01
CONNECTING DIGITAL LIVES

In this chapter:

You will learn about the benefits that access to the Internet brings and how to increase connectivity through innovation, cooperation, education and the right policies to leave no one behind.
1. Digitalisation is changing everyday life

Digitalisation can be viewed as the Fourth Industrial Revolution and the basis for amazing new services and business models that are transforming and disrupting many businesses.

Around the world, the way we work, communicate and face daily tasks is being revolutionised by digitalisation — from shopping to culture and entertainment.

The telecommunications sector is a good example of how digital services have changed the way people communicate: images, video and enriched text messages now complement voice communication.

But this is not just about private businesses; public services, governments and politics are changing too. Healthcare, transport and education are all among rapidly-evolving services that are improving their ability to interact with citizens and better meet their needs.

To be sustainable, digitalisation must be an inclusive process that ensures everyone has the opportunity to participate in the connected world.

Public administrations should make broadband deployment a priority for their national development and work together with the private sector to bring connectivity to all.

The private sector will need to rethink how it deploys network infrastructures and commercialises broadband services. Telefónica is a leader doing so in Latin America.

Governments should modernise regulation to support and foster new ways to deploy, operate and commercialise networks by companies.

Regulatory reform should strive to attract private investment and support lowering the cost of infrastructure deployment by removing taxation.

Public administrations should also contribute to increase demand for broadband services by improving people’s skills, promoting relevant local content and digitalising public services.

Connectivity is the first requirement to enter the digital world.

The connectivity has a positive and relevant impact on employment and improves the Gross National Income (GNI) per capita as the International Telecommunications Union (ITU) has reported. Improving Internet access and use are correlated with higher GNI (see chart 1). The ITU has also published an ICT Development Index (IDI), which records the population’s digital skills and suggests a clear relationship between education and per capita GNI (see chart 2).

But worldwide 3.9 billion people, more than half the world’s total population, are still offline. The majority of these people are from the developing countries.

Out of this, around 1.2 billion cannot access to 3G or 4G mobile infrastructures and therefore cannot connect to the Internet, but 2.7 billion live in areas of coverage of mobile Internet access and do not connect and use it (see Chapter 1: At a glance).

Telefónica has invested more than 45 billion euros over the last five years to provide global infrastructure, becoming the first fibre provider in terms of footprint and bringing mobile broadband coverage to almost 80% of the Latin-American population. Nevertheless, 20% of this region’s population is still unserved by mobile broadband.
2. New infrastructures, better infrastructures.

Connectivity is the first step in the digitalisation. It is important to work on two key areas:

Digital divide. Connecting the unconnected

Connecting those who don’t have access to the most advanced networks (New Networks). The unconnected should be the main focus of policymakers and governments. This New Networks should not just be provided for the short term, but designed to evolve as soon as new solutions and innovations are created, thus reducing the capability gap between rural area networks compared to urban areas.

Inclusion is a concern for all governments and other organisations shaping the digital world. In the same way that power and water infrastructure were central to development in the 20th century, today connectivity must be accessible for everyone.

Sustainable networks

Improve or evolve older networks to meet the demands of a fully digitalised society (Better Networks). The digitalisation of everything will concentrate in ultra-dense areas up to 1 million devices connected simultaneously into a single 1 km² (counting users’ smartphones and other devices). This is an unprecedented challenge that entails a radical change in how networks are deployed and operated.

In order to connect people and objects, networks will need to become smarter and more flexible. Some applications will need higher bandwidth or better latency and response, while others will be able to operate in networks with less demanding performance. In the same way, the controlled and identifiable environment and the level of cybersecurity that industry 4.0 will require differ profoundly from the environment of open access and freedom to attach (uncontrolled) devices offered by generic Internet access.

“How broadband represents a powerful way to accelerate progress towards the attainment of the 17 SDGs, and new broadband networks and services will play a key role in the delivery of education, healthcare and basic social services, particularly for chronically disadvantaged communities.”

Howlin Zhao, ITU Secretary-General
Current approaches won’t work for these new challenges because:

- The current obligations that operators have when building infrastructures make it impossible to provide networks at reasonable prices for low-income users living in remote areas.
- Misleading and restrictive understanding of current regulations requires networks to perform equally for all services or devices.

Both challenges have a common ground: they require a modernisation of rules and regulations in order to provide an adequate framework where network innovation is not discouraged.

Providing such resilient, trusted and pervasive infrastructures that bring connectivity to everyone represents a big challenge that will need a multi-stakeholder approach. This will require the collaboration and cooperation of the private and public sectors, as well as operators, device suppliers, regulators, policymakers, vendors, standardisation bodies and open source communities.

Telefónica maintains a firm commitment to provide infrastructure to everyone in the countries where we operate. We have invested €45 billion worldwide over the last five years and we continue to seek innovative ways to cooperate with other players in the ICT sector in order to increase our presence and extend our services to challenging areas.

Making services more relevant to diverse populations and creating relevant content and services in local languages are key issues that create a virtuous circle by promoting the experience of digitalisation and encouraging further exploration.

In order to get people connected it is necessary to find innovative ways to deploy networks, enable the creation of relevant digital services and equip users with basic digital skills to benefit from them.

A variety of initiatives from the private and public sectors are required to close the connectivity gap by taking action on both the supply and demand sides:

- Private sector:
  - Devising innovative and sustainable technology and exploring disruptive investment models to deliver infrastructure.
- Public administrations:
  - Creating an investment-friendly policy framework to build Information and Communications Technology (ICT) infrastructures.
  - Following a holistic approach.
  - Digitalising public administrations and civil services.

Telefónica believes that this is the best way to help societies, in line with the United Nations (UN) Sustainable Development Goals (SDG)\(^1\).

Furthermore, finding new ways of providing better infrastructure to increase access to services is not enough unless people can see the benefits of using them. Even in well-connected areas, there are significant gender, age, income and education gaps\(^2\).

Inadequate communications infrastructure restricts access to markets, jobs, information and training, creating a major barrier to business.

Small and medium-sized enterprises (SMEs) that engage in industrial processing and manufacturing are the most critical for the early stages of industrialisation and are typically the largest job creators. Over 90 percent of businesses worldwide are SMEs, accounting for between 50-60 percent of employment.

The United Nations sustainable development agenda is guided by 17 Sustainable Development Goals (SDGs) that seek to end poverty, protect the planet and ensure prosperity for all. Two of the SDGs are directly linked with communications infrastructure, digitalisation and its impact on education and economic growth.

Goal 9: Build resilient infrastructure, promote sustainable industrialisation and foster innovation

This goal recognises the importance of investment in communications infrastructure:

- 1.1-1.5 billion people do not have access to reliable telephone services.
- Quality communications infrastructure supports the achievement of social, economic and political goals.

Goal 17: Revitalise the global partnership for sustainable development

This goal recognises the importance of a multi-stakeholder partnership approach:

- Enhancing the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilise and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries.
3. Private sector

Innovation to deliver the access infrastructure that consumers need

The networks of the future should be personal, fully flexible and adapted to customer demands. People will interact with networks to manage and configure their experiences, depending on their immediate needs and wishes. Networks need to be sustainable and also smart enough to keep pace with consumers.

Delivering ubiquitous access infrastructure will require a huge effort from the telecommunications sector. Connecting remote sites can cost much more than urban areas and, therefore, the return on investment is much lower due to the cost of deployment, even assuming the same intensity of use as in urban areas.

Similarly, the high cost of developing infrastructure in ultra-dense areas able to deal with the new requirements of the Internet of Things and other new services will need of new solutions that may later be escalated to rural areas.

The new technologies that are being developed to provide fully flexible infrastructure management in order to make them more sustainable are based on Software Defined Networks, Network Function Virtualisation and Network Slicing in 5G networks. This will allow infrastructure providers to be more efficient, providing network capabilities fit for purpose, instead of having a rigid platform that cannot sustainably satisfy the needs of a digitalised society.

Additionally, innovative ways of using existing technologies will allow the private sector to overcome traditionally unmanageable problems. Balloons, drones and satellites may all become elements of a network solution.

Open standards and open source initiatives reach their maximum potential in remote places. They can reduce the level of expertise required to manage a local access network by enabling communities to handle an operator’s local equipment by themselves and contributing to network maintenance in remote areas. The use of more generic equipment can then reduce the cost of equipment maintenance and upgrades.

Thus, in order to provide access infrastructure that brings connectivity to diverse and challenging contexts and areas across the world, from ultra-dense downtown districts to remote and rural coverage, the private sector will need to:

- Develop new equipment and technical solutions.
- Find new business models and explore cooperation with other players.
- Cooperation with digital service providers in some rural and low-income areas in order to provide sustainable network access provision.
- Transform conventional business approaches, break down silos and develop business models to implement 5G networks that will help to solve these challenges, both in rural and ultra-dense areas.
- Strengthen the cooperation between equipment suppliers and software developers, working with open standards to achieve economically feasible, efficient and sustainable solutions.

Almost 100 million people in Telefónica’s footprint are not connected. We are committed to ensuring that the benefits of digitalisation flow to all citizens and are more evenly shared, in order to create a more inclusive society that leaves nobody behind.

“Internet para Todos” is Telefónica’s internal programme that reimagines the way networks are designed, deployed, operated, maintained and commercialised, so as to continue extending our mobile Internet coverage beyond our current reach.

Telefónica tackles this major challenge with a radically open approach, collaborating with several cross-industry stakeholders: Internet companies, other local operators, local entrepreneurs, governments, etc. We are using the next generation of software-based networks to build a rural, sustainable value chain with scalable financial structures capable of deploying the networks of tomorrow.

Some of the key elements that “Internet para Todos” is reinventing in Latin America are:

- Adapting infrastructure to low-density areas.
- Designing an open, simplified, fully virtualised, environmentally efficient and programmable network and support tools.
- Discovering disruptive deployment models such as High Altitude Platforms, local communities and entrepreneurs.
- Leveraging Big Data & Artificial Intelligence (AI) to guide decision making.

TELEFÓNICA’S PROGRAMME: “INTERNET PARA TODOS”

With the “Internet para todos” programme, Telefónica is expanding Internet with an innovative approach, incorporating a broad range of partners and stakeholders to solve the rural connectivity challenge.

- HIGH ALTITUDE PLATFORMS
  Extension of coverage with “flying towers” in extremely remote areas. On demand coverage

- RURAL INNOVATION
  Overlay of voice network
  Update our voice business with innovation in network (Access and transportation)

- RURAL OPERATOR
  Use third parties to cover places where our operating model or financial performance are not profitable

Already piloted in Peru with good results.
4. Public administrations

Investment-friendly policy framework

Public administrations must focus on providing the best outcome for all citizens, being open to new operational and investment models. Predictability of the legal and regulatory environment is vital to enable investors to assume risks and to attract the private capital that is needed to build the infrastructure networks of the future.

A flexible and predictable approach includes:

- Greater flexibility in the way networks are developed and used to provide services, supporting a more efficient rollout of next-generation networks such as fibre and 5G both in ultra-dense and remote areas, taking full advantage of what technology can provide in terms of infrastructure usage efficiency.

- The promotion of private investments in cooperative and community networks operated by local residents in very low-density and unserved areas that may then be attached to:
  - Private backhaul links
  - Wholesale-only networks, also privately funded, where anyone can join.

- A regulatory reform or soft approach to encourage new business models that can get the best of a two-sided market which only on bandwidth and/or volume of data consumption. Such a two-sided market is a key feature of the Internet for specific rural areas with low-income population, as well as for ultra-low latency networks needed to provide new services in very high density areas.

It might be time to reconsider whether consumers alone should assume the funding burden of access networks, given how little control they have over the volume of data being pushed towards them by digital services.

SPAIN LEADS FIBRE TO THE HOME (FTTH) DEPLOYMENT IN EUROPE

In Spain, a change in the regulation of optical fibre access in 2009 aimed to attract investment in high-speed broadband (above 30 Mbps). It resulted in massive fibre roll-out by the three operators. By June 2016, more than 11 million households had fibre to the home (FTTH) access and by the end of 2016 take-up was nearly to 35%. Back in 2008 Spain was a laggard in Europe in terms of homes passed with FTTH technology. Now it is ranked 5th in the world (7th by number of FTTH subscribers) and has the biggest FTTH network in Europe, making Spain the leading European country for FTTH availability.

A two-sided market means that both consumers and producers contribute to fund their common platform. It avoids the burden of funding falling solely on one party or the other. In many cases, consumers can contribute to fund the platform with their personal data in addition to or instead of financial remuneration.

Operators, industries and individuals will need to develop and experiment with new business models, and regulators should be open to lightening regulatory burdens like some existing net neutrality provisions.

As well as a modernised approach to innovative business models, new ways are needed to provide licenses from governments and regulators, removing the costly processes that transfer private capital to governments instead of having that capital deployed directly into the building of networks and infrastructure.

The experience of limiting regulation around wholesale fibre obligations in Spain resulted in a boost to fibre deployment by all the operators, putting Spain at the forefront of the EU in terms of number of fibre connections and networked homes.

Holistic policy approach

Regulation should take into account the value of innovation in business models and retail offers and the benefits this can bring in terms of take-up. While some of these initiatives have come under criticism for potential Net Neutrality violations, it is fair to say that many of them have been very popular.

Affordability is often viewed as a relevant reason why people do not use the Internet. Obviously, people need to be able to pay for connectivity, so price levels do matter. However, as the ITU has recently stated in a major study for least-developed countries, the relationship between mobile broadband prices and Internet use is not particularly strong and other factors, such as availability and skills, are also at play (see chart 4). Furthermore, mobile broadband prices have fallen considerably in recent years (see chart 5).

Chart 4. Relation between mobile broadband basket and internet usage, 2015, Least Developed Countries.

Where Fiber Broadband is Most Prevalent

<table>
<thead>
<tr>
<th>Country</th>
<th>Fixed fiber broadband subscriptions per 100 inhabitants in selected OECD countries*</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Korea</td>
<td>30.0</td>
</tr>
<tr>
<td>Japan</td>
<td>22.9</td>
</tr>
<tr>
<td>Sweden</td>
<td>15.5</td>
</tr>
<tr>
<td>Spain</td>
<td>10.7</td>
</tr>
<tr>
<td>Switzerland</td>
<td>9.6</td>
</tr>
<tr>
<td>Netherlands</td>
<td>6.0</td>
</tr>
<tr>
<td>Australia</td>
<td>5.8</td>
</tr>
<tr>
<td>United States</td>
<td>3.7</td>
</tr>
<tr>
<td>Canada</td>
<td>3.7</td>
</tr>
<tr>
<td>France</td>
<td>3.3</td>
</tr>
<tr>
<td>Germany</td>
<td>0.7</td>
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</tbody>
</table>

*December 2016  Source: ITU
Affordability is, therefore, one factor, but other issues are equally important, including take-up barriers that need more focus by governments than just the price of connectivity. For example, the cost of the associated equipment and devices required to run digital applications and services. Computers, tablets, smartphones and the power supply required to run them are fundamental components of digital life and need to be accessible priced so that citizens can take advantage of the connectivity available to them.

Communications services should not be taxed differently than any other basic good and neither should there be differences in taxation rules between different providers. High tax rates, or sector-specific taxes, make communications services less affordable for lower-income groups, and can have the effect of turning the use of digital services into the preserve of a privileged few. Governments should bear this in mind when determining their tax policy and categorising devices, which should be treated as basic tools for empowering people, not as luxury goods.

Modernisation of public administration

Public administrations can help to build trust and confidence by demonstrating the huge advantages of digitalisation. This process of digitalising administrations has additional advantages, as it increases their service capacity and optimises resources, enabling reinvestment and increasing efficiency.

It is a win-win proposition for all. Citizens become engaged in the digitalisation process and develop an increasing need to participate in the digital society as public services go online.

It is easy to envisage some examples:
- Digitalising healthcare will enable better services to be delivered and efficiently extend the reach of advanced medical services to remote areas.
- The use of data analytics makes public transport systems more efficient.
- Digitalisation of processes involving tax authorities has been demonstrated to be a great incentive for people, companies and other agencies to embrace the advantages of such changes, saving time, efforts and money for all parties.

Chart 5. 1 Mbps broadband landline rate in Latin American countries as a percentage of monthly per capita GDP, 2010 and 2015

Source: ECLAC Regional Broadband Observatory. For 2010, the rates correspond to December. The rates for 2016 correspond to January; GDP to 2015

March 2017, the Swedish National Land Survey completed the second phase of a Blockchain-powered National Property Registry, working with the start-up ChromaWay, two banks specialised in mortgages, Telia and Kario's future technology consultants.

The solution clears the way for the removal of the old paper-based process and substitutes it with a fully digitalised system. Blockchain provides security and convenience, and a reliable way to streamline the workflow across the ten or more different entities involved in the process.