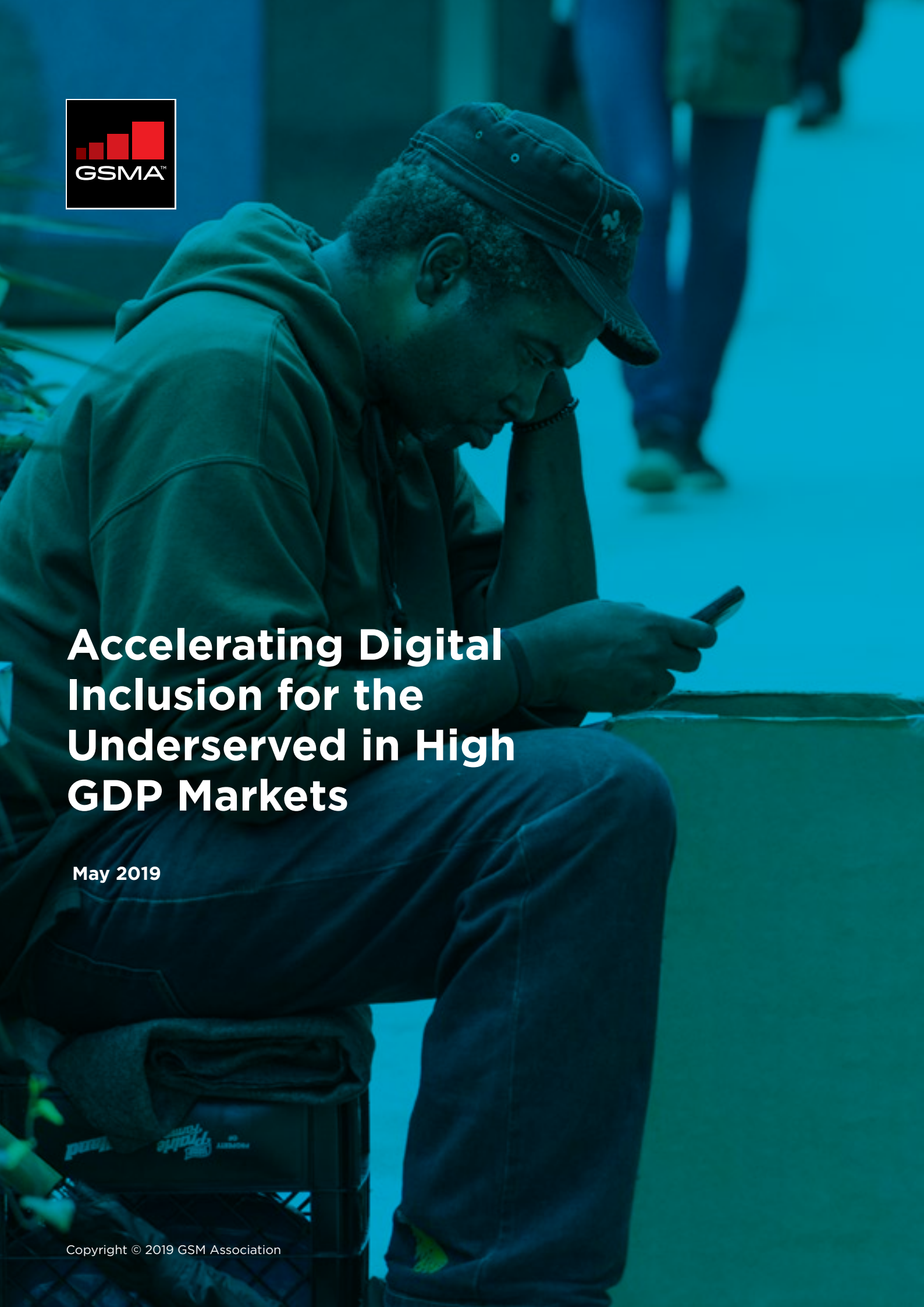

Accelerating Digital Inclusion for the Underserved in High GDP Markets

May 2019

Accelerating Digital Inclusion
for the Underserved in High GDP Markets

The GSMA represents the interests of mobile operators worldwide, uniting more than 750 operators with over 350 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces the industry-leading MWC events held annually in Barcelona, Los Angeles and Shanghai, as well as the Mobile 360 Series of regional conferences.

For more information, please visit the GSMA corporate website at **www.gsma.com**

Follow the GSMA on Twitter: **@GSMA**

GSMA Mobile for Development

The Mobile for Development team drives innovation in digital technology to reduce inequalities in our world. Singularly positioned at the intersection of the mobile ecosystem and the development sector, we stimulate digital innovation to deliver both sustainable business and large-scale socio-economic impact for the underserved. Our unique research and insights platform advances digital innovations and implementations that empower underserved populations to build a better future. Our in-market expertise informs partnerships between the mobile industry, tech innovators, governments and the development sector. And our unparalleled convening power motivates conversations and inspires action. To date, we have impacted the lives of 58 million people.

For more information, please visit the GSMA M4D website at **www.gsma.com/mobilefordevelopment**

Follow GSMA Mobile for Development on Twitter: **@GSMAm4d**

Acknowledgements
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Contents

Executive summary

This report examines the role of mobile technology in accelerating digital inclusion and improving the socio-economic conditions of underserved and marginalised populations in high GDP markets.

This research examines digital tools targeted at underserved populations in the United States, United Kingdom, Spain, France and Germany. In particular, the research focuses on: the elderly; low income populations; persons with disabilities; abuse victims; youth not in education, employment or training; substance abusers; homeless persons and refugees.

The mobile industry is keen to demonstrate how mobile solutions and apps can enable digital inclusion, especially those expected to generate the greatest economic return (e.g. Internet of Things and smart environments). As consumer groups and an untapped workforce, underserved and marginalised groups present important opportunities for the telecommunications sector in general.

Addressing the needs of underserved groups through mobile technology is both an opportunity and a responsibility.

Driving digital inclusion and socio-economic development for these groups will require the following:

- Collaboration between the private sector, public sector and civil society organisations;
- Applying the lessons of effective digital tools (e.g. those with broad user appeal, user engagement in designing the tools and scalability);
- Employing the triggers that drive digital inclusion (e.g. inclusion by design, offline support, multi-stakeholder participation); and
- Addressing the challenges technology poses for user privacy, the potential bias of artificial intelligence (AI) and the unintended consequences of technology in general.

Our research and interviews suggest that the GSMA is uniquely positioned to play an active role in the digital inclusion ecosystem in high GDP markets. Given the unique strengths of our industry programmes (e.g. IoT) and experience with multistakeholder programmes, there is an opportunity for the GSMA to work with established players in the field to push cross-industry initiatives to meet the needs of the underserved.

Introduction

In 2019, the GSMA Mobile for Development (M4D) team undertook research to answer the question: *How can mobile technology be used as a tool to accelerate digital inclusion and improve socio-economic conditions among underserved and marginalised populations in high GDP markets?*[1]

For the purpose of this research, "digital inclusion" was understood as a broad framework with three main elements:

- **Access:** availability, affordability, design for inclusion and public access
- **Adoption:** relevance, digital literacy and consumer safety
- **Application:** economic and workforce development, education, healthcare, public safety and emergency services, civic engagement and social connections

While the primary focus of the research was on the application of digital inclusion, relevant findings from the other two elements were also considered. Applications are defined broadly as software programmes running on mobile devices (smartphone, tablets), possibly interfacing with other connected devices (wearables, sensors) and generally available for download via open (web-based) or closed platforms (app stores).

Underserved and marginalised populations included the elderly (over 60), persons with disabilities (PWD), low-income groups, victims of abuse, youth not in employment, education or training (NEET), individuals experiencing homelessness and refugees. While these groups were examined individually, these populations are porous and their needs often overlap and intersect.

When assessing these groups, efforts were made to ensure statistics across countries were comparable, but common population definitions were not always available. Some groups also tend to fall outside the social system, and therefore outside the scope of official statistics, which affects the reliability of the data.

This report is organised into three main sections:

- **Research on digital inclusion and mobile technology.** Research and interviews shed light on the main issues and actors driving digital inclusion research and perceived gaps in understanding.
- **Initiatives creating an enabling environment for digital inclusion in high GDP markets.** This section forms the bulk of the report and provides an overview of the digital landscapes in these markets, including the types of tools being used, the stakeholders involved and the effectiveness of these tools in serving target populations.
- **Lessons learned.** This section outlines the characteristics of tools that have proven to be effective, triggers for digital inclusion and socio-economic development and challenges still to be overcome.

1. The GSMA's Connected Society and Assistive Tech programmes address this question in emerging markets. For more information: www.gsma.com/mobilefordevelopment

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Methodology

Sixteen qualitative interviews were conducted in five high GDP markets: France, Germany, Spain, the United Kingdom and United States. Interviewees (see Table 6 in the appendix) were selected to capture a broad range of stakeholders: mobile operators, device manufacturers, associations supporting underserved groups, charities and philanthropic organisations, social entrepreneurs, subject matter experts from multilateral organisations and advocacy groups.

Existing research on the digital needs of the underserved

Current research on digital inclusion can be split into six focus areas[2] (Figure 1).

Figure 1

Snapshot of current research on the digital needs of the underserved

Policy	• Enabling ICT accessibility
Landscaping inclusion	• Who is excluded and why? • What needs to change?
National digital strategies	• Enabling inclusive national digital transformation
Impact assessment	• Financial impact of digital inclusion • Progress of existing initiatives
Opportunities and risks	• Potential of new technologies (mHealth, IoT, etc.), privacy and risks
Special groups	• Digital needs of refugees, the homeless and other special groups

2. For a detailed list, see the Appendix: Page 27

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1. Policy: The objective is to drive policy recommendations by public sector bodies and other stakeholders on the role of ICT in general, and mobile phones in particular, in supporting vulnerable groups. For example:
   - ICT Accessibility Policy for Persons with Disabilities (ITU, 2017)
   - *Mobile: A Powerful Tool for Digital Inclusion* (Vodafone, 2014)
   - *Mobile: Helping to Close the Digital Divide?* (Good Things Foundation, 2015)

2. Digital inclusion landscape: Research in this category tracks and assesses the extent of digital exclusion, why it persists and what can be done about it. For example:
   - Access and inclusion assessments (Ofcom, 2013)
   - Understanding the motivations of non-users of the internet (Good Things Foundation, 2018)

3. National digital strategies and plans: Governments in many high GDP countries have laid out national plans for digital transformation. These plans anticipate to some extent the efforts that will be needed to ensure all citizens, including the most vulnerable, are included in this transition. For example:
   - Digital inclusion strategies (German Government, the FCC)

4. Impact assessments: These assessments demonstrate the socio-economic benefits of investing in digital inclusion. For example:
   - *Valuing Digital Inclusion* (BT, 2014)
   - *L'inclusion numérique: un investissement rentable* (WeTechCare and Capgemini Consulting, 2017)

5. Opportunities and risks: Research covering key verticals and areas of economic interest for the mobile industry. This research anticipates positive outcomes from the digital inclusion of underserved groups, and media coverage highlights the risks. For example:
   - Risks and opportunities of mobile health apps (Germany's Federal Ministry of Health, 2016)
   - Privacy issues with smart city projects (New York Times, 2019)
   - Adverse use of smartphone data to deport refugees (Wired, 2018)

6. Special groups: Research focusing on a specific interest group and the relevance of ICT or mobile technology. For example:
   - *Connecting Refugees* (UNHCR, 2016)
   - New media use by homeless patients (Journal of Medical Internet Research, 2013)

Lessons from existing research

This broad scan[3] of the research on digital inclusion indicates that the elderly, low-income groups and persons with disabilities are the most significant vulnerable groups, both in terms of size and the attention they receive. There are global treaties protecting the interests of persons with disabilities, such as the Convention on the Rights of People with Disabilities (CRPD), and the International Telecommunication Union (ITU) and advocacy group G3ICT are major stakeholders pushing for an inclusive ICT agenda.

Research is also driven by national digital transformation strategies and commitments to promote the inclusion of elderly and low-income groups (often on the receiving end of social welfare benefits that have been moving online). The focus of the public sector and civil society is therefore on maximising the digital inclusion of these groups using every available tool, including mobile-enabled technologies.

In this context, and given the size of these audiences, the mobile industry is keen to examine and demonstrate the benefits of mobile solutions and applications in enabling digital inclusion, with a focus on those with the greatest expected economic return (e.g. IoT, smart environments, healthcare).

Research gaps

Interviews and a broad look at the research revealed gaps in understanding that signal both opportunities and risks for digital inclusion initiatives.

Opportunities:

- The discourse on smart environments (home, city) is currently focused on urban environments. There is a gap in our understanding of the rural smart environment opportunity.
- Some of the groups included in this research represent a significant part of the population and their value as customer groups needs to be investigated.
- A large-scale impact assessment of mobile applications is missing from the current body of research (limited small-scale studies tend to be the norm).

Risks:

- Lack of research into how to prevent underserved groups from being further excluded, such as promoting creative uses of technology and problem solving for the benefit of users.
- Lack of guidance and best practice in managing privacy protection and providing support for vulnerable groups were recurring challenges raised in interviews.
- Anticipating the algorithm bias of AI,[4] and a lack of general rules and regulations that may increase the transparency of these biases.[5]

3. The intention was not to make an exhaustive research assessment, but rather to inform our research objective.
4. https://medium.com/microsoft-design/how-to-recognize-exclusion-in-ai-ec2d6d89f850
5. https://hbr.org/2018/07/we-need-transparency-in-algorithms-but-too-much-can-backfire

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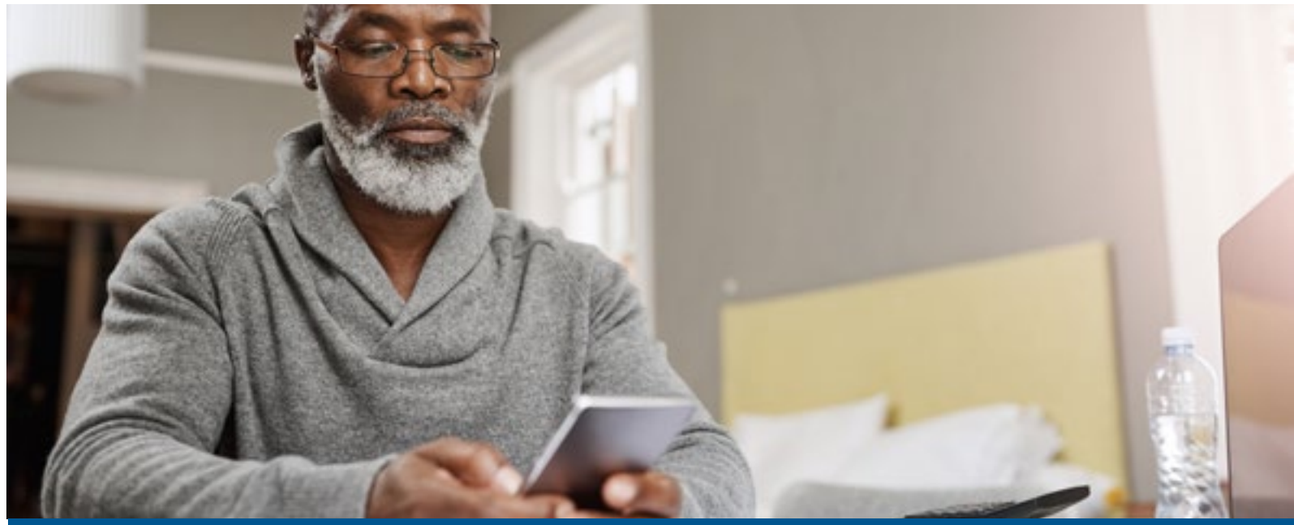


Digital inclusion initiatives using mobile technology

Initiatives that use mobile technology for digital inclusion characterise the current enabling environment and are based on four main pillars (Figure 2):

Figure 2

Enabling environments for mobile-enabled digital inclusion

Innovate	Promote	Facilitate	Implement
Enable an ecosystem where initiatives can flourish	Promote mobile technology as a viable tool	Smooth the way for initiatives to take hold	Execute via dedicated organisations and platforms

Promotion initiatives: Promoting mobile technology as a tool for digital inclusion

Promotion initiatives are driven by the mobile industry and civil society organisations. Research and small-scale trials using mobile technology have shown the potential of mobile to address digital inclusion. For example, the Good Things Foundation and Vodafone have worked jointly to demonstrate the benefits of mobile technology in addressing digital exclusion,[6] and the effectiveness of this technology for users with limited digital skills.[7] Their report provides concrete recommendations for civil society organisations, local governments and communities, and national governments (Figure 3).

Figure 3 *Source: Mobile: A Powerful Tool for Digital Inclusion, UK, 2014*

Example recommendations and main stakeholders

Recommendations

Civil society organisations	Local government and communities	National government
Promote social innovations through mobile	Offer mobile training in local centres	Increase government spending for training
Training programs tailored to vulnerable client groups	Caregivers help users with mobiles at home	Improve usability of government sites (including mobile)
More apps that appeal to marginal users	Help manage user fear of data charges	

Advocacy can also occur when users share apps. For example, phone sharing is prevalent and makes it affordable for low-income users[8] to share the benefits of commonly used apps (e.g. a food stamps management app in the US).[9]

Apps can be used by advertisers as a channel to raise awareness and disseminate targeted support. For example, FreshEBT app users are targeted with advertising from the US Lifeline program, a government-funded smartphone and data plan for low-income individuals.

Finally, advocacy can happen via apps like Anpacker, Entourage and Streetlink, all of which have the ability to muster support (among volunteers, local communities, concerned citizens) for vulnerable groups such as refugees or the homeless.

6. Devices are affordable, widespread, suitable, portable, easy to use/train with and have built-in features for users with disabilities. Apps should support a variety of uses. https://www.goodthingsfoundation.org/research-publications/mobile-powerful-tool-digital-inclusion
7. All participants in the trial improved their digital skills and over half learned on their own. Local centres played a key role for those who were socially excluded and disadvantaged. https://www.goodthingsfoundation.org/research-publications/mobile-helping-close-digital-divide
8. https://www.independent.co.uk/life-style/gadgets-and-tech/features/increasing-numbers-of-homeless-people-in-america-keep-their-mobile-phones-on-the-streets-10213727.html
9. Interview with Propel, maker of the food stamps management app, FreshEBT.

Facilitation initiatives: Spreading mobile technology to accelerate digital inclusion

An enabling environment is supported by several types of initiatives that sensitise technology stakeholders to the needs of underserved populations and help to disseminate mobile technology solutions (Figure 4).

Figure 4

Toolkits, app directories and open data sets

Accessibility guide for mobile apps	For app developers to achieve accessibility objectives of applications. Access to iOS/Android code
Open government data	Free data sets for citizen-centric services and apps
Coding initiatives	To help residents and government solve community problems using technology (e.g. Code for America)
Inclusive toolkits	• Creating inclusive technology design • Smart Cities for All toolkit
Mobile app directories	• US and Spanish goverment app directory • Open government data apps in the US • Global Accessibility Reporting Initiative (GARI)
Standardisation	Initiatives to standardise digital skills

Facilitate

App developers are targeted to sensitise their community to the unique requirements of vulnerable groups. For example, the Spanish government provides a guide[10] for app developers to create accessible apps or evaluate the accessibility of existing apps for persons with disabilities.

Open data sets play an important role in providing free and reliable content for user-centric services and applications. Telefonica's Mapcesible is an example of an app that leverages crowdsourcing and open data from local government to identify wheelchair accessible locations. Data.gov, a US open-government data initiative, groups these apps into a searchable directory.

With its Code for All organisations, the developer community has created a mechanism to "make government work in the digital age". For example, Code for America has created a streamlined online experience, available on mobile, to expedite applications for California's food stamp (SNAP)

10. https://administracionelectronica.gob.es/pae_Home/pae_Estrategias/pae_Accesibilidad/pae_documentacion/pae_eInclusion_Accesibilidad_de_apps.html#.XIOJUohKg2x

programme.[11] It is now possible to complete the application six times faster than before.

Technology and advocacy groups have been developing toolkits that highlight the specific needs of persons with disabilities. Microsoft, for example, has published a set of tools to raise awareness of inclusive design[12] and ways to promote inclusion through design.[13] Similarly, G3ICT, an advocacy group for persons with disabilities, has built a set of tools for smart cities worldwide to "include a focus on ICT accessibility and the digital inclusion of persons with disabilities and older persons"[14] What we are not seeing, however, are similar toolkits targeting groups such as abuse victims, refugees or the homeless.

There are several initiatives that create directories to make apps aimed at vulnerable groups easier to find. For example, the US and Spanish governments both list government apps in their public service app directories. The Global Accessibility Reporting Initiative (GARI) classifies apps for persons with disabilities according to impairment and device type. These directories suggest a level of maturity in the availability of apps for vulnerable groups. However, government apps and directories for vulnerable groups are not available everywhere or for all underserved groups, and the directories themselves are often difficult to find and not well maintained.

Digital inclusion is also facilitated through efforts to standardise digital skills and digital literacy for all users. This is especially relevant for educational schemes that aim to improve online safety for youth and adults and enhance their ability to navigate and leverage digital tools. Examples include the UK's essential digital skills framework. A global initiative, the Coalition for Digital Intelligence, is driven by the DQ Institute, OECD, IEEE Standards Association and the World Economic Forum, and coordinates efforts to raise digital intelligence across the technology and education sectors.

Implementation initiatives: Digital inclusion through dedicated organisations and platforms

Mature digital inclusion schemes have dedicated platforms and funding in place, and schemes are supported at multiple levels. For example, the ITU-D programme offers an Internet for @ll programme for countries and governments that trains trainers to develop accessible digital content and design accessible websites.

Another example is collaboration between government and civil society organisations to close the digital skills gap. A civil society organisation's funding can be tied to key performance indicators (KPIs) that capture the number of people reached and engaged. Learning typically takes place via local centres that deliver a combination of offline and online support. Dedicated online learning platforms include Learn My Way from the Good Things Foundation in the UK, or Les Bons Clics managed by WeTechCare in France. These platforms, and the offline support they provide, help address key motivation issues for non-users, namely, the perception that the internet is not for them or is too complicated.[15]

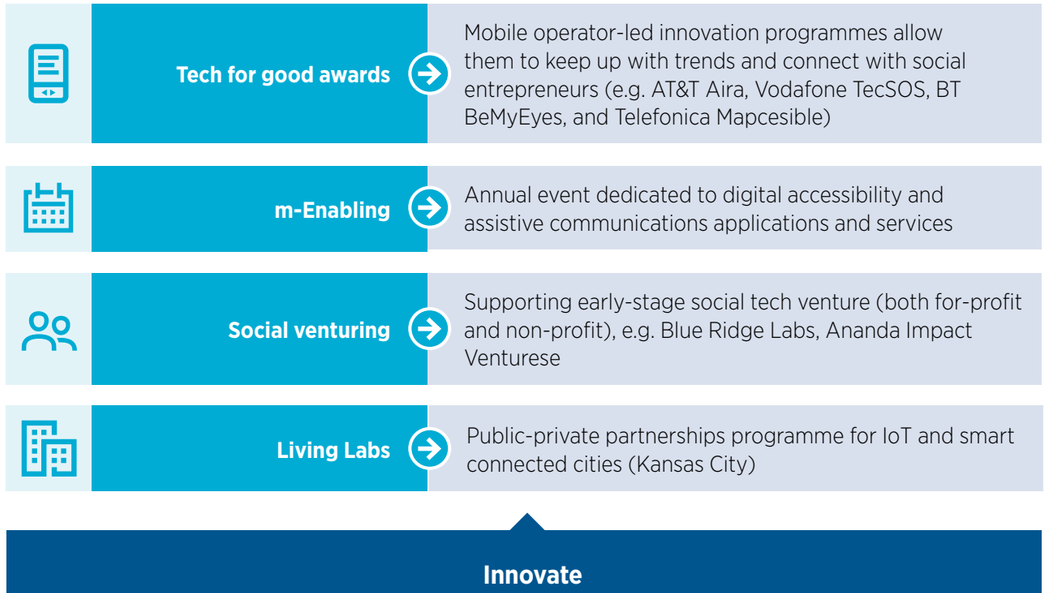
Innovation initiatives: Fostering an innovative ecosystem for digital inclusion

The fourth pillar of an enabling environment for digital inclusion is an ecosystem in which innovation and new opportunities can flourish. This innovation is fostered in a number of ways, as illustrated in Figure 5.

11. https://www.codeforamerica.org/programs/getcalfresh
12. https://download.microsoft.com/download/b/0/d/b0d4bf87-09ce-4417-8f28-d60703d672ed/inclusive_toolkit_manual_final.pdf
13. https://download.microsoft.com/download/b/0/d/b0d4bf87-09ce-4417-8f28-d60703d672ed/inclusive_toolkit_activities.pdf
14. https://smartcities4all.org/english-toolkit/
15. Motivations of non-users (Good Things Foundation, 2018)

Figure 5

An ecosystem for mobile social innovation involves multiple stakeholders



The telecom industry drives innovation in this space primarily through technology awards, which allow mobile operators to keep up with trends and connect with social entrepreneurs. Corporate responsibility objectives tend to drive Tech for Good awards, some examples[16] of which are highlighted in Figure 5.

Annual events, such as m-Enabling, provide a forum to showcase innovations in technology that enable the elderly and persons with disabilities to access digital content and services in new ways. This particular event was instrumental in mobile OS vendors (Android, iOS) adopting accessibility menus, including device manufacturers that licensed their software.[17]

Social entrepreneurs rely to some extent on their ability to raise funds to carry out their projects. These funds come from both public or private sources, and social venture enterprises are instrumental in creating and supporting early-stage social tech ventures.

Finally, the industry anticipates that significant business opportunities will emerge from residential or urban environments powered by the Internet of Things (IoT). Urban planners and city governments are vying for opportunities to launch public-private partnerships to scale city-wide projects (e.g. Kansas City, Chicago and Atlanta). For example, AT&T has worked with G3ICT and Business for Social Responsibility (BSR) to map opportunities for smart city technologies to benefit all communities, including persons with disabilities and the elderly.[18]

The most significant initiatives using mobile technology for digital inclusion today are focused on digital literacy and facilitating an enabling environment for mobile applications to grow. Digital literacy efforts focus on groups that tend to be excluded (e.g. the elderly, low income, persons with disabilities) and underline the importance of offline local support combined with online tools. Enabling environment initiatives tend to focus on persons with disabilities (tools for the developer community, app directories, industry events), and there may be a gap in similar initiatives for other vulnerable groups.

16. AT&T Aira, Vodafone TecSOS, BT BeMyEyes and Telefonica Mapcesible
17. Interview with G3ICT President and Executive Director, Axel Leblois
18. http://smartcities4all.org/wp-content/uploads/2017/06/Smart-Cities-for-All-A-Vision-for-an-Inclusive-Accessible-Urban-Futur...-min.pdf

What digital tools are targeted at underserved populations?

The underserved groups considered in this report are listed and sized in Table 1 (and Table 5 in the Appendix).[19]

Table 1

Underserved and marginalised populations in high GDP markets (millions)

	France	Germany	Spain	UK	US
Elderly*[20]	16.70	22.90	11.70	15.80	69.70
Low income[21]	11.93	15.47	12.31	15.22	40.00
PWD[22]	6.81	14.78	6.55	10.27	51.40
Abuse victims*[23]	8.77	9.16	3.08	9.31	57.11
NEET[24]	0.89	0.51	0.52	0.82	10.20
Substance abusers[25]	0.28	0.25	N/A	0.37	7.10
Homeless[26]	0.14	0.34	0.02	0.30	0.57
Refugees[27]	0.09	0.20	0.03	0.03	0.11

** Indicates a common statistical source across all markets*

19. Statistics may reflect differences in definitions due to the lack of common definitions across countries (e.g. a European definition of people living in poverty includes indicators related to income level, work intensity in the household or rate of material deprivation, while the US Census Bureau uses a set of dollar value thresholds to determine who is in poverty).
20. Elderly: Age 60+ (UN, 2017)
21. Low income: People at risk of poverty or social exclusion for EU countries. EU statistics modified from number of households at risk to number of individuals at risk (EUROSTAT, 2017; US Census Bureau, 2017).
22. Persons with disabilities (PWD): Age 15+, a person identifying a health problem or basic activity limitation as barrier in any life domain is categorised as disabled (EUROSTAT, 2012) and age 15+ for US (Census Bureau, 2010).
23. Percentage of women who experienced physical and/or sexual violence from an intimate partner in their life. The percentage was applied to the population of women in respective countries (OECD, 2014).
24. Not in Education, Employment, or Training (NEET). Age 15–24 for European countries (EUROSTAT, 2017), age 16–29 for US (Pew Research Center, 2015).
25. Substance abuse: defined as injecting or long/regular use of drugs (e.g. opioids, cocaine, amphetamines), France (2014), Germany (2014), UK (2012) (EMCDDA), US (SAMHSA, 2014).
26. OECD: France (2012), Germany (2014), Spain (2012), UK (Guardian, 2017), US (2015).
27. Non-EU asylum seekers in the EU (Eurostat, 2017); US summary of refugee admissions (RPC, 2017)

It is important to note that the marginalised or digitally excluded are a sub-group of underserved populations. These sub-groups are likely to be disproportionately affected by digital exclusion. For example, in the US, 29 per cent of working age Americans with a disability participate in the workforce (versus 75 per cent of Americans without disabilities).[28] In the UK, those with a visual impairment are most likely to have limited use of communication services or devices, while other groups, such as refugees, may have the devices[29] but are 50 per cent less likely than the general population to have an internet-enabled device.[30]

Although these sub-groups are examined individually, they should not be considered homogenous or distinct. These groups are porous and individuals who belong to multiple groups are that much more vulnerable to digital exclusion. Some are also beyond the reach of official statistics and are not accounted for in these figures.

Who are the underserved?

Table 1 and Table 5 give a sense of the size and proportion of different underserved groups in each of the selected high GDP countries. The first three groups (elderly, low income and persons with disabilities) account for 75 per cent of all underserved groups, or over 300 million people. Based on our review of existing digital inclusion initiatives, these groups tend to receive the most attention.

The population over 60 years in France, Germany, Spain, the UK and the US is set to grow between 30 and 56 per cent between 2017 and 2050.[31] Population ageing is a significant societal transformation in all these countries and is receiving significant attention from governments, which are trying to anticipate the adaptations needed in various areas of life, from work to healthcare and housing.

Low-income groups, although defined differently, are significant in all five countries — a reflection of persistent social inequalities. These groups tend to attract the attention of state bodies and local associations in part because they are on the receiving end of social benefits that most governments have brought online in the push for digital transformation. However, these groups are also the most in need of digital literacy skills offered by local organisations. In the UK, many poorer and more vulnerable households are effectively offline without any digital skills.[32]

Persons with disabilities typically represent 10 to 15 per cent of any country's population. Most countries around the world have ratified the Convention on the Rights of Persons with Disabilities (CRPD) and taken steps to reform their laws and policies to meet their obligations under this treaty. For example, many EU countries are moving to create more inclusive societies; in Spain, the 2013 Law on the Rights of People with Disabilities and their Social Inclusion, foresees the adoption of reasonable accommodation mechanisms in the areas of telecommunications and information society, transport and public goods and services.[33] Some of the applications featured later in this chapter help in these efforts.

The remaining groups (abuse victims, NEET, substance abusers, homeless and refugees) represent about 25 per cent of all selected underserved populations, with abuse victims accounting for 80 per cent of these groups. Abuse victims are predominantly women, and violence against women and domestic violence is tackled at the European level through the Istanbul Convention and integrated policies aimed at prevention, protection and prosecution. In the US, the Office on Violence Against Women was created to respond to and reduce violence against women.

NEET, substance abusers, the homeless and refugees account for the remaining five per cent. The prevalence of these groups varies significantly depending on a country's political agenda. For example, Germany's open-border policy between 2015 and 2017 was positive for refugees while the current US immigration policy is not.

28. https://www.accenture.com/t20181029T185446Z__w__/us-en/_acnmedia/PDF-89/Accenture-Disability-Inclusion-Research-Report.pdf
29. https://www.ofcom.org.uk/__data/assets/pdf_file/0018/132912/Access-and-Inclusion-report-2018.pdf
30. https://www.gsma.com/mobilefordevelopment/resources/the-importance-of-mobile-for-refugees-a-landscape-of-new-services-and-approaches/
31. http://www.un.org/en/development/desa/population/publications/pdf/ageing/WPA2017_Highlights.pdf
32. https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=23881&LangID=E
33. https://fra.europa.eu/sites/default/files/fra-2015-focus-05-2015-crpd_en.pdf

Mobile apps for the underserved

Table 2 lists many of the types of mobile applications found today. The most successful ones appeal to millions of users (e.g. FreshEBT and EVA Facial Mouse). They tend to be developed with a specific target group in mind (e.g. recipients of food stamps benefits in the US for FreshEBT), but often have broader appeal. For example, EVA Facial Mouse is an app that allows hands-free access to the functions of a mobile device by tracking the user's face captured by the front camera of a smartphone. Many groups with disabilities can benefit from this app (e.g. people with amputations, cerebral palsy, spinal cord injury and muscular dystrophy) and it has been a success with two million downloads to date. According to the head of Vodafone Foundation Spain, it is also gaining traction among mobile gamers.

Most apps, however, will not have millions of users. Many will range in the hundreds, thousands or tens of thousands of downloads. This implies that the space for mobile apps targeted to underserved groups is fragmented and immature. It is not uncommon to find apps fulfilling identical functions under different names and by different providers. Also, forums dedicated to the development and promotion of apps for underserved groups are, with the exception of m-Enabling, almost non-existent. These forums are important for fostering healthy competition and rationalising and scaling these apps.

Table 2

App types and names by target group

	App type	App name
Elderly	• Adoption • Safety • Mobility • Health monitoring • Presence	• Ardoiz • Mpers • Carius • Pillboxie, Glucose Monitoring, Remote Diagnosis, Home Health Sensing • Elli-Q
Low income	• Food • Finance • Health • Transport	• Fresh Ebt, Foodbank/Olio, Food Benefit Enrolment • Digit, Saver Life • Scriptsave Well Rx, Am Well • Hitch-Hiking Spots, Car Pooling
Persons with disabilities	• Accessibility • Safety • Entertainment • Mobility • Education • Economic integration	• Kapsys, Roger Voice, Facial Mouse • Mjn-Seras • Goall • Aira, Access Map • Breaking Sound Barriers • Easy Use, Who Is Who
Homeless & NEET	• Food • Housing • Health • Job seeking	• Range, Foodforall • Lease-Up, Merci, Couchsurfing • Next, Streetconnect (Pro) • Craigslist
Refugees	• Connectivity • Mental health • Kin finder • Integration • Volunteer matching	• Vf Instant Network, Whatsapp • Almhar, Smilers • Refunite, Tracetheface • Refugeye, Intergreat • Anpacker
Other	• Safety • Health • Support • Education	• Brightsky, Tecsos, Pormi, Street Furniture, Safenight • Connectính, Squirrel Recovery • Monzo, Cari-App • Cartable Connecté

Apps in Table 2 tend to fall into two categories:

1. **Apps that address a gap**

   This can be an information gap, such as locations of health services for youth leaving supervised care (Next). When used by health providers, an app can help to collect anonymised health data on the homeless to better address their needs (Streetconnect Pro). Other apps provide easy and convenient access to information that already exists (Fresh EBT).

   Apps can also address participation gaps, such as those that support persons with disabilities or sick children to participate in school (Breaking Sound Barriers, Cartable Connecté) or work (Easy Use, Who Is Who).

   Apps also address gaps related to safety, such as the safety needs of victims of domestic abuse (Brightsky, Tecsos, Pormi), the elderly (mPers) or persons with disabilities (MJN Seras).

2. **Apps that enable or facilitate everyday tasks**

   For the elderly, apps can facilitate the adoption of technology (Ardoiz), provide access to transport (Carius) and enable various healthcare functions, such as tracking medications (Pillboxie) or self-health monitoring through wearables or connected devices (Glucose Monitoring, Connect'inh).

   For persons with disabilities, these enablers can be as simple as a high-contrast visibility feature or a magnifier app in a device (Kapsys), to a more complex ecosystem involving third parties (Aira-connected glasses for the visually impaired).

   Other groups rely on apps to meet their needs for housing (Lease-Up) or shelter (Safe-Night), find next of kin (Refunite, Tracetheface), integrate in their new environment (Intergreat) or deal with addictions (Monzo, Squirrel Recovery).

   Apps that fill gaps or facilitate everyday tasks have important real-life impacts on users that may be measurable. The next section looks at the impact of these apps and what we can learn from them.

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How impactful are these apps?

Table 4 identifies several initiatives that measure the impact of digital inclusion initiatives. When impact has been measured, the findings suggest that supporting basic digital skills for digitally excluded people have positive learning outcomes. For example, in the UK, 90 per cent of Future Digital Inclusion learners moved on to higher level learning, and there were significant economic and social benefits, including the £48.6 million savings from shifting to online channels for government services.[34] Similar studies in France demonstrate significant benefits from greater use of digital services in the public and private sectors.[35]

For mobile operators, promoting a working environment that hires persons with disabilities more systematically is an untapped opportunity. Any apps or tools that facilitate the integration of employment for persons with disabilities would help to realise this opportunity. In the US, it is estimated that companies embracing disability inclusion would gain access to a new talent pool of more than 10 million people, and including just one per cent of persons of disabilities in the US workforce would boost GDP by $25 billion.[36]

There is anecdotal evidence however, that apps can be abused and have adverse effects on users.

For example:

- Smart home technology can be used to perpetuate domestic abuse;[37] and
- Smartphone data can be used to deport refugees.[38]

The latter issue raises important questions about the protection of privacy for vulnerable groups. However, most available evidence, even if anecdotal, suggests that apps can also have a positive impact on users, including:

- Reducing social isolation for the elderly;[39]
- Qualitative improvements in communication and independence of persons with disabilities;[40]
- Enhanced safety of epilepsy sufferers;[41]
- Coordination of support for vulnerable groups;[42]
- Reconnecting refugees with lost kin;[43]
- Positive effects on managing addictions;[44] and
- Improvements in personal safety and saved lives of victims of domestic abuse.[45]

Evidence suggests that apps can have widescale benefits, and while mobile technology plays a part, physical and local support structures are essential. There is also evidence that small-scale mobile technology tools can also benefit users, but in a fragmented app space the impact remains limited.

34. https://www.goodthingsfoundation.org/sites/default/files/research-publications/dfe_fdi_end_of_year_report_2016-17_final_version_for_good_things_website_0.pdf
35. https://www.inclusion-numerique.fr/wp-content/uploads/2018/03/letude-linclusion-numerique-un-investissement-rentable-finale.pdf
36. https://www.accenture.com/t20181029T185446Z__w__/us-en/_acnmedia/PDF-89/Accenture-Disability-Inclusion-Research-Report.pdf
37. New York Times, 2018
38. Wired, 2018
39. https://www.researchgate.net/publication/303817159
40. How Technology Is Transforming Disabled People's Lives
41. MJN-SERAS
42. https://www.linfodurable.fr/social/entourage-lapplication-qui-connecte-sans-abri-et-riverains-956
43. Forbes
44. https://www.sciencedirect.com/science/article/pii/S0376871614009776
45. Vodafone, TecSOS

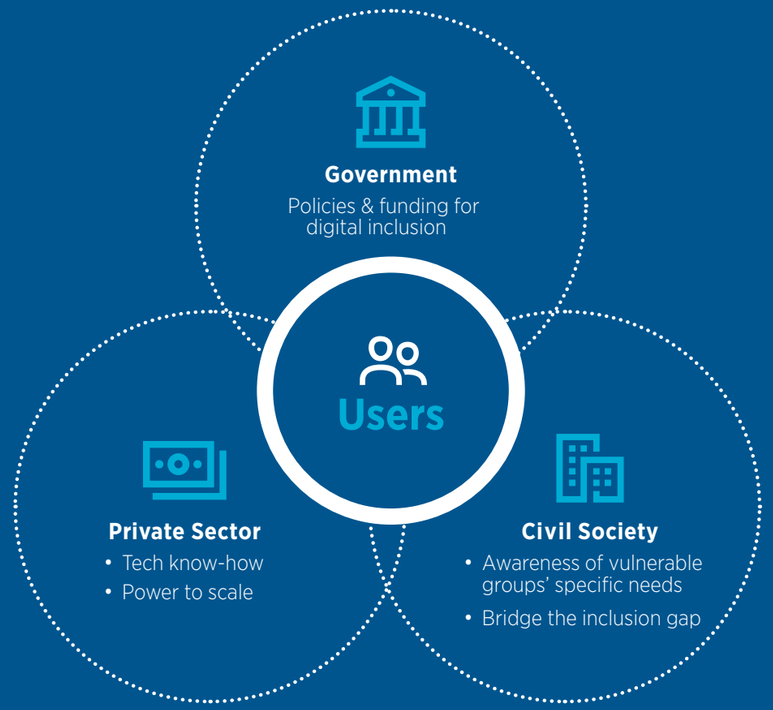
Who are the main players in the mobile technology ecosystem?

The mobile technology ecosystem driving digital inclusion and socio-economic development for underserved groups is an outcome of collaborations between the public sector, the private sector and civil society organisations (Figure 6).

Public sector policy instruments help to anticipate and address significant social transformations, such as managing an ageing population or ensuring the digitisation of government bodies and their services are inclusive. The reach of the public sector varies by country, and multiple layers of governance can add to the complexity of implementing local digital inclusion initiatives (e.g. US federal, state and county-level governments). However, the sector remains a critically important source of funding for civil society and community organisations.

Figure 6

A multistakeholder approach is key for mobile-enabled digital inclusion



The **private sector** is made up of social entrepreneurs and telecom and internet companies, which approach the digital inclusion space in two primary ways. First, the philanthropic efforts of mobile operators deliver significant benefits that meet the unique needs of underserved groups. Vodafone Foundation Spain, for example, focusses on developing solutions for persons with disabilities, partnering with the Red Cross to create a non-profit organisation, Fundacion TecSOS, dedicated to bringing new solutions to markets. The Foundation collaborates with over 150 local entities in Spain (disability foundations, academia, local governments, etc.). The Red Cross identifies social needs while Vodafone contributes its technical capabilities and TecSOS manages the innovation process.

> *"We cannot do this on our own, we need to collaborate." – Mari Satur Torre, Head of Vodafone Foundation Spain*

Similarly, AT&T's work with inclusive smart cities has resulted in a multistakeholder advisory panel that identifies and promotes benefits for the elderly and persons with disabilities.

Secondly, mobile operators see significant business opportunities in addressing the needs of vulnerable groups. For example, some MNOs offer subsidised services (broadband) for eligible low-income families (e.g. BT Basic, ATT Access). BT in the UK was recognised for its tailored service proposition targeted at the hearing-loss community (combining a data plan and dedicated customer team).

More significantly, MNOs see a major role for themselves in the "longevity economy", enabling smart environments (home, city) with IoT, AI and wearable technology. The global spending power of those over 60 is expected to reach $15 trillion annually by 2020.[46] Mobile health and care services will be particularly relevant for this group.

Finally, **civil society organisations** and community organisations work closely with the private and public sectors and have a well-established role in bridging the inclusion gap via local and online digital literacy support (e.g. Good Things Foundation, WeTechCare). These organisations are as varied as the groups they represent. Their reach is local and their impact depends on the extent to which they are integrated in larger and coordinated structures. They are the main advocacy groups ensuring that the specific needs of the underserved are heard and considered when designing technology solutions. They counsel, train, provide helpline support, collect data, raise awareness and promote the independence, well-being and dignity of underserved groups.

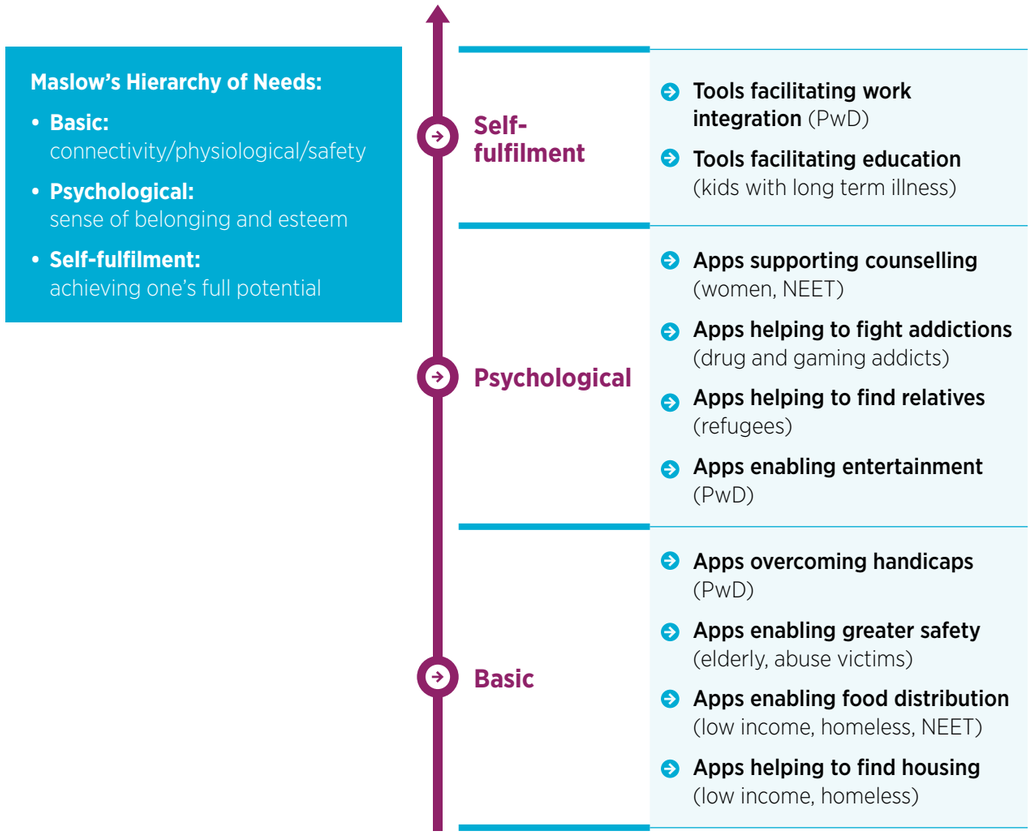
46. https://ec.europa.eu/research/innovation-union/pdf/active-healthy-ageing/merrill.pdf

An application framework

Apps targeting the underserved can be categorised into different frameworks depending on the needs they fulfil (Figure 7) or their functions (Figure 8).

Figure 7

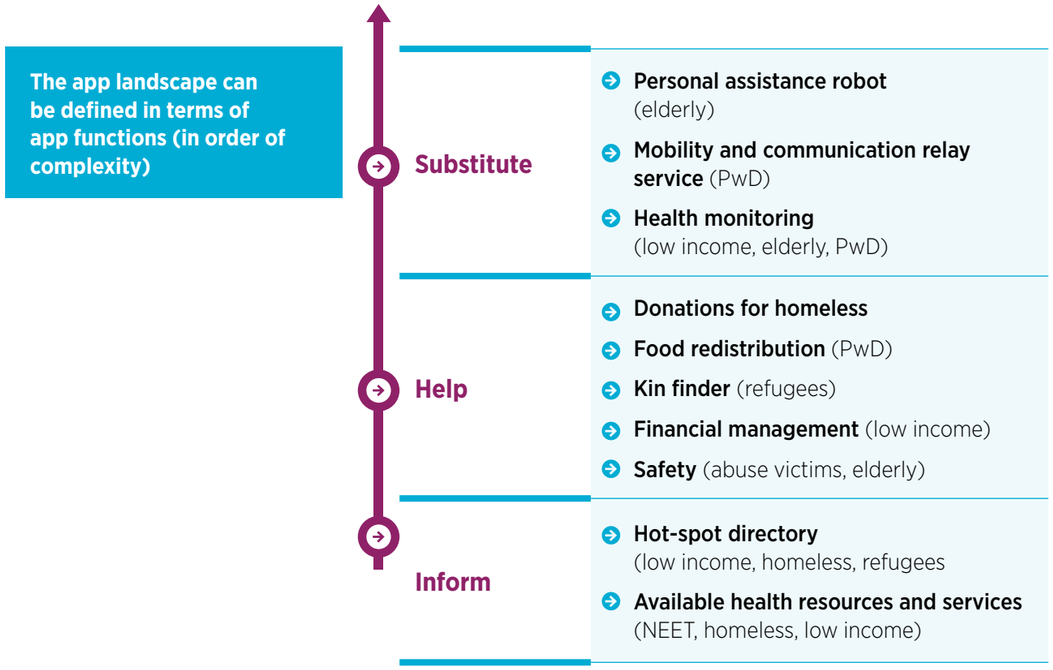
Needs-based app framework



A needs-based framework (based on Maslow's Hierarchy of Needs) categorises mobile apps in terms of their ability to fulfil a set of needs along a continuum, ranging from basic user needs all the way to self-fulfilment needs. This framework may help to determine the extent to which apps fulfil certain needs and the role technology can or should play in the development of digital social innovations.

Figure 8

Function-based app framework



A function-based framework categorises mobile apps by the functions they support, from informing users (typically making relevant information available on a mobile device) to substituting functions that require little or no intervention from users. This typically involves a more complex ecosystem in which apps rely on third parties to help users (examples from Figure 8 include health monitoring, personal assistant robot for the elderly and communication relay services for PWD). Most apps today fall within the 'inform' and 'help' categories. As sensors and wearable technologies become more pervasive, we are likely to see more substitution apps.

Lessons

Characteristics of effective tools

Research and interviews with industry and subject matter experts identified what characterised an effective app for vulnerable users:

Table 3

Characteristics of effective apps

- Have broad appeal (beyond the target group)
- Shaped by target users (before, during and after conception)
- Feature universal design and are easy to use
- Support dynamic content online and offline (e.g. easily updated, available offline)
- Allow multiple users on one app (e.g. phone sharing among low-income groups)
- Packaged for purpose (e.g. data plan for deaf users and access to dedicated customer service)
- Shared via trusted channels
- Scalable
- Leverage available data (e.g. using open data, crowdsourcing)

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Digital inclusion triggers for the underserved

For underserved groups, there is a sequence to digital inclusion: basic connectivity, accessibility, education and eventually socio-economic development.

In most high GDP markets, basic connectivity is almost universally available, although significant coverage gaps remain (mainly in rural areas) and the affordability of broadband remains an issue for low-income groups.

With connectivity in place, the industry should pursue efforts to systematically ensure tools and services are accessible for users with disabilities. Without accessible technology, app usage is unlikely, and usage will depend on targeted users being an integral part of solution design and testing.

The next trigger for digital inclusion is the availability of education and training to foster user confidence and motivation (especially for older users) or maximise usage in areas not yet considered (especially for youth). Digital acceleration rarely happens without offline support. Digital inclusion journeys vary in length and intensity, and tools must be adapted to accommodate different user needs and demands.

Finally, the importance of engaging with all stakeholders cannot be overstated. Technology is developing rapidly and threatens to further exclude society's most vulnerable members. Collaboration between the public sector, private sector and civil society will help to address this challenge and must continue to be pursued.

Challenges and how they are being addressed

User perceptions of technology can be a barrier to digital inclusion and socio-economic development. Interviews revealed that vulnerable groups can be on the receiving end of predatory technology schemes, compounded by alarming media portrayals of online scams that help create a general lack of trust of technology and the industry. Companies may address these perceptions through more transparent practices and reputation-building efforts.

The potential for technology to have unintended consequences must be directly addressed. First, the privacy of users. Privacy is an issue for everyone, but underserved groups can be particularly vulnerable, not least because they may be asked to give up some privacy to claim a benefit such as housing.[47] Digital privacy rights organisations will be instrumental in raising awareness of privacy breaches, while multi-stakeholder working groups (e.g. those involved in smart city pilots) will typically deal with these issues upfront through ("privacy by design").

The second negative impact is the potential bias of new technologies like artificial intelligence (AI). AI is taking on an overwhelming role in a user's online interactions (what information they see, the way apps are designed, etc.), which makes it an important trend for user groups that are likely to be overlooked. AI holds a lot of promise, but it will take a long time to build trust. There are calls for academia to provide independent analyses of the role of AI so that lawmakers can regulate appropriately.[48] The industry is beginning to recognise biases[49] in AI and develop design tools to address them, but more attention is needed in this area.

Finally, mobile operators have an opportunity for greater collaboration. For example, a US operator we interviewed is seeking to support the connectivity needs of low-income students across the US - a task that could benefit tremendously from greater collaboration. This kind of initiative could be an opportunity for the GSMA to act as a facilitator for cross-industry projects helping vulnerable groups.

47. https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=22533
48. https://www.nytimes.com/2017/11/14/opinion/academia-tech-algorithms.html
49. https://medium.com/microsoft-design/how-to-recognize-exclusion-in-ai-ec2d6d89f850

Future Direction

The GSMA is uniquely positioned to play an active intermediary role in the digital inclusion ecosystem in high GDP markets.

The GSMA recommends:

- MNOs, other private sector actors, civil society organisations, the public sector and other stakeholders collaborate and build partnerships to target the underserved;
- Applying design research practices to understand unique needs of underserved segments and inform service design; and
- Regular reviews of how underserved users are experiencing the service in order to understand user adoption rates, behavior change and impact.

Over the coming year, the GSMA Digital Equity Initiative will be providing support to select stakeholders to implement the above principles.

To find out more, visit www.gsma.com/digitalequity

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Appendix

Selected research on digital inclusion

Table 4

Selected research on digital inclusion

Policy	• ICT Accessibility Policy for PWD (ITU, 2017) • Making mobile phones and services accessible for PWD (G3ICT, 2012) • *Mobile: A Powerful tool for Digital Inclusion* (2014) and *Mobile: Helping to Close the Digital Divide?* (Good Things Foundation, 2014 and 2015)
Landscaping inclusion	• *illectronisme en France* (CSA, 2018) • Access and inclusion assessments (OFCOM, 2013) • Motivations of non-users (Good Things Foundation, 2018) • DARE Index – tracking ICT accessibility compliance (G3ICT)
Strategic plans	• Digital inclusion strategies (The FCC, NTIA, governments of the UK, France and Germany)
Impact assessement	• Social return on investment of digital inclusion programme in the UK (Good Things Foundation, 2016) • Economic impact of digital inclusion (CEBR, Good Things Foundation, 2018) • *Valuing Digital Inclusion* (BT, 2014) • *L'inclusion numérique : un investissement rentable* (WeTechCare, Capgemini Consulting, 2017)
Opportunities & risks	• Risks and opportunities of mobile health apps (German Federal Health Ministry, 2016) • *Smart Cities For All: A Vision for an Inclusive, Accessible Urban Future* (G3ICT, 2017) • IoT in healthcare (elderly care, monitoring), personal robots (elderly), wearable devices (patient monitoring and more), conversational AI for citizen services (Gartner research, 2016–2018) • Recognising exclusion in AI (Microsoft, 2017), privacy issues around smart city projects (New York Times, 2019), adverse use of smartphones to deport refugees (Wired, 2018)
Special groups	• *Connecting Refugees* (UNHCR, 2016) • New media use by homeless patients (Journal of Medical Internet Research, 2013) • Poverty in UK, US and impact of technology (UN special rapporteur, OHCHR 2017)

Size of underserved and marginalised populations

Table 5

Underserved and marginalised populations in high GDP markets (as a percentage of total population)

	France	Germany	Spain	UK	US
Elderly (2017)	25.70%	28.00%	25.30%	23.90%	21.50%
Elderly (2050)	32.20%	37.60%	41.90%	31.50%	27.80%
Low income	18%	19%	27%	23%	12.10%
PwD	14%	21%	17%	20%	21%
Abuse victims	26%	22%	13%	29%	36%
NEET	11.3%	5.8%	11.6%	10.1%	16.9%
Substance abusers	0.4%	0.3%	N/a *	0.6%	2.2%
Homeless	0.22%	0.42%	0.05%	0.45%	0.18%
Refugees	0.14%	0.24%	0.07%	0.05%	0.03%

* Data not available

Table 6

List of interviewees

Country	Organisation	Type	Title
United Kingdom	The UK Department for International Development (DFID)	Subject matter expert	Interim Head of Department (Economic Policy, Innovation and Capability)
Germany	Intergreat	Social innovator	CTO and Product Manager
United States	Propel	Social innovator	COO
Spain	Showleap	Social innovator	Co-Founder
Spain	Navilens	Social innovator	CEO
Other	The International Telecommunication Union (ITU)	Multilateral organisation	Senior Programme Officer, focal point for ICT accessibility
United States	Global Initiative for Inclusive ICTs (G3ICT)	Multilateral organisation	President and Executive Director
Spain	Vodafone Foundation Spain	MNO	Head of Spain Foundation
Spain	Telefonica Foundation	MNO	Institutional Relations
United States	AT&T	MNO	Director, Sustainability Integration
United Kingdom	BT	MNO	Head of Digital Inclusion
United States	Sprint Foundation	MNO	Head of Foundation
France	Kapsys	Device manufacturer	Managing Director
Germany	Caritas	Civil society	Digital Agenda Coordinator
United Kingdom	Good Things Foundation	Civil society	Head of Research
Spain	TecSOS Foundation	Civil society	Managing Director

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