



# Digital inclusion – recent trends and messages

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## Question

What are the most important trends, issues, and messages emerging from policy-relevant research on digital inclusion in international development? Please provide an annotated bibliography summarising the main messages from recent landmark studies of digital inclusion.

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# 1. Overview

This annotated bibliography collates extracts from recently published flagship policy reports on digital inclusion in international development, highlighting the key messages, trends and issues. The digital inclusion agenda seeks to close the gaps in access to, and adoption of, fast evolving information and communication technology (ICTs) services, particularly mobile phones and the internet. It is an important aspect of the Sustainable Development Goals (SDGs) as both an end and a means to the cross-cutting policy aim of 'leaving no one behind'. The potential gains from digital technologies are high, however they often remain unrealised (World Bank, 2016).

There is a **large amount of recently published policy relevant literature** on this broad ranging subject. All of the literature remarks on the gender digital divide, and some papers focus entirely on this divide (see section 3). However, other dimensions - such as disability - were not highlighted as important issues or included in the executive summaries.

**Key messages** emerging in the literature include:

- Nearly all countries in the world saw **improvements to their ICT technologies** in 2016, according to the ICT Development Index (IDI), yet the gap between the highest and lowest performing countries (one measure of the digital divide) remained almost unchanged since 2015 (ITU, 2017a).
- **Mobile phone** ownership in the developing world was about 80% in 2015, and steadily rising (World Bank, 2016). Factors contributing to this trend include: the mobile industry's expanding infrastructure and improving quality of service leading to better mobile networks, increased connectivity for those previously excluded, and increasing user sophistication in using mobile phones and digital services (GSMA, 2017).
- **Global internet penetration** is increasing and is expected to reach 50% in 2017, up from just 20% a decade ago (A4AI, 2017). Factors contributing to this trend include: increasingly availability of mobile broadband rather than fixed broadband, and rising internet bandwidth (ITU, 2017c).
- Increased access to ICT allows many people to **access services and information that previously were out of reach**, e.g. those in rural areas, people with disabilities (World Bank, 2016).
- **Increases in access to ICT does not necessarily translate into increased usage.** E.g. While most people in the world live in areas where mobile-broadband services are offered, many people do not actually use them.
- **Effective usage of ICTs** is shaped by a range of issues such as the quality of access to ICTs (internet access in the home or in public access points, the speed of connection), the skills individuals have (literacy), and a range of socioeconomic factors.
- **Persistent digital divides** intersect across gender, geography (rural/urban), age, education, and income dimensions within each country.
- The **gender gap** means that the proportion of women using the Internet is 12% lower than the proportion of men using the Internet worldwide (ITU, 2017b). While this gap has narrowed in most regions since 2013, it has widened in Africa. Women on average are 14% less likely to own a mobile phone than men in low and middle income countries (GSMA, 2015).

- There are **many barriers** to digital inclusion. E.g. on the **supply side**, infrastructure costs for delivering new technologies are often too high to lead to investment and innovation operating expenses for delivering to rural populations will remain high and revenues low. On the **demand side**, some people remain unconnected despite living in areas with viable Internet access due to (digital) illiteracy and the lack of locally relevant content. ICT services unaffordable for many (GSMA, 2014). Social norms shape who is confident to use new technologies and who is allowed to own devices.
- **Technology is often presented as a silver bullet solution** to international development challenges such as inclusion, however it can exclude more than include.
- **The digital divide looks set to entrench already existing power imbalances.** (Ramalingham & Hernandez, 2016). Access to the Internet is not enough; policy-makers must address broader socio-economic inequalities and help people acquire the skills they need to take full advantage of the Internet (ITU, 2017a).
- A **data** revolution is needed to better understand who uses the Internet, where and how. (ITU, 2017a), especially disaggregated by gender and by other typically discriminated groups (Broadband Commission, 2017).
- Progress on ICT requires **collaboration and partnerships** across diverse and private and public actors, including related to funding (GSMA, 2017; Broadband Commission, 2017).
- The **pace of policy change** has so far been 'far too slow' (A4AI, 2017; World Bank, 2016), possible solutions to explore include: employing public access solutions to close the digital divide, fostering market competition and protecting consumers through policies; promoting infrastructure and resource sharing through clear policy incentives and regulatory certainty; and making effective use of universal service and access funds (A4AI, 2017). Digital development strategies need to be broader than ICT strategies (World Bank, 2016).

It appears from this rapid review of the literature that the digital inclusion concepts used in the reports reviewed in this query have developed in tandem with the 'leaving no one behind' agenda, as demonstrated by the explicit references many make to the SDGs and the language of 'inclusion'. Bringing these two agendas together could use the 'digital inclusion' agenda focus on: disaggregating data and understanding how digital development relates to existing power imbalances; and DFID's<sup>1</sup> policy commitment to prioritise the 'most excluded' in DFID's work.

## 2. Digital inclusion - general

**Alliance for Affordable Internet (A4AI) (2017) 2017 Affordability Report, p.4-5**

<http://1e8q3q16vyc81g8l3h3md6q5f5e.wpengine.netdna-cdn.com/wp-content/uploads/2017/02/A4AI-2017-Affordability-Report.pdf>

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<sup>1</sup> (a) Every person counts and needs to be counted; (b) Every person should have a fair opportunity in life no matter who or where they are; and (c) People who are furthest behind, have least opportunity and are the most excluded must be prioritised. See - DFID (2017) Policy paper. Leaving no one behind: Our promise. <https://www.gov.uk/government/publications/leaving-no-one-behind-our-promise/leaving-no-one-behind-our-promise>

What progress has been made towards universal, affordable internet provision? This annual paper examines progress toward affordable internet provision by creating a composite “Affordability Drivers Index” (ADI) comparing the policy frameworks in place across 58 low- and middle-income countries, and through illustrative case study analysis (p.38-41). It focuses on what changes countries have made to drive prices down and expand access, and what areas they should focus on to enable affordable connectivity for all. It focuses on two key aspects driving affordability: communications infrastructure and access. **Key findings** include:

**Global internet penetration will reach 50% in 2017**, a significant milestone, especially considering that just ten years ago barely over 20% of the world’s population was online (p.6). But for the half of the world that remains offline — mostly women in developing countries — this means being left even further behind as the digital revolution steams ahead. While affordable, universal internet access by 2020 is a SDG goal, without urgent policy action, we will miss this target by over 20 years. (p.5)

**High connectivity costs remain one of the biggest obstacles** to achieving the universal access pledge. Although broadband prices are falling, they are not falling fast enough, leaving low income earners and other marginalised populations unable to afford even a basic connection. (p.5)

**The pace of policy change has been ‘far too slow’**. Just 50% of countries have policies to support public access that are also backed by some financial support for implementation, resulting in unfulfilled public access plans. Only 45% of countries have developed plans to reduce costs by facilitating resource sharing (e.g., sharing of infrastructure) among telecommunications companies. Effective implementation of such policies is even rarer. Only one in three countries has a detailed, time-bound plan for making more spectrum available to meet increasing mobile broadband demands. In over a third of countries, Universal Service and Access Funds, an important tool to finance strategic investments in the sector, do not exist or are dormant. National broadband plans - an overarching framework for policy reform to drive universal access — are badly out of date, or have never been developed, in 41% of countries surveyed. (p.4,7)

**The report recommends:** employing public access solutions to close the digital divide (e.g. subsidised access in schools, public WiFi, and community networks) and to reach groups that cannot pay for regular internet use, even once prices have reduced. Fostering market competition and protecting consumers through policies. Promoting infrastructure and resource sharing through clear policy incentives and regulatory certainty. Making effective use of universal service and access funds — which collect contributions from operators to subsidise the expansion of ICT in underserved communities. Ensuring effective broadband planning turns into effective implementation (p.5)

**Caribou Digital (2016) Digital Access in Africa. Caribou Digital Publishing, p.2-3**

<http://cariboudigital.net/new/wp-content/uploads/2015/11/Digital-Access-in-Africa-Caribou-Digital-and-DFID.pdf>

How can universal digital access be achieved in Africa? This report summarises recent debates, based on synthesis and analysis of current research, primary user research, and expert interviews. The key points are:

**There is a need for new Internet access models** as existing models struggle to reach the whole population, particularly in rural areas with coverage issues, and at the lower end of the income spectrum where affordability is an issue. Users with a “metered-mind set” are constantly aware of access prices and use the Internet in a more constrained and less productive way. Even once basic Internet is offered it does not necessarily lead to effective usage, as other factors constrict productive usage (e.g. language content and the limitations of cheap mobile devices). (p.2)

**There are many barriers to scaling Internet access.** On the supply side, the infrastructure costs for delivering new technologies with as yet unproven business models are a key barrier. Operating Expenses for delivering fast broadband data to rural populations will remain high, and revenues low, and new business models and — more importantly — innovative service models that address how Internet access sits alongside, or uses the infrastructure, of banking, retail, and other already successful businesses, will be needed with funding from donors and the private sector (e.g. mobile operators and tech companies). Whatever Capital Expenditure investment there is, from whichever source, there are not yet clear break-even business models for connecting rural populations. **Regulations can support and nurture new business models** e.g. in spectrum policies, taxation policies. (p.3)

**Demand side barriers are significant, and require new content and services to overcome them.** Some people remain unconnected despite living in areas with viable Internet access. Some research indicates this is partly because there are not compelling reasons to come online in the first place. The discoverability of local content in local languages and the ability to produce local content will remain critical issues to stimulate demand for internet access beyond social media (p.3).

**Zero-rating and free services are not necessarily the answer.** It is not clear from the primary user research in this report that these services are bringing the unconnected online for the first time. Governments can play a key role in driving the adoption of Internet by improving access to critical services. (p.3)

**Measuring the impact of access to the Internet requires us to look at the positives and negatives in a balanced, nuanced way.** The WDR2016 challenged many of the previous linear causalities posed that linked Internet connectivity to economic, democratic, and social progress. There is a need for a more detailed debate that measures the benefits of connecting people to the wealth of available knowledge online, but which is also sensitive to how digital platforms have redistributed wealth and reorganised labour globally (p.3).

Connecting the last four billion users in the world to the Internet may well bring wealth and opportunity, but the question remains unanswered whether this will be for the end-users, or for a small few platform owners, none of whom will likely reside in Africa (p.3).

#### **GSMA (2014) Digital Inclusion 2014. GSMA, p.4**

[https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/11/GSMA\\_Digital-Inclusion-Report\\_Web\\_Singles\\_2.pdf](https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/11/GSMA_Digital-Inclusion-Report_Web_Singles_2.pdf)

What are the barriers to digital inclusion? This report explores four **types of barriers to mobile internet adoption** prioritised by GSMA's Digital Inclusion programme:

**Network infrastructure and policy.** Network coverage is critical for access to the mobile internet. The economic case for mobile operators to expand networks into remote, rural areas is challenging because of the cost of maintaining and powering cell towers in remote, off-grid locations, combined with lower revenues expected from thinly spread, low income populations. Industry solutions to address this barrier include infrastructure sharing and use of renewable energy for powering off-grid cell towers. Government policies can also support increased network coverage including timely release of low frequency spectrum, supporting voluntary network sharing and providing public subsidies for networks.

**Taxation.** The combination of low incomes, the cost of the device, charging fees, and data plan payments create an affordability barrier to accessing the mobile internet. This issue is compounded by government taxes and fees, such as airtime taxes and handset taxes. Taxes on mobile consumers restrict access and usage by reducing affordability, while taxes on mobile operators limit incentives for investment in networks. Yet the mobile sector is often subject to higher taxation than other sectors. Reducing mobile taxes has been demonstrated to increase digital inclusion, as well as mobile operator investment, leading to a greater economic contribution from the mobile industry which ultimately expands the tax revenue base for governments.

**Consumer barriers.** Illiteracy, digital illiteracy and lack of internet awareness are consumer barriers to mobile internet adoption. In developing countries illiteracy is most prominent across rural areas and marginalised groups, such as the poor and youth, and causes a major challenge in accessing internet content which is predominately text based. Combined with an overall lack of awareness about the internet and its potential uses and benefits, this creates a significant barrier for mobile internet adoption, even where coverage and affordability issues have been addressed. Building awareness of the internet and required skills in the developing world will require the work of multiple stakeholders with respect to the delivery of awareness building campaigns and literacy training programmes.

**Local content** - Content plays a vital role in the adoption of mobile internet in developing countries, however, at present most content is in English and is largely focussed on data-heavy smartphone apps. Smartphone penetration is still low in the developing world and English is not the primary language for most of the populations, thereby limiting accessibility and usefulness of the content. To reach the widest audience, content needs to be available on as many devices as possible in languages the users understand, as well as being relevant to their local needs and interests. E-government services are emerging as a major source of local content for mobile internet in developing countries, and are a driver for use of mobile internet.

## GSMA<sup>2</sup> (2017) 2017 Mobile Industry Impact Report: Sustainable Development Goals, p.9-12

[https://www.gsmaintelligence.com/research/?file=f62a94c22f3f7e90fc2165a8dd5b44bc&download=&utm\\_source=website&utm\\_medium=button&utm\\_campaign=Track\\_Downloads&utm\\_term=SDGs&utm\\_content=PDF](https://www.gsmaintelligence.com/research/?file=f62a94c22f3f7e90fc2165a8dd5b44bc&download=&utm_source=website&utm_medium=button&utm_campaign=Track_Downloads&utm_term=SDGs&utm_content=PDF)

How is the mobile phone industry contributing to the SDGs? This is the second annual report to monitor the mobile phone industry's influence on the progress of the SDGs. It finds that the greatest improvement in 2016 was in SDGs 3 (Good Health and Well-being), 11 (Sustainable Cities and Communities), and 13 (Climate Action). For all three, enhanced connectivity, network quality and resilience are the key drivers behind the industry's increased impact. The Goals where the industry is contributing the most are SDGs 9 (Industry, Innovation and Infrastructure), 13 (Climate Action), and 11 (Sustainable Cities and Communities). The overall impact remains lowest for SDGs 14 (Life below Water), 2 (Zero Hunger), and 6 (Clean Water and Sanitation) (p.9). The report identifies the following trends:

**Better networks.** Mobile operators have invested heavily in expanding infrastructure and improving quality of service. More than half the world's population – around 4 billion people – are now within reach of a 4G network, while 350 million more people were covered by a 3G network in 2016, bringing overall 3G coverage to 83%. In addition to providing access to mobile services, wider coverage, improved network quality and resilience play a critical role before and during epidemics, conflicts and natural or climate-related disasters. (p.10)

**More connectivity.** Operators continue to connect the unconnected, with 230 million new subscribers in 2016, bringing the total to 4.8 billion (65% penetration); 350 million new mobile internet subscribers, bringing the total to 3.5 billion (48% penetration); and 100 million more cellular machine-to-machine connections, bringing the total to 410 million. The economic and social benefits of this are wide-ranging, with connectivity driving improvements in economic growth through improved productivity, infrastructure development and efficiency. Operators have been particularly proactive in pursuing more innovative solutions to roll out mobile networks in remote areas, making mobile services more affordable to the poorest individuals and driving efforts to accelerate digital inclusion for women. (p.10)

**Doing more with mobile.** Users are becoming increasingly sophisticated in how they use their mobile phones and are starting to access more advanced mobile-enabled services. In 2016 more than 100 million new mobile money accounts were registered to reach a total of more than half a billion, allowing users to access financial services that enable them to make investments and manage expenses. There were also 500 million new users of social media on mobile to reach a total of 2.5 billion, helping promote social and political inclusion and facilitating the development of education networks (p.11).

However, **the industry still has far to go** to support universal access, to scale up new solutions, to help fill gaps in health, education, finance and utilities through the development of mobile-

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<sup>2</sup> The GSMA represents the interests of mobile operators worldwide, uniting nearly 800 operators with more than 300 companies in the broader mobile ecosystem (including handset and device makers, software companies, equipment providers, internet companies, and organisations in adjacent industry sectors).  
<https://www.gsma.com/aboutus/>



enabled solutions, to connect the unconnected and expand the range of services and digital solutions offered (p.12). The report finds the most progress to date is in SDG 9 (with the score of 45 out of 100).

The paper concludes that it is critical that operators continue to work together as an industry and establish partnerships and collaborations with a range of organisations – governments, international organisations and other industries – to maximise efforts towards the SDGs. As the mobile industry looks to meet the demands of a digitalised world, the need to work with governments to develop pro-investment conditions and modernised regulatory policies has never been greater. Both industry and governments must approach this digital revolution with the right mix of policies, regulation and consumer protection while providing the framework for companies to compete and innovate.

### **International Telecommunication Union (ITU)<sup>3</sup> (2017a) ICT facts and figures 2017. ITU**

<https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2016/MISR2016-w4.pdf>

The ITU ICT Development Index (IDI) tracks annual ICT development, the 2016 report covers 175 countries. The IDI combines eleven indicators on ICT access, use and skills, and allows for comparisons across countries and over time. Key findings by chapter are:

**Global analysis of ICT trends.** Nearly all countries improved their IDI values over the last year, but great disparities continue to exist between more and less connected countries. The gap between the highest and lowest performing countries – one measure of the digital divide – remained almost unchanged in 2016. The top 10 countries in the IDI rankings in 2016 include three economies in the Asia-Pacific region, and seven European countries. This reflects the high level of ICT investment and innovation occurring in developed and high-income developing economies. Most high-performing countries have liberalized and competitive ICT markets that encourage innovation. They also have populations with relatively high incomes and the skills needed to make effective use of ICTs. There is a strong association between economic and ICT development, with least developed countries at a disadvantage. There has been greater improvement in ICT use than access.

**The ICT Development Index (IDI) – regional and country analysis.** The 2016 IDI finds a strong association between national and regional levels of ICT development, and the level of social and economic development. While the overall regional IDI values did not shift dramatically compared to 2015, some countries made significant progress because of infrastructure investment and changes in policy and regulation. Europe continues to lead the way in ICT development. While several countries in the Americas significantly improved their performance in the IDI. The Commonwealth of Independent States (CIS) is the most homogeneous region in terms of ICT development. By contrast, the Asia and the Pacific region is the most heterogeneous. There is great diversity in ICT development across the Arab States. Africa is the region with the lowest IDI performance. Investment, policy and regulation influence the performance of individual countries.

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<sup>3</sup> ITU is the UN specialised agency for ICTs



**The role of ICTs in monitoring the SDGs.** Several SDGs refer to ICTs and technology, and several ICT indicators were identified to help track progress including: Monitoring access to computers and the Internet in schools (under SDG 4); Monitoring ICT skills among youth and adults (SDG 4); Monitoring the role of ICTs in women's empowerment (SDG 5); Monitoring the growth of access to ICTs and the Internet (SDG 9); Monitoring the contribution of ICTs to science, technology and innovation (SDG 17); and Monitoring the use of ICTs as an enabling technology (SDG 17).

**ICT prices.** Many people continue to be excluded from the global information society, and the relatively high cost of ICT services remains one of the main barriers to ICT uptake. Monitoring prices is critical for developing policies that aim to make ICT services affordable for all citizens. The report finds that mobile-cellular prices continued to fall in 2015, and more steeply than in previous years. The Asia and the Pacific region has the lowest average PPP\$ price for mobile-cellular services of all regions. Fixed-broadband prices continued to drop significantly in 2015 but remained highest – and clearly unaffordable - in several LDCs. People in most low-income countries get lower speeds and quality for their money. Mobile-broadband is cheaper and more widely available than fixed-broadband, but is still not deployed in most LDCs. The decrease in mobile-broadband prices goes hand in hand with an increase in the intensity of use.

**Mobile uptake.** Many people still do not own or use a mobile phone. Most people who do not own or use a mobile phone are among the youngest (5-14 years old) and the oldest (>74 years old) segments of the population. Significant gender gaps exist in mobile-phone adoption and the gap is larger for mobile phone ownership than for mobile-phone use. People living in rural areas are less likely to own or use a mobile phone than people in urban areas. Affordability is the main barrier to mobile-phone ownership. Universal use of mobile-cellular services has not been achieved yet. Mobile phone adoption has largely been monitored based on mobile-cellular subscription data. However, since many people have multiple subscriptions or devices, other metrics need to be produced to accurately assess mobile uptake, such as the number of mobile phone users or mobile phone owners.

**Internet user and activity trends.** The benefits of the Internet are still unavailable to over half the world's population. Most people have access to Internet services but many do not actually use them. The full potential of the Internet remains untapped, especially for low-income and less educated users. The Internet is liable to reinforce existing inequalities, instead of addressing them. Access to the Internet is not enough; policy-makers must address broader socio-economic inequalities and help people acquire the skills they need to take full advantage of the Internet. A data revolution is needed to better understand who uses the Internet, where and how.

#### **ITU (2017b) ICT facts and figures 2017. ITU.**

<http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf>

The most recent data in the annual ITU factsheet finds:

**Youths (15-24 year olds) are at the forefront of Internet adoption.** In developing countries, on average 67% of young people aged 15-24 use the Internet, this reduces to only 30% in Least Developed Countries (LDCs). Out of the 830 million young people who are online, 320 million (39%) are in China and India. Nearly 9 out of 10 young individuals not using the Internet live in Africa or Asia and the Pacific (p.1).

**Only 43% of households in developing countries have Internet access at home**, this lowers to 15% in LDCs. In these countries, many Internet users are accessing the Internet from work, schools and universities or from other shared public connections outside the home. (p.2)

**The digital gender gap persists.** The proportion of women using the Internet is 12% lower than the proportion of men using the Internet worldwide. While the gender gap has narrowed in most regions since 2013, it has widened in Africa. In Africa, the proportion of women using the Internet is 25% lower than the proportion of men. In LDCs, only one out of seven women is using the Internet compared with one out of five men. There is a strong link between gender parity in the enrolment ratio in tertiary education and gender parity in Internet use (p.3).

**Broadband is increasingly mobile.** Mobile-broadband subscriptions have grown more than 20% annually in the last five years, while fixed-broadband subscriptions have increased by 9%. Despite the high growth rates, there are four times as many mobile-broadband subscriptions per 100 inhabitants in developed countries as in LDCs. Fixed-broadband uptake remains very limited in LDCs, with only one subscription per 100 inhabitants. (p.4-5) Mobile broadband is more affordable than fixed-broadband services in most developing countries. However, mobile broadband prices represent more than 5% of GNI per capita in most LDCs and are therefore unaffordable for the large majority of the population (p.6).

**Fibre deployment is increasing fixed broadband speeds in developing countries.** However, despite the worldwide increase in high-speed fixed-broadband subscriptions, there remains a lack of high speed connections in the developing world, with a penetration rate of 6% (1.6% excluding China) compared with 24% in developed countries (p.6).

**International Internet bandwidth grew worldwide** by 32% between 2015 and 2016. Africa experienced an increase of 72% during this period, the highest of all regions. Developing countries saw a compound annual growth rate in telecommunication revenue of 6.6% in the period 2007-2015. Developing countries are home to 83% of the global population but generate only 39% of the world's telecommunication revenues (p.7).

#### **ITU (2017c) Maximising availability of international connectivity in developing countries: Strategies to ensure global digital inclusion**

<http://handle.itu.int/11.1002/pub/80f5eade-en>

What are the barriers to, and possible policies for, improving international connectivity for global digital inclusion? This report aims to build awareness of the challenges, strategies and possible options for improving international connectivity. It draws on data from case study analysis to discuss the technical, economic and policy or regulatory constraints. It identifies the following barriers to connectivity:

**Limited local network infrastructure.** In 2015, there were still an estimated 350 million people out of reach of a mobile network. Although 89% of the world's urban population is now covered by a 3G network, only 29% of the 3.4 billion people living in rural areas have 3G coverage.

**Low-income levels and/or lack of electricity.** International connections are often relatively costly. Some countries are land-locked, unable to reach the global backbones without the additional cost of traversing their neighbours. Small island nations isolated by large stretches of ocean may have difficulties recovering the cost of the necessary infrastructure.

**Policy and regulatory environment.** In some countries, governments have not stepped in to build demand for ICT services, or the policy and regulatory environment may constrain investment in local and international infrastructure, especially when there is an absence of neutral platforms where stakeholders can meet and exchange information.

**Lack of experience in the wide range of technical and economic fields required.** Such as in laying of cables in deep waters and setting up satellite earth stations, to the business and ownership strategies of the large consortia of operators and investors that finance international projects. These and many other aspects of international network deployment and operation must work seamlessly together to ensure that there is sufficient demand for and supply of international connectivity.

**Ramalingham B., & Hernandez, K. (2016) The multiple forms of digital inequality. *World social science report, 2016: Challenging inequalities; pathways to a just world*, p.68-69**

<http://unesdoc.unesco.org/images/0024/002459/245938e.pdf>

The digital revolution, like every other revolution, has produced winners and losers. Inequalities stemming from social stratification are strongly correlated with digital inequalities: the digital world frequently mirrors the analogue one and reinforces it.

Tangible dimensions of digital inequality include: apparatus inequality - relating to differing levels of physical and technological ownership and access, based on the presence and adequacy of hardware, software and connectivity; and spatial inequality - concerning differences in digital coverage and participation between urban and rural areas, city centres and outskirts, and developed and developing countries. Tangible and intangible dimensions are intricately interwoven and cannot easily be tackled in isolation from each other, or from other forms of inequality.

This paper recommends: (1) a better understanding of the many forms of digital inequality requiring collaboration between social, computing, humanities and physical sciences; (2) tackling digital inequalities requires broader societal, political and economic engagement to avoid narrow views of problems and solutions; and (3) relinquishing views of the digital bottom 4 billion as passive agents waiting to be reached through elaborate technological innovations. Just as broader debates and efforts on inequality are moving beyond notions of 'reaching the poor' and towards empowering them, we must start thinking and doing more in the emerging realm of digital empowerment.

**Toyama, K. (2011). Technology as amplifier in international development. *Proceedings of the 2011 iConference*. ACM. p.75-82.**

<http://www.kentarotoyama.org/papers/Toyama%202011%20iConference%20-%20Technology%20as%20Amplifier.pdf>

Does information and communication technology in international development magnify existing institutional forces rather than transform them? Amplification theories of information technology argue that technology is primarily a magnifier of existing institutional forces. In this paper, these ideas are synthesized and augmented for an amplification theory of "information and communication technology for development". Three mechanisms for amplification are identified, arising out of differentials in access, capacity, and motivation, and the ideas are developed using

examples from telecentres, television, and mobile phones. The amplification thesis contradicts theories that imply that technology's impact is additive or transformative in and of itself, e.g., that access to technology levels the playing field of power, or that the Internet, per se, democratizes access to information. The consequences of an amplifier theory for information and communication technology for development are that (1) technology cannot substitute for missing institutional capacity and human intent; (2) technology tends to amplify existing inequalities; (3) technology projects in global development are most successful when they amplify already successful development efforts or positively inclined intent, rather than seek to fix, provide, or substitute for broken or missing institutional elements.

**USAID, Caribou Digital and the Digital Impact Alliance. (2017) Closing the Access Gap: Innovation to Accelerate Universal Internet Adoption. p.7**

<https://www.usaid.gov/sites/default/files/documents/15396/Closing-the-Access-Gap.pdf>

What potential business models and technological innovations could accelerate access and adoption of mobile phones and the internet in emerging markets? This report addresses this question, presenting a framework to help decision makers consider where innovation could best address gaps in specific contexts, outlining lessons and opportunities across the ecosystem. It finds that:

**The market alone will not close the access gap.** Over time, industry investment in mobile and fixed networks in the developing world may increase and extend existing network coverage, but will likely not expand to connect marginalised populations in unconnected and under-connected geographies because of the high capital and operational costs and low profit potential (the “market frontier”). A growing set of non-traditional service providers are testing new and varied business models and technologies to reach consumers beyond the market frontier. Thus far, none have the type of scale that would address the access and adoption gaps. The paper concludes:

**A portfolio of diverse, innovative access solutions is required to meet unique market contexts.** Market dynamics, geographic conditions, regulatory constraints, and community characteristics all play a role in the potential success of different business models and the applicability of different technologies. An active community of innovators is implementing solutions, but many require risk capital to fully explore alternative business models. To help support entrepreneurs, risk capital is needed to help offset immediate infrastructure costs but must be carefully structured to avoid dependency. Although industry will remain the chief source of investment in the sector, governments, bilateral donors, and impact investors have key roles to play in supporting innovation, appropriate financing and risk.

**Greater collaboration and knowledge sharing across the community,** within bounds of market competitiveness, can play a role in accelerating innovation. Both innovators and investors alike require more actionable market intelligence (for example on end users, geographic characteristics, existing infrastructure, and regulatory constraints) to tailor different market models. The type of market data commonly used to base investment decisions in mature markets is more expensive and difficult to obtain in low-resource environments. Most innovators, particularly smaller actors, struggle to navigate regulatory, technical, and financial challenges. Greater government and donor investment to support research and knowledge sharing can help address these gaps and uncover these data.

**World Bank (2016) World Development Report 2016: Digital Dividends. World Bank. p.5-7**

<http://documents.worldbank.org/curated/en/896971468194972881/pdf/102725-PUB-Replacement-PUBLIC.pdf>

What impact does investing in internet, mobile phones, and related technologies have on economic development? The WDR2016 explores this question, arguing that the potential gains from digital technologies are high, but often remain unrealised. It proposes policies to expand connectivity, accelerate complementary reforms in sectors beyond information and communication technology (ICT), and address global coordination problems (p.5). The key points are:

**Growth, jobs, and services are the most important returns to digital investments** (so called “digital dividends”). Digital technologies help businesses become more productive; people find jobs and greater opportunities; and governments deliver better public services to all. (p.5).

**Digital technologies promote development and generate digital dividends.** By reducing information costs, digital technologies greatly lower the cost of economic and social transactions for firms, individuals, and the public sector. They promote innovation when transaction costs fall to essentially zero. They boost efficiency as existing activities and services become cheaper, quicker, or more convenient. And they increase inclusion as people get access to services that previously were out of reach. (p.5). Persons with disabilities face barriers to communicate, interact, access information, and participate in civic activities. Digital technologies are helping overcome some of these barriers. (p.15)

**Digital dividends are not spreading rapidly enough.** First, nearly 60% of the world’s people are still offline and can’t fully participate in the digital economy. There also are persistent digital divides across gender, geography, age, and income dimensions within each country. Second, some of the perceived benefits of the internet are being neutralized by new risks. Vested business interests, regulatory uncertainty, and limited contestation across digital platforms could lead to harmful concentration in many sectors. Quickly expanding automation, even of mid-level office jobs, could contribute to a hollowing out of labour markets and to rising inequality. And the poor record of many e-government initiatives points to high failure of ICT projects and the risk that states and corporations could use digital technologies to control citizens, not to empower them. (p.5).

**To mitigate these risks, connectivity is vital, but not enough to realize the full development benefits.** Digital investments need the support of “analogue complements”: regulations, so that firms can leverage the internet to compete and innovate; improved skills, so that people can take full advantage of digital opportunities; and accountable institutions, so that governments respond to citizens’ needs and demands. Digital technologies can, in turn, augment and strengthen these complements—accelerating the pace of development. (p.5).

**To connect the unconnected, it recommends:** Market competition, public-private partnerships, and effective regulation of internet and mobile operators encourage private investment that can make access universal and affordable. Public investment will sometimes be necessary and justified by large social returns. A harder task will be to ensure that the internet remains open and safe as users face cybercrime, privacy violations, and online censorship. (p.5).

**It concludes that digital development strategies need to be broader than ICT strategies.** Connectivity for all remains an important goal and a tremendous challenge. But countries also

need to create favourable conditions for technology to be effective. When the analogue complements are absent, the development impact will be disappointing. But when countries build a strong analogue foundation, they will reap ample digital dividends—in faster growth, more jobs, and better services. (p.5).

### 3. Digital inclusion - gender

**Broadband Commission (2017) Working Group on the Digital Gender Divide  
Recommendations for action: bridging the gender gap in Internet and broadband access and use. p.9**

<http://broadbandcommission.org/Documents/publications/WorkingGroupDigitalGenderDivide-report2017.pdf>

How can we close the gender gap in Internet and broadband access and use? This report reviews data on the digital gender gap, summarises reasons for addressing this, and recommends practical actions for stakeholders to address the gap in Internet access in the following action areas:

**Data:** the need to collect, analyse, and track gender-disaggregated data; the need for greater research into women's access to and use of the Internet; and the pressing priority for publishing and sharing data and research.

**Strategies, policies, plans and budgets:** establishing gender equality targets for Internet and broadband access and use; assessing strategies, policies, plans and budgets for gender equality considerations; and consulting and involving women as well as relevant local communities and experts.

Measures to address the barriers faced by women:

- **Affordable access:** improved understanding of affordability issues; innovating to reduce the cost of devices and services; improving network coverage, capacity and quality; and providing public access facilities.
- **Addressing threats that prevent access and use:** researching and understanding threats; increasing awareness of threats and how they can be addressed or reduced; developing safety applications and services; and strengthening protection measures and reporting procedures.
- **Improving digital literacy and confidence:** understanding women's needs; investing in education and capacity-building initiatives; developing skills and confidence; supporting educators; and supporting and promoting female role models.
- **Relevant content, apps and services:** building awareness; developing relevant content and services; and consulting and engaging women.

**Enhancing cooperation between stakeholders:** Developing and sharing tools, guidelines and case studies to support national and international efforts to address the digital gender gap; and supporting and encouraging multi-stakeholder cooperation and sharing of expertise.



**GSMA (2015) Connected Women 2015. Bridging the gender gap: Mobile access and usage in low and middle-income countries, p.6**

[https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/02/GSM0001\\_03232015\\_GSMAReport\\_NEWGRAYS-Web.pdf](https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2016/02/GSM0001_03232015_GSMAReport_NEWGRAYS-Web.pdf)

How can we close the gender gap in mobile access and usage in low and middle-income countries? This report examines how many women own mobile phones, how intensively they use them, and the barriers to mobile phone adoption and use compared to men. Drawing on 11 case studies including surveys, focus groups, expert interviews and secondary sources it highlights recent progress and identifies new challenges and opportunities. Key findings include:

**Mobile phone ownership:** Over 1.7 billion females in low- and middle income countries do not own mobile phones. Women on average are 14% less likely to own a mobile phone than men, which translates into 200 million fewer women than men owning mobile phones. Women in South Asia are 38% less likely to own a phone than men, highlighting that the gender gap in mobile phone ownership is wider in certain parts of the world.

**Mobile phone usage:** Even when women own mobile phones, there is a significant gender gap in usage. Women report using phones less frequently and intensively than men, especially for more sophisticated services such as mobile internet. In most countries, fewer women than men who own phones report using messaging and data services beyond voice.

**Barriers to mobile phone adoption:** Cost remains the greatest barrier overall to owning and using a mobile phone, particularly for women, who often have less financial independence than men. Security and harassment emerged as one of the top five barriers, and a key concern for women. Women also cite service delivery issues (network quality and coverage and agent or operator trust) and technical literacy and confidence as key barriers. Social norms influence women's access to and use of mobile technology, and often contribute to women experiencing barriers to mobile phone ownership and use more acutely than men. Women understand the inherent value of mobile phones and a 'lack of perceived value' is no longer a top barrier to mobile phone ownership, indicating a positive shift in attitudes in the last five years. Systemic barriers, including a lack of gender disaggregated data at all levels (e.g., mobile subscribers, national statistics) and unconscious biases within organisations, have kept the focus off women and sustained the gender gap in ownership and usage. (p.6)

Taken together, these findings indicate the gender gap in mobile ownership and usage are driven by a complex set of socio-economic and cultural barriers negatively affecting women. Without targeted intervention from the mobile industry, policy-makers, and other stakeholders, the gender gap in ownership and usage is unlikely to close naturally on its own.

## **4. Key websites**

- GSMA - <https://www.gsma.com/>
- Alliance for Affordable Internet - <http://a4ai.org/>
- UN Agency for ICT - <https://www.itu.int/en>
- Digital Impact Alliance's (DIAL) - <https://digitalimpactalliance.org/>
- Women and the Web Alliance - <http://www.womenandtheweballiance.org/>



- USAID Centre for Digital Development - <http://www.digitaldevelopment.org/>
- Broadband Commission for Sustainable Development - <http://www.broadbandcommission.org>
- Institute of Development Studies Digital and Technology - [www.ids.ac.uk/team/digital-and-technology](http://www.ids.ac.uk/team/digital-and-technology)
- Caribou Digital - <http://cariboudigital.net/>

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## About this report

*This report is based on five days of desk-based research. The K4D research helpdesk provides rapid syntheses of a selection of recent relevant literature and international expert thinking in response to specific questions relating to international development. For any enquiries, contact [helpdesk@k4d.info](mailto:helpdesk@k4d.info).*

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