



Ultra-fast Broadband is a connection speed equal to or greater than 100 Megabits per second. Via optical fibre connections or via 4.5 G (LTE-Advance) radio connections .

The opportunity is identified in the implementation or deployment of Ultra-fast Broadband. To deploy new telecommunications networks, operators can reuse the pipes, ducts and publicly owned sites or other networks of private operators

For the development of this opportunity, the Spanish Government sets out specific measures to encourage investment, facilitate deployment of fixed access ultra-fast network and promote the modernisation and renovation of existing networks.

ORIGIN OF THE INVESTMENT OPPORTUNITY



The development of a dynamic and innovative digital economy that fosters growth and productivity, allows for the development of new services, generation of social improvements and enhancement of job creation require wide access to ultra-fast broadband. That is why the deployment of new infrastructure for fixed and mobile broadband access, together with the promotion of intensive and efficient use thereof, has positioned itself as one of the key strategic objectives of the decade (1).

Spain faces the challenge of establishing an environment that favours private investment to modernise existing networks to provide ultra-fast services and that continue to expand the ultra-fast broadband coverage to reach 2020 targets (universal broadband coverage in 2013, 100% coverage of the population of at least 30Mbps by 2020 and at least 50% of households subscribing to speeds above services of 100 Mbps in the same year) (1).

New mobile technologies (LTE) play an important role as they bring forward access to ultra-fast networks in rural areas, at the same time as increasing the current mobile broadband speeds in urban environments.

LOCATION OF THE INVESTMENT OPPORTUNITY IN THE SECTOR VALUE CHAIN



This opportunity is in the link of Telecommunications Networks and affects telecommunications companies that carry out the deployment of ultra-fast networks. The importance of modernisation of infrastructure stands out, facilitating the deployment of access to next generation networks, although initially limited speeds will be offered, they are prepared to increase their capacity.

DIFFERENTIATING FACTORS OF THE INVESTMENT OPPORTUNITY

Table with 3 columns: CONSUMER/USER, COMPANY/INNOVATION, SOCIETY. Each column lists factors with corresponding red circle icons and descriptive text.

INVESTMENT OPPORTUNITY LIFE CYCLE

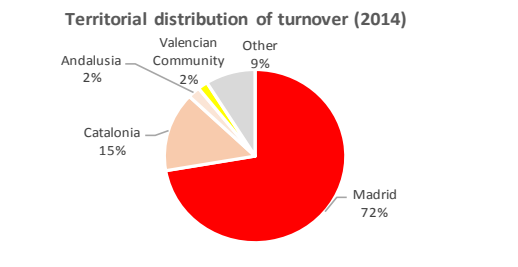
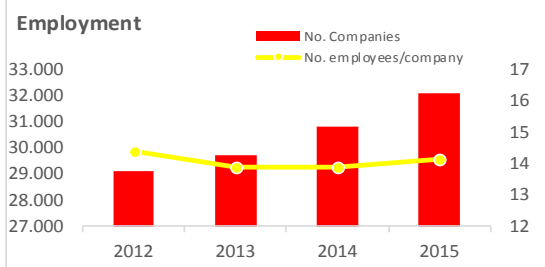
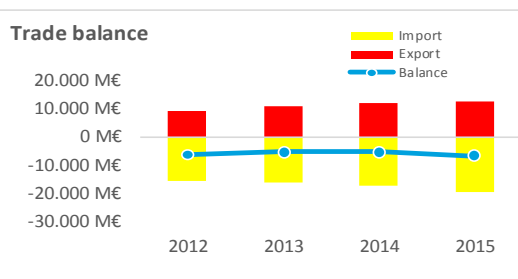
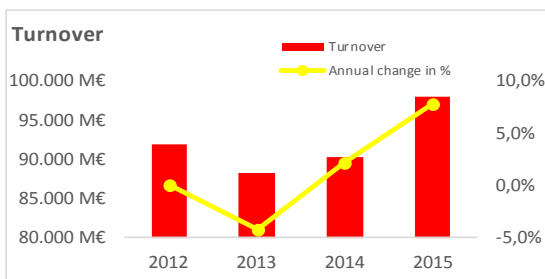


According to data referring to first half of 2012, the coverage of ultra-fast networks with the capacity to serve at least 30 Mbps download speed stood at 53% of the population. While, connectivity at over 100 Mbps stood at 47% of the population. In 2014, in line with the objectives of the Government, it managed to increase this percentage to 61% (2).

Given the favourable prognosis of this opportunity, operators of fixed and mobile lines establish partnerships to achieve the best results in the development of their services.

Sources: (1): Plan for Telecommunications and Ultra-fast Networks - Ministry of Energy, Tourism and Digital Agenda. (2) Report to the Council of Ministers of the Digital Agenda for Spain-July 2015

CHARACTERISTICS OF THE ICT SECTOR (3)



SUPPLY

TOP 5 COMPETITORS

#	Company	Net sales	Last available data
1	Telefónica	€59,104 M	2014
2	Orange	€4,010 M	2013
3	Vodafone-ONO	€1,598 M	2013
4	Jazztel*	N. avai.	-
5	Euskaltel*	N. avai.	-

* Data not available in the queried database. SABI.

DEMAND

GROWTH

- By **2017**, the main operators will provide more than **19 million optical fibre lines**.
- The European target is to ensure that **50% of European households hire services of 100 Mbps in 2020**. In 2012, this percentage in Spain was **0.2%**, a growth in the medium term is expected due to infrastructure deployments.
- In 2016, according to forecasts by IHS iSuppli Research, would be **1 billion users** with access to fourth generation mobile networks, 4G and LTE, which also increases the capacity to innovate.

SUCCESS STORIES



Huawei- Leading the LTE era: Huawei's social contribution to Spanish society has been a constant since the introduction of the company in the country. In recent years, the Corporate Social Responsibility strategy of the company has focused its efforts on ensuring a more dynamic educational environment and to **democratise the deployment of next-generation networks throughout the country**. The firm commitment of the company to innovation, its expertise in the development and deployment of next-generation LTE networks and its **pioneering work with 5G technology** are already underway and entrench the company's commitment to Spain and economic, social and technological improvement in the country.

Through the framework agreement "Leading the LTE era", Huawei and the Polytechnic University of Madrid teach a **graduate course in mobile communications that, in addition to theoretical training, includes internships in the virtual LTEStar 6.0 laboratory, run by Huawei**.



Vodafone buys ONO to offer its customers better landline and mobile services: Vodafone and Ono have "**complementary characteristics**" because of their expertise in landline and mobile broadband.

Thus, the new company will be a **leader in ultra-fast broadband**, offering 100 Mbps Internet and 4G. That is to say, a powerful landline broadband network. Moreover, through this strategy Vodafone-ONO offers a pay-TV platform, which means it can compete with other operators.



Google Fiber: Google as a provider of lines, supplies the people of Kansas City: a speed of 1Gb per second. Attracted by this capacity, web **entrepreneurs and professionals** have come to **exploit the advantages** of a connection that is 100 times faster than the average in the United States. The city of Chattanooga in Tennessee, is also acting as a **magnet for innovation**. Since it built a 1Gb optical fibre network, companies like **Amazon** and **Volkswagen** have established themselves there. More than 3,700 jobs have been created related to the new infrastructure.



POSITIVE FACTORS FOR INVESTING IN SPAIN

Favourable factors in Spain for the development of the opportunity

- Boost from the Government
- Implementation of ultra-fast networks in schools
- Elimination of administrative barriers
- Social factors and habits

The **Telecommunications and Ultra-fast Networks Plan** and the **National Strategy for Ultra-fast Networks**, set out specific measures to **promote deployment** and **promote the adoption of ultra-fast networks**, focusing on reducing deployment costs, and measures to promote the use of new products and services.

According to this plan, by 2020, **50% of households** will be connected at **more than 100 Mbps**.

In Spain, a **framework agreement for the extension of access to ultra-fast broadband for Spanish schools has been signed**. The project has a budget of **330 million euros** through the European Regional Development Fund (ERDF) under the Multi-Regional Operational Program of Smart Growth and jobs will run through Red.es through public tenders for operators.

The General Telecommunications Act, which has the aim of facilitating network deployment and the provision of electronic communications services will lead to administrative simplification by eliminating licenses and authorisation by the telecommunications administrators.

Broadband coverage of over 30 Mbps rose from 53% to 65% of the population and **ultra-fast broadband over 100 Mbps has already reached 61% of the population**, which is above the estimated 50% target for 2015 in the Digital Agenda for Spain. ⁽⁴⁾

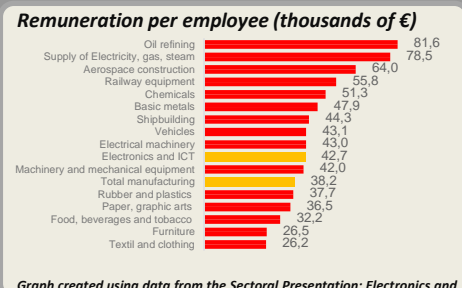
Favourable factors for the sector in Spain

- Macroeconomic situation
- Labour market

The **Added Value of the information technology and communications sector** in 2015 was 45,296 million euros, representing 4.9% of the added value of the Spanish economy.

Sector exports totalled **13,032 million euros**. ⁽³⁾

The **average productivity per employee** in the ICT sector is **52,100 euros per year**. Their **average individual remuneration is 42,700 euros per year**. The **Unit Labour Cost** accounts for **81.8%** of the ratio between the remuneration per employee and the individual productivity (productivity defined as value added per employee). ⁽⁵⁾



Graph created using data from the Sectoral Presentation: Electronics and ICT.

- Incentives
- I+D+i
- Talent
- Geographic location

In its **Telecommunications and Ultra-fast Networks Plan**, the Spanish Government established budget of **200 million euros to boost the deployment of ultra-fast fixed access networks to accelerate coverage of ultra-fast mobile networks and boost demand**.

The measures envisaged to reduce deployment costs of landline networks stand out, as does a programme for the extension of next-generation broadband, facilitating access for operators to new frequency bands, and the simplification of the requirements including for the deployment of mobile networks.

There are 15,736 **innovative companies** and the **percentage of innovative companies is roughly 28.5%**, spending a total of **13,6747 million euros** on innovation. ⁽⁶⁾

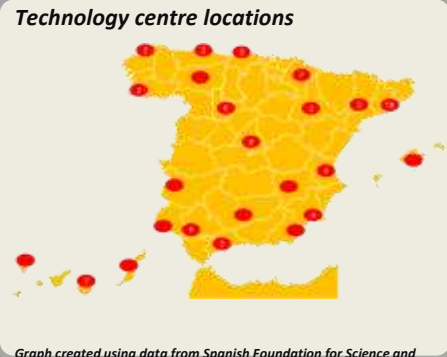
Installs in Spain Google Campus to the world's largest entrepreneurs, ahead of London, Seoul and Tel Aviv, demonstrating confidence in the creativity and talent in the country by leading companies the sector. These facilities provide work areas and technical advice for the implementation of new projects. TechHub is involved in this project which manages a **global community of digital entrepreneurs**.

Spain is **within reach of three main regions**: the **European** region, the **Mediterranean** region and the **Atlantic** region. Spain is considered to be the gateway between North Africa and Europe, and a key link to Latin America, not only because of its geographical location but also because of its strong historical and cultural ties with the region. In Spain the **Canary Islands** play a key role with regards to **maritime traffic with West Africa**.

- Technological and research infrastructure
- Transport infrastructure and logistics networks

Spain has a very advanced technological infrastructure as shown in areas such as: the presence of **84 technology parks** that house more than 5,000 technology companies and a **broadband coverage of 96.5%**, one of the few OECD countries that has had included in its legislation since 2012 the **universal obligation of 100 Mbps broadband supply**. In the **business** arena, broadband penetration exceeds that achieved in the European Union. In 2016 **99% of companies in Spain** that access the Internet do so by broadband ⁽⁷⁾.

There are **250 airlines** operating in Spain in its 47 airports; its high-speed rail network is the 2nd best in the world and the best in Europe; it is ranked **1st in the EU for its motorway network**; and it has excellent sea connections to its **46 ports** distributed along the Atlantic and Mediterranean coasts.



Graph created using data from Spanish Foundation for Science and Technology.

Sources: (4) Report to the Council of Ministers of the Digital Agenda for Spain-July 2015 (5) Electronics and ICT Sectoral Presentation. April 2015. MINETAD (6) Innovation in companies Survey 2016 (7) ONTSI.