauses cover, and are aware of the implications for the security of their personal information | • Surveys of internet users, collecting sex disaggregated data | |
| • Lack of financial inclusion | • Male/ female access to bank accounts (commercial/ payments or small finance banks) | | • World Bank's Global Findex, the FinScope Survey and Financial Inclusion Insight Surveys.<br>• Bank regulator in the country |
| • Lack of financial inclusion | • Reach of ATMs in urban/ rural areas | • | • Website of banking regulators of the respective country |
| • Lack of digital literacy<br>• Lack of trust in modern technology | • Gender gaps in digital skills [measured at different competency levels] | • Testing/ surveys based on self-reported digital skills | |
| • Lack of complementary non- ICT skills | • Skill gap in women entrepreneurs/ coders in ICT domain | • Local gender experts to determine awareness, skills (technical and non-technical) women need to develop | |

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| | | • Targeted interviews with businesses | |
| • Lack of trust in modern technology | • Self-reported barriers in use of digital tools | • FGDs/ Surveys with target population | • GSMA also has had two surveys (2010 and 2015) to measure gender gap in mobile ownership and usage and barriers hindering female access. |
| • Gender blind/ male centric environment for digital entrepreneurs (Access to finance) | • Availability of finance for female/ male entrepreneurs | | • Previous studies on access to finance to male/ female entrepreneurs<br>• Data from banking regulators/ sourced from banks/ MFIs |
| • Gender blind/ male centric environment for digital entrepreneurs (Access to finance) | • Ease of access to finance | • Discussions with female entrepreneurs, banking experts | • Central bank requirements on loan disbursal, review of private sector loan pre-conditions |
| • Gender blind/ male centric environment for digital entrepreneurs (Access to finance) | • Presence of special schemes for female entrepreneurs in ICT, proportion of female beneficiaries of such schemes | | • Government websites on MSME development<br>• Data from private financial institutions – banks/ MFIs<br>• Central bank requirements |
| • Gender blind/ male centric environment for digital entrepreneurs (Access to finance) | • Number of male/ female digital entrepreneurs accessing funds through angel networks, venture funds | | • Data from private venture funds/ angel networks |

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| • Gender blind/ male centric environment for digital entrepreneurs (childcare facilities) | • Availability of child care facilities near homes, incubator program locations<br>• Cost of child care facilities per day and if it is subsidized | • Interviews with emerging and established female entrepreneurs, managers of incubator ecosystem | • Government maternity guidelines to see if child care facilities are subsidized |
| • Gender blind/ male centric environment for digital entrepreneurs (business registration process) | • Ease of getting business registration for female digital entrepreneurs | | • Website and staff at government business registration offices, female business networks |
| • Gender blind/ male centric environment for digital entrepreneurs (lack of access to networks and markets) | • Presence of associations/ formal/ informal networks of digital entrepreneurs and the representation of women on them | • Interviews with active members of formal networks to understand representation of women on them<br>• Interviews with female entrepreneurs | |
| • Lack of processes in decision-making that encourage women's inclusion | • If priority is given to gender-mainstreaming in ICT/ sector policies; if yes, the specific goals and targets set for gender-based outcomes; sex-disaggregated indicators being monitored; if gender budgeting is being undertaken | | • ICT sector policy documents |
| • Lack of processes in decision-making that encourage women's inclusion | • If policy consultations are held with representatives of women's groups, number of gender experts represented | • Key stakeholder interviews | • ICT sector policy documents |

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| • Lack of institutional capacity on gender | on policy committees, if gender analysis is conducted before policy decisions are taken | | |
| • Lack of institutional capacity on gender | • Representation of gender experts/ women in the relevant departments and line ministries, number of trainings undertaken for relevant personnel to mainstream gender | • Key stakeholder interviews | Organizational data from the government |
| • Lack of sex-disaggregated data on ICT | • Availability of sex-disaggregated data relevant to the ICT sector (including ownership/ use and workforce data) | | • Analysis of the following statistics-<br>• Supply-side statistics<br>• National labor force surveys<br>• Nationally representative consumption side surveys<br>• Nationally representative education sector surveys<br>• Existing ICT gender gap assessments<br>• Nationally representative demand side surveys<br>• Qualitative studies on gender barriers to ICT use<br>• Qualitative studies on gender inequalities in general |

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| • Barriers to accessing RTI | • Awareness of RTI among women, level of political and civic participation among women | • FGD/ Surveys with women of varying education and income levels | |
| • Barriers to accessing RTI | • Simplicity of RTI procedures/ accessibility through multiple modes, availability of templates for application | • FGDs and key informant interviews with women, local community leaders, experts, information officers and civil servants. | RTI/ATI legislation (if it exists) and published procedures/ protocols |
| • Lack of awareness and capacity in IPR | • Gender gap in-<br>• applications for patents/ copyrights/ trademarks<br>• infringements or disputes originated by women<br>• representation of women in design and development fields in the ICT sector | | • National intellectual property office<br>• Data available under Patent Cooperation Yearly Treaty Review, World Intellectual Property Organization (WIPO)<br>• National labor force surveys<br>• Tertiary educational enrolment data (sex disaggregated) |
| • Lack of awareness and capacity in IPR | • Gender gap in awareness of IPR processes and protocols | • Surveys of women working in development and design of computer programs and ICT modes etc. | |
| • Opportunity of Gender-sensitivity in PPP | • If gender has been mainstreamed in the current PPP legal framework | | • PPP model agreements |

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| • Opportunity to ensure QoS indicators account for women's differential usage | • Gender differences in internet use (mode and function) | • Surveys of QoS perceptions among men vs women; QoS tests conducted on a random sample of male and female broadband users (including down/upload speeds, jitter, latency, packet loss measurements) | • National surveys of broadband usage among men vs women |
| Opportunity to increase representation of women in the information security domain | Current representation of women in the information security workforce | | Employment data from IT companies/ industry association<br>Government employment figures |

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