



## **Digital Economic Opportunity in Spain**

How digitalization may boost  
the Spanish Economy

September 2017



**accenture**strategy



## **CONTENT**

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<b>1 Executive Summary .....</b>	<b>9</b>
1.1 Key quantitative findings.....	9
1.2 Causes of the digitalization delay in Spain.....	10
1.3 The opportunity ahead .....	11
1.4 The Digital Transformation roadmap .....	12
1.5 The vision of leaders on the ground .....	13
1.6 Conclusions.....	13

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<b>2 Digital Transformation .....</b>	<b>15</b>
2.1 Digital Transformation definition .....	16
2.2 Digital Transformation measurement .....	17
2.3 Digital Transformation in Spain.....	19
2.4 Causes of the Digital Transformation delay in Spain .....	25
2.5 Digital Transformation in Spain per industry.....	29

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<b>3 Digital Economy .....</b>	<b>54</b>
3.1 Digital Economy definition .....	54
3.2 Digital contribution to Spanish economy .....	54
3.3 Digital contribution to employment.....	55

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<b>4 Digital Transformation Acceleration.....</b>	<b>58</b>
4.1 Optimal combination of DEO impulse .....	58
4.2 Digital Transformation acceleration key guidelines.....	61
4.3 Digital Transformation acceleration initiatives.....	65
4.4 Digital Transformation acceleration initiatives by industry .....	71

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<b>5 Conclusions .....</b>	<b>94</b>
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<b>6 Annex .....</b>	<b>96</b>
6.1 Key definitions .....	96
6.2 Methodology .....	97
6.3 Interviewees .....	98



## **Digital Transformation as a growth driver**



**Alberto Zamora**

Accenture Strategy  
Iberia Lead

The Digital Disruption we are witnessing is profoundly changing the way we live, work, and relate to one another. This 4<sup>th</sup> Industrial Revolution blurs the frontiers between the physical, digital, and human scenes, impacting business ecosystems, employment, policymakers, environment, and people habits in a broader sense.

Although the entire society determines the digitalization of an economy, business ecosystems have a leading role to empower the transformation through three sets of levers: digital skills, technologies and accelerators.

Based on our research, Spanish economy presents certain delay in its Digital Transformation when compared with its European peers, mainly due to the lack of a clear digital strategy, the digital talent gap, the operating complexity of companies, the limited investment in innovation and the sometimes-rigid regulation.

This delay has prevented the Spanish economy from realizing a tremendous value so far, but the good news is that we still have a huge economic opportunity ahead if the Digital Transformation is accelerated. In fact, if we accelerate the digitalization in Spain, there is an estimated opportunity of incremental GDP up to USD 48.500 million by 2021.

Throughout this study, we have identified the key initiatives to realize this value based on 5 key guidelines: Leadership, Digital Strategy, Investment & Execution, Digital talent & Organization and Government Support.

We intent this study to serve as a call for action for Spanish companies, institutions and policymakers to promote a shift towards digital. Thus, Accenture has joined its experience in the digital space with Mobile World Capital Barcelona (MWCB) to create awareness in the business ecosystem of the need of accelerating the digitalization of our economy and to help them navigate the process.



## **An opportunity for change**



### **Constantí Serrallonga**

General Manager of  
Mobile World Capital  
Barcelona

Digitalisation is a global revolution that is here to stay. The eruption has brought about a paradigm shift requiring a strategic global, cultural and cross-sectional response. Joining the transformation in which we are immersed in, means evolving so we stand out from the crowd, and this requires investment, training and incentives for new social and economic ecosystems.

Identified as the economy with the greatest prospects for growth in the EU and the target of large international investment funds, Spain has a major opportunity within its grasp. After living through the economic crisis, the moment has arrived to grow, accelerate and make a qualitative leap forward. We have been given a great opportunity in which, if we are to grasp it to the full, requires cooperation and commitment among all parties involved. Only in this way, can we provide the right response to the challenge that we face as a society that is eager to improve.

In this context, we have the necessary potential to undertake a major process for change: research centres, business schools, human capital and talent, and government bodies willing to collaborate.

Since its conception, Mobile World Capital Barcelona Foundation has been a part of this essential driving force for change. The Foundation's work is oriented towards the areas driving this revolution: entrepreneurship and innovation, economic and industrial transformation and digital training and empowerment. In turn, these efforts have produced significant success: making Barcelona the mobile world capital and an increasingly relevant agent in the global digital ecosystem. This growth is thanks to the participation and collaboration of all agents involved, both public and private, who make up a continuously improving ecosystem and who offer a bright future.

The progress to date should provide the motivation to continue working in the same direction, ever faster, without looking back. The hurdles in our path are not easy and will require a lot of intensive work if they are to be overcome. Forecasts suggest that by 2020 around 1 million jobs will not be covered due to a lack of digital talent. With this mind, one of our goals must be to promote the training of talent and digital skills to ensure growth.

This revolution requires vital changes and a digital agenda for the country, leading it towards new forms of value creation. We must be able to develop a framework that incentivises and facilitates impact on all areas of our society; an environment for strategic growth that is also sufficiently dynamic to tackle the most immediate economic and social challenges.

This report contains a clear reference to the high rate of return from such efforts, with a genuine potential to increase our GDP. This goal should fill us with motivation and energy because, in short, it means improving people's quality of life, which is a fundamental aspect and constant challenge in our daily existence. We have before us a major opportunity to work together in fostering change that could position us as an economic leader in the digital age.

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## **01. *Executive Summary***

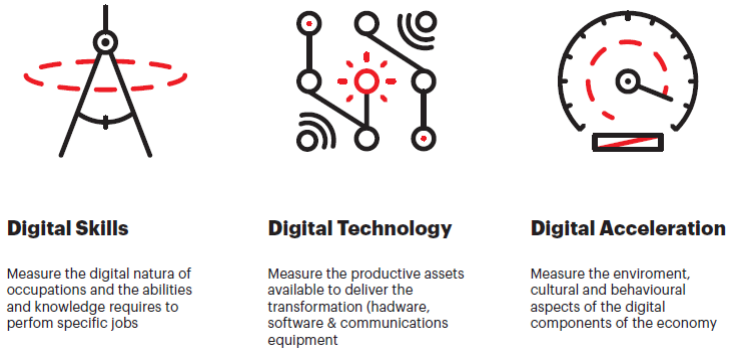


## 1 Executive Summary

We live in an era of constant change, in which the Digital Disruption is profoundly changing the way we live, work, and relate to one another. This transformation is delivering immense benefits for businesses, consumers, society and environment, yet there are still challenges and threats that must be addressed.

One of the most relevant effects of the digitalization is the acceleration of the economy leveraging the latest technologies, such as artificial intelligence, data analytics, IOT, mobility and cloud computing. In the face of this scenario, Accenture and Oxford Economics developed the Digital Economic Opportunity (DEO) index to measure the digitalization and the digital opportunity within an economy.

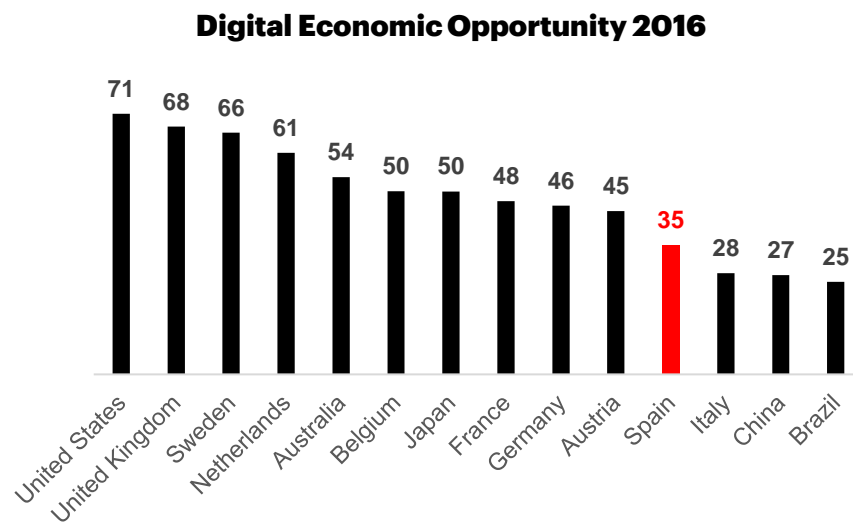
As the Digital Transformation spans far beyond cutting-edge technologies, our methodology structures the analysis through 3 levers:



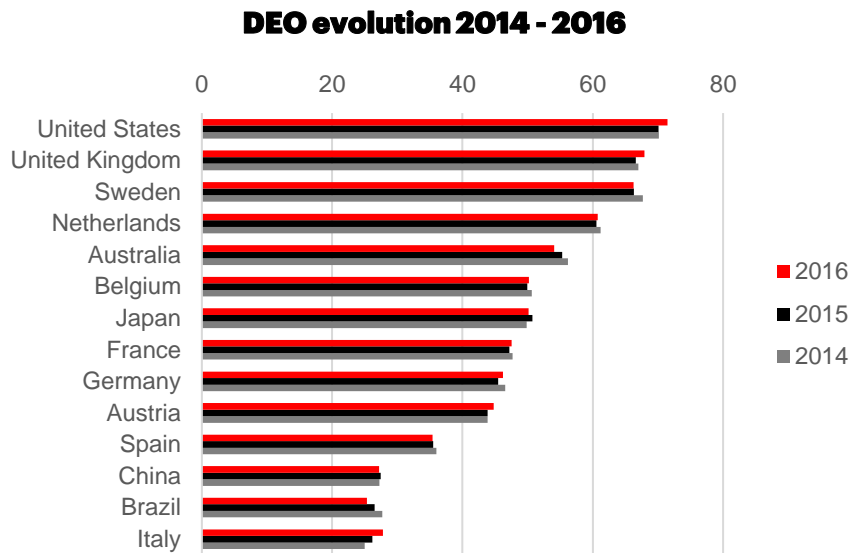
### 1.1 Key quantitative findings

Our analysis positions USA and UK as world’s digital leaders, while Spain is still far behind even compared with the average of its European peers, as shown in the graph below.

**Spain ranks 11<sup>th</sup> out of the 14 countries analysed, showing a significant room for improvement in its digitalization**



Not only Spain is in the back pack, but it is not closing the gap with the leading countries. In fact, the Spanish DEO decreased in 2014-2016, revealing that its digital growth has been lower than the peer average during this period, since the DEO is a relative index.



**The Spanish DEO evolution states the need for an acceleration of its Digital Transformation to follow Leaders' pace**

Source: "2016 Digital Economic Opportunity Index" – Accenture & Oxford Economics

## 1.2 Causes of the digitalization delay in Spain

There are a myriad of causes that explain the digitalization delay of Spain. Since there are many possible angles for this analysis, we have selected the most relevant causes across the three levers of our analytical framework:

### Digital Skills

The digital talent gap is a main cause of the delay from Skills perspective. As digital transformation is knowledge-intensive activity, it requires high density of digital talent, but the current demand for digital skills is not met by the offer in Spain. Low ICT salaries, youth unemployment and low demographic mobility are some of the reasons for the talent gap.

At the same time, companies in Spain have not invested as much as other countries in digital training, so employees' reskilling has also been delayed. The effects of the financial crisis are still noticeable in this space.

### Digital Technologies

The lack of a clear digital vision and strategy, coupled with the uncertainty around the profitability of new technologies and the operating complexity of Spanish companies are restraining the digital transformation.

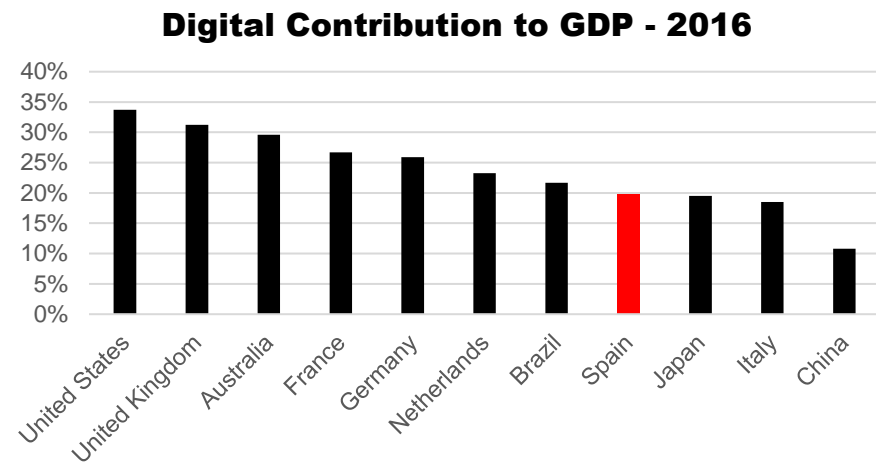
Thus, the level of investment in innovation in Spain is still behind other European peers and the scarcity of corporate ventures makes it more difficult to transfer innovation from research centres and universities into the market.

### **Digital Accelerators**

Regulatory frameworks, scarce innovation ecosystems and limited access to finance have also slowed down the digital transformation pace in Spain. Additionally, Spanish customer behaviour is more traditional than in other countries (e. g. ecommerce consumption), so companies have contemporised some digital investments as the Spanish customer behaviour continues evolving.

### **1.3 The opportunity ahead**

The digitalization delay in Spain shown by the DEO Index is confirmed by our analysis of the Digital Economy, in which digital contribution to Spanish GDP is again clearly behind world leaders.

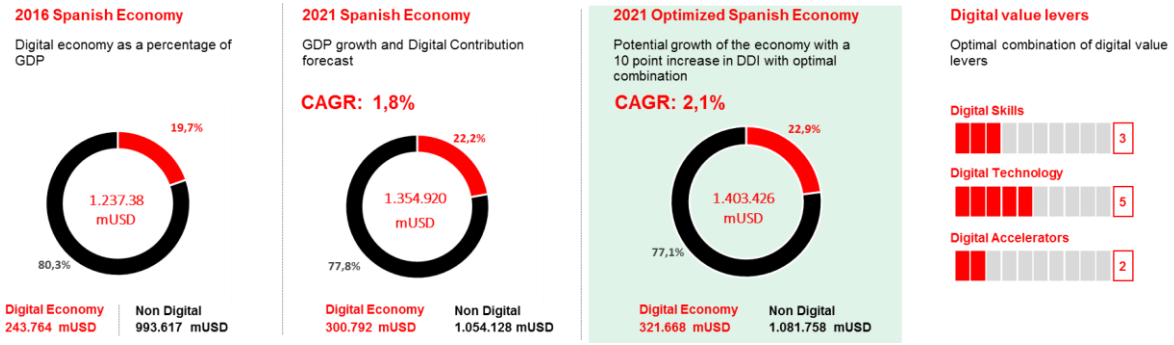


Source: "2016 Digital Economic Opportunity Index" – Accenture & Oxford Economics

We have analysed the optimal impact of a 10-point increase in the DEO on the Spanish GDP to size the multiplier effect of the Digital Transformation on the economy. These efforts do not necessarily mean a higher investment on top of the current plans, but a more efficient reallocation based on the needs of the Spanish economy.

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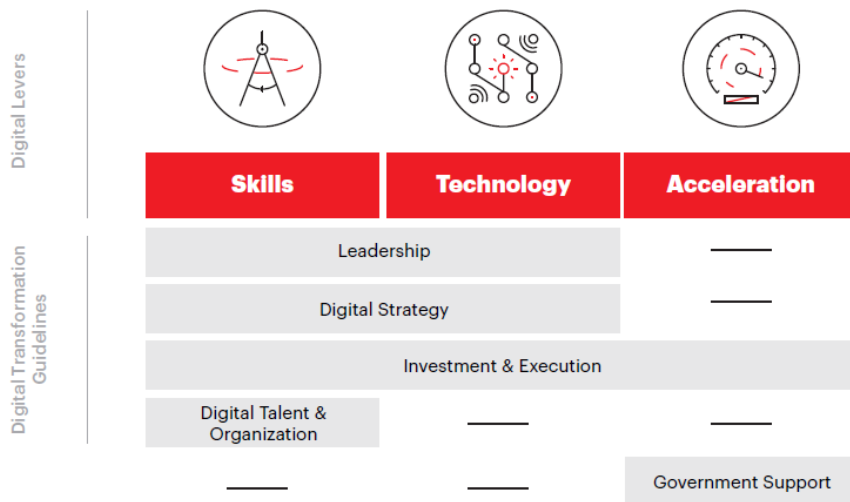
**If we accelerate the digitalization in Spain through the optimal allocation of efforts across the 3 digital levers, there is an estimated opportunity of incremental GDP up to USD 48.506 million by 2021.**



Source: "2016 Digital Economic Opportunity Index" – Accenture & Oxford Economics

### 1.4 The Digital Transformation roadmap

We consider 5 key guidelines to accelerate the Digital Transformation: Leadership, Digital Strategy, Investment & Execution, Digital Talent & Organization and Government Support.



Although there are many initiatives to be launched to accelerate the Digital Transformation across the 5 pillars, we have selected those that impact the most in the causes of the digitalization delay in Spain for each digital lever:

#### Digital Skills

We suggest three key initiatives to boost the digitalization of skills in Spain: acceleration of the reskilling of people, redesign work to unlock human potential and strengthen the talent pipeline.

#### Digital Technologies

Strengthening technology infrastructure and building new ecosystems are the two core initiatives we recommend to accelerate the roll out of Digital Technologies across Spanish companies.

## **Digital Accelerators**

Public sector and institutions can boost Digital Transformation by increasing the incentives (e. g. tax deductions), ensuring an appropriate regulation to foster investments and developing an educational system adapted to new digital needs.

### **1.5 The vision of leaders on the ground**

We have interviewed more than 25 Digital Leaders across the most representative sectors of the economy to get their vision about the digital trends, challenges and transformation pace in Spain.

Not surprisingly, we have found many common answers across all our questions regardless the sector. Leaders see a profound change in human habits and behaviours driven by new technologies that is forcing them to evolve their business models and the way they relate with their customers and employees.

We also found some technologies impacting all sectors; Big Data, Artificial Intelligence, IoT, mobility and cloud computing are top-of-mind trends when talking about the digital transformation.

Leaders know intuitively that Digital Transformation in Spain is noticeably delayed compared to reference countries such as USA, but key challenges depend on each company's context. Organizational resistance, limited investment, weak innovative ecosystems, regulatory frameworks and the pull of legacy businesses and technologies are amongst the most common challenges to accelerate digitalization.

### **1.6 Conclusions**

Digital Transformation in Spain is delayed due to several causes -from financial crisis in 2008 to the digital talent gap-, but the opportunity ahead is huge for the Spanish economy.

Defining an ambitious digital strategy should be the kick-start for a large-scale transformation that must be fully supported by business leaders to secure enough investments and get the right digital talent on board.

At the same time, the public sector will have a word in the speed and depth of the digital transformation acceleration in Spain through the evolution of current regulatory frameworks and fostering investments.

Now, it is time to double down Digital Transformation efforts across the business ecosystem to boost Spanish GDP

**We have found many common elements of Digital Transformation across sectors**

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## **02. *Digital Transformation***

## **2 Digital Transformation**

Remarkable advances in technologies such as artificial intelligence, data analytics, IOT and cloud computing are changing our world; redefining industries, making new business models possible and opening unparalleled opportunities for value creation.

The impact of the transformation will spread far beyond the business space, dramatically changing how we live, work and relate to one another, delivering immense benefits for businesses, consumers, society and the environment. However, digitalization brings several threats that must be addressed, such as the widening of the digital divide or human substitution for certain jobs. In fact, Oxford University economists state that 47% of all jobs are at risk of being lost to computers over the next two decades.

In the face of this massive transformation, MWCB and Accenture Strategy have aligned their know-how and efforts to develop this study with two main objectives:

- Determine the impact of the Digital Transformation acceleration in Spain
- Create awareness of the urgent need of this acceleration among all the stakeholders involved.

Although the Digitalization impacts the entire society, the study is focused on the business space through 3 main stages:

1. First, we define the Digital Transformation, our way to measure the Digital Economic Opportunity and we describe the situation of the Digital Transformation in Spain by industry compared with a set of comparable countries.
2. Then, we explain the Digital Economy and its contribution to Spanish GDP.
3. Finally, we analyse the potential impact of the Digital Transformation acceleration on the Spanish economy by 2021, explaining some guidelines to achieve this objective.

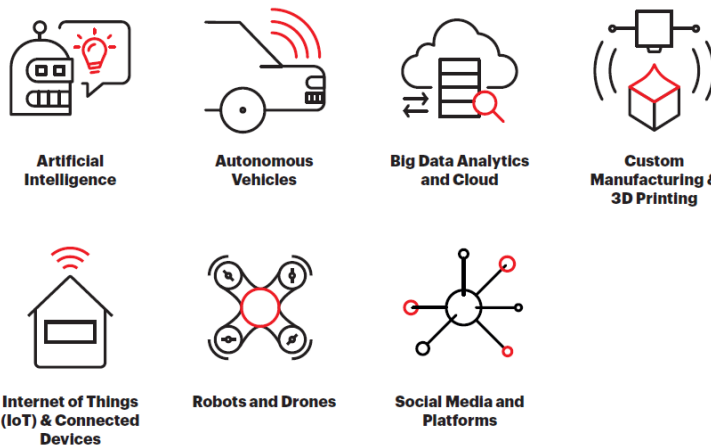
The study leverages on an analysis conducted on a yearly basis by Accenture and Oxford Economics based on quantitative data obtained from public sources such as Eurostat, OECD, EU KLEMS, IDC, WEF, the Open Data Barometer, the UN, the World Bank and proprietary datasets. This data-driven approach is complemented through our qualitative understanding of the Digital Disruption and a set of interviews with business leaders to build a complete vision of the Digital Transformation situation in Spain.

## 2.1 Digital Transformation definition

We define Digital Transformation as the process of incorporating information technologies at all levels of the society (individuals, organizations and public entities) to achieve a more competitive business ecosystem.

The term “Transformation” involves not only the implementation of new technologies, it also requires a deep revision of products and services, business models and operating models; changing the way in which employees work and the relationship with the customer.

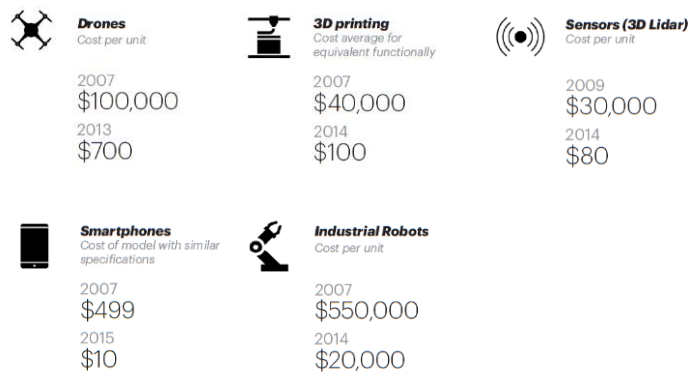
We have identified a set of 7 technologies that reinforce each other to boost the Digital Transformation across the economy, generating deep social changes and the way in which businesses deliver value, blurring barriers between industries:



**Innovative digital technologies reinforce each other to boost Digital Transformation**

Source: “Digital Transformation Initiative Executive Summary” – World Economic Forum & Accenture

The impact and spread of these technologies are increasing at a fast pace, due to the exponential growth of computing power and the lowering of production costs:



Source: “Corporate Venturing: Achieving Profitable Growth Through Startups” - mVenturesBcn (MWCB) and IESE



**Accenture & Oxford  
Economics have  
developed the  
“Digital Economic  
Opportunity Index”  
to measure the  
impact of Digital  
Transformation**

## **2.2 Digital Transformation measurement**

Typically, digitalization is measured as the contribution of the ICT sector to the GDP. However, as the Digital Transformation spreads across the whole economy, this approach is increasingly incomplete.

Accenture has developed together with Oxford Economics the “Digital Economic Opportunity Index” (DEO) to capture the extent to which digital technologies have penetrated the economic activity in a country or industry and the economic opportunity behind them.

It is not just a question of the utilization of digital technologies and processes, but the degree to which ‘digital’ is enabled in the surrounding business, institutional and economic environment. The index measures market competitiveness, companies’ structure agility, production processes’ sophistication, flexibility and quality of production factors and institutional environment in which a company operates.

The DEO is developed both at country and industry levels, varying the indicators used in each case. The underlying data for these indicators comes from a variety of sources, including Eurostat, OECD, EU KLEMS, IDC, WEF, the Open Data Barometer, the UN, the World Bank and Accenture and Oxford Economics’ proprietary datasets<sup>1</sup>.

This metric is materialized in an interactive tool that allows us to deeply explore the digital profile of an economy or industry, helping us to clearly identify economies which are at a digital frontier and those lagging.

The index is constituted of three equally weighted pillars – **digital skills, technologies and accelerators**.

**Digital skills** measure the digital nature of occupations and the abilities and knowledge required to perform specific jobs. The key aspects valued in this lever are:

- Stock of digital Skills: degree to which the ICT workers are present in the economy.
- Digital Skills development: effort performed by companies to train their employees in digital skills.
- Digital ways of working: presence of digital assets and tools such as mobility, social media, etc. in the day to day tasks.

**Digital technologies** measure the productive assets available (hardware, software and communications equipment). The key aspects valued in this lever are:

- Digital capital stock: degree of investment by companies in software and hardware assets.

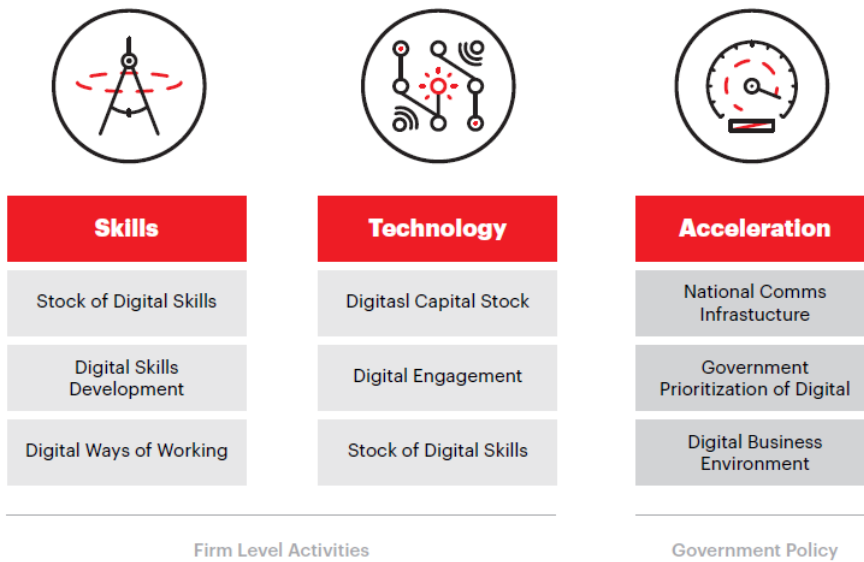
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<sup>1</sup> For more information, see Annex I: DEO Methodology

- Digital engagement: use of digital assets in interactions with employees and customers.
- Digital enablement: adoption of innovative technologies such as Cloud, Analytics and IOT.

**Digital accelerators** measure the environmental, cultural and behavioural aspects of the digital components of the economy. The key aspects valued in this lever are:

- National communications infrastructure: characterization of the internet quality and access of an economy.
- Government prioritization of digital: degree to which a Government’s actions and investments incorporates digital as a key asset.
- Digital business environment: facilities provided by the environment to digital ways of working and digital business models.



Digital Economic Opportunity framework

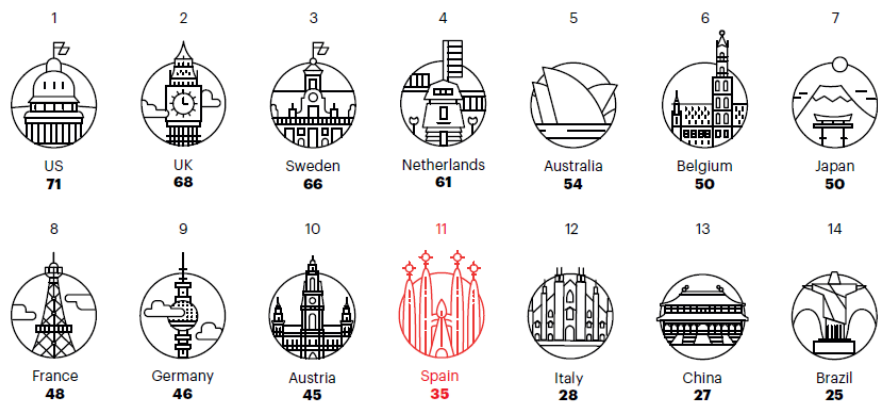
### 2.3 Digital Transformation in Spain

We have performed an exhaustive digital profile analysis for a set of 14 countries representative of the European and Global economy (10 European + 4 Non-European countries) based on their geography, demographics, industries and digitalization level.

The DEO score for Spain in 2016 is 35,4 points, ranking 11<sup>th</sup> out of 14 and well behind the most digitalized economies: USA (score of 71) or UK (score of 68). This results are aligned with other indexes such as DESI (The Digital Economy and Society Index), in which Spain’s digitalization is below the European average, ranked 15<sup>th</sup> out of 28 economies.

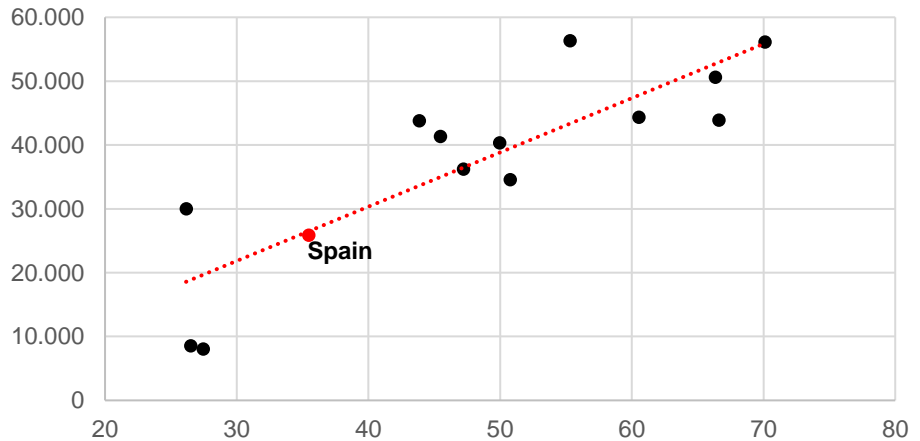
**Spain ranks 11<sup>th</sup> out of the 14 countries analysed in the DEO 2016**

Digital Economic Opportunity 2016



Source: “2016 Digital Economic Opportunity Index” – Accenture & Oxford Economics

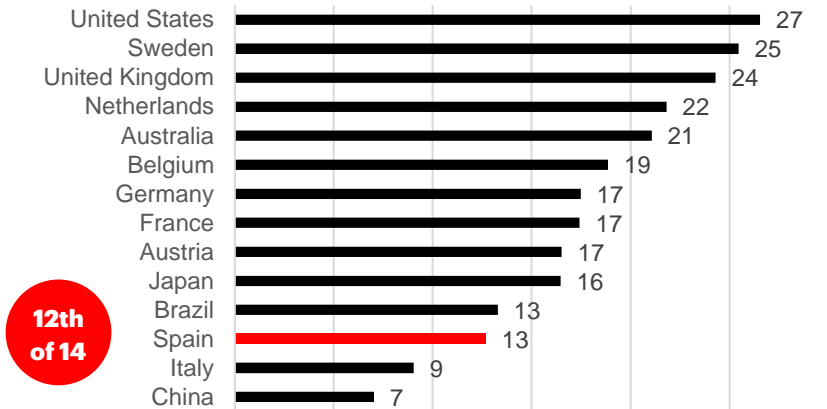
GDP per Capita vs. DEO



Source: “2016 Digital Economic Opportunity Index” – Accenture & Oxford Economics & The World Bank GDP per capita

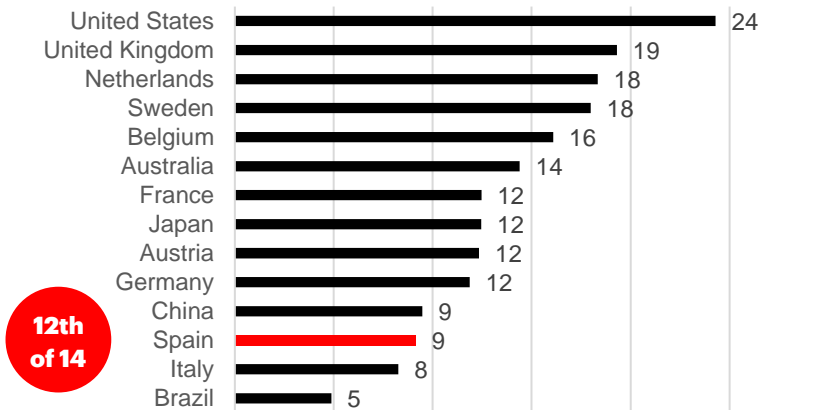
As seen in the graph above, there is a direct correlation between a country’s GDP per capita and its DEO, showing the huge economic opportunity posed by the digital transformation acceleration.

**DEO 2016 - Skills**

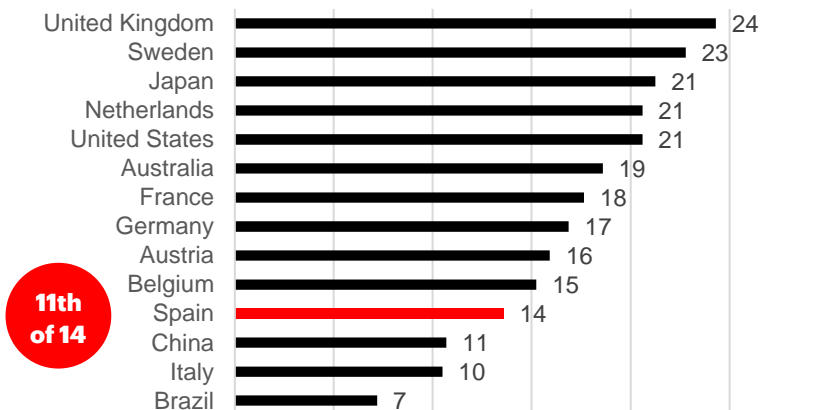


**If we break down the DEO by lever, Spain ranks close to the bottom for Skills, Technology & Accelerators**

**DEO 2016 - Technology**



**DEO 2016 - Accelerators**



**The best score of Spain is obtained in the Accelerators index, which reflects the digitalization efforts done by the Public Sector**

The DEO shows a significant room for improvement in the Digital Transformation journey of Spain, especially in Digital Technology & Skills. In fact, one of the key issues is the reskilling of workers to pursue the digital workforce of the future, where there is still a significant work to be done.

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*Within the Energy industry, key innovation trends for the short term rely on Data Analytics, Digital Skills of workers and IoT, all of them supported by models focused on cybersecurity and leveraging cloud technologies. In the medium-large term, we will see other technologies and trends such as massive use of wearables, augmented reality, machine learning, etc. **The first step to start a digital transformation relies upon talent and organization's culture** and it should be empowered by a network of public-private coalitions.*

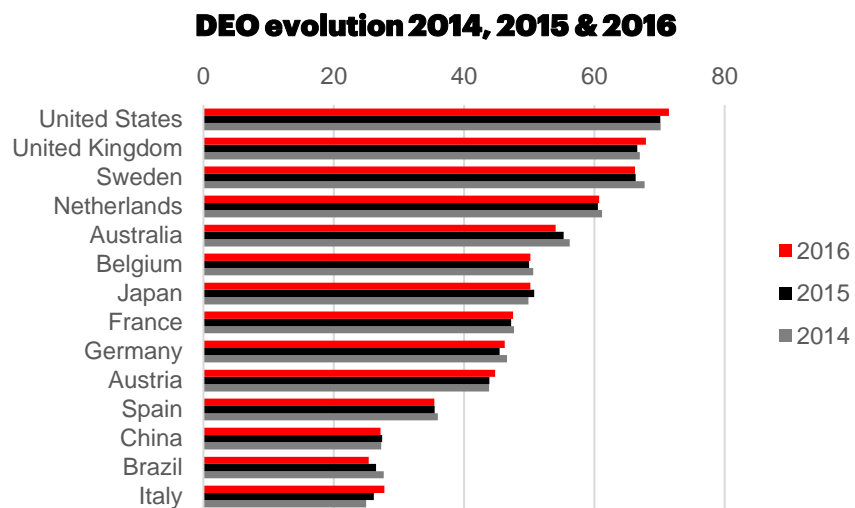
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**Olga Núñez – Digitalization Director & Victor Gimeno – Digital Transformation Lead (HR) at Enagás**

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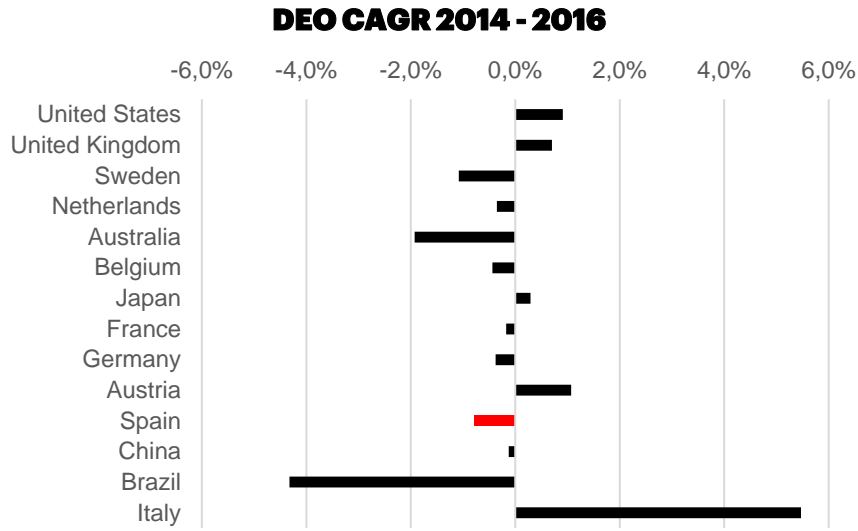
Additionally, Spain's DEO has decreased in 2014-16. As a relative Index, this decrease is due to a higher rate of digitalization registered in other countries compared to Spain. The most digitalized countries -USA and UK- are still growing in their DEO, showing the huge opportunity for the Spanish economy if the correct investments and efforts are executed.

**As the DEO is a relative index, the Spanish 2014-2016 decrease reveals lower DEO growth than peers**



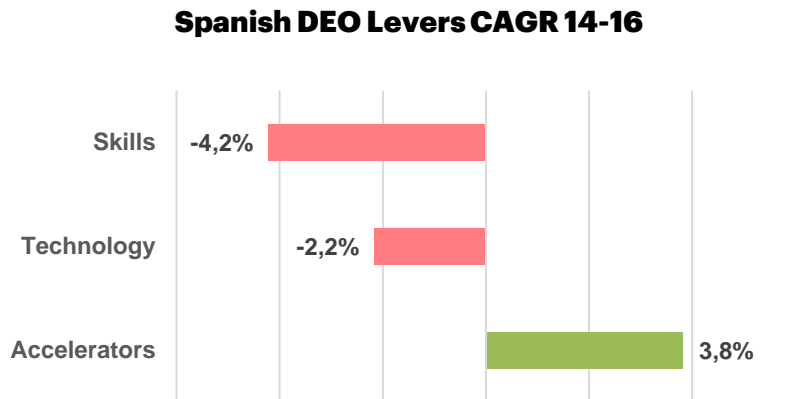
The room for improvement in Spanish DEO states the need for an acceleration of its Digital Transformation to follow Digital Leaders pace of growth in Digital and Non-Digital GDP.

DEO evolution per country (2014 – 2016 CAGR):



Source: "2016 Digital Economic Opportunity Index" – Accenture & Oxford Economics

The underlying reasons for Spanish DEO negative evolution can be found both in Digital Skills and Digital Technology levers, in which there has been a significant decrease during the analysed period. Digital Accelerators, on the other hand, have increased their score as a result of the public sector’s work in digital transformation.



Source: "2016 Digital Economic Opportunity Index" – Accenture & Oxford Economics

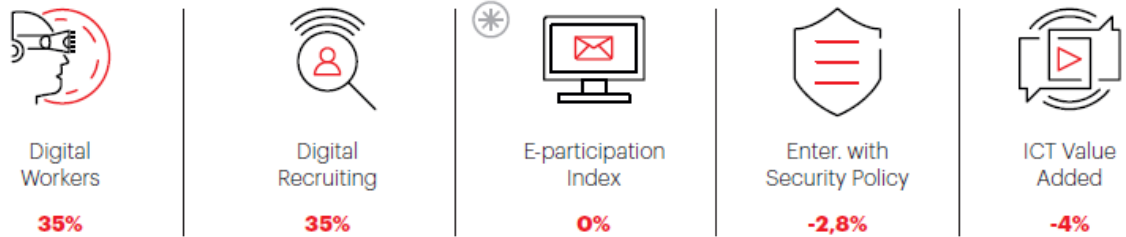
**Digital Accelerators is the only lever in which Spanish DEO has grown in 2014-2016**

If we take a closer look at the results of the Spanish DEO, Spain is ahead of Europe only in 2 metrics within the Digital Skills Sub-indicators: “% of workforce with basic ICT skills (“Digital Workers”)” and “% of enterprises trying to recruit personnel with ICT skills”.

The graphs below show the top and worst indicators of Spain comparing to the European average, ranked by the percentage difference.

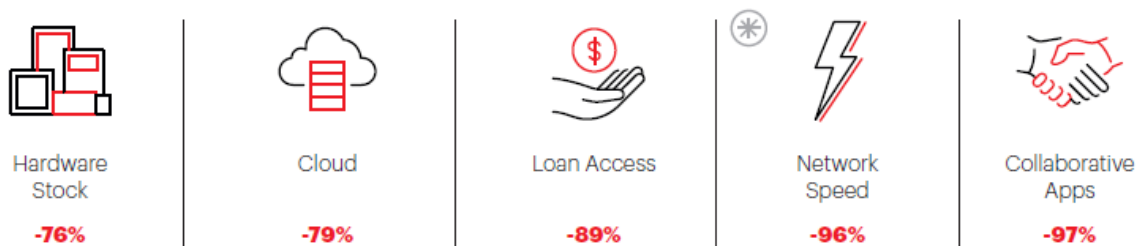
### Spanish top 5 Indicators vs. Peer Average

(%) Difference



### Spanish Worst 5 Indicators vs. Peer Average

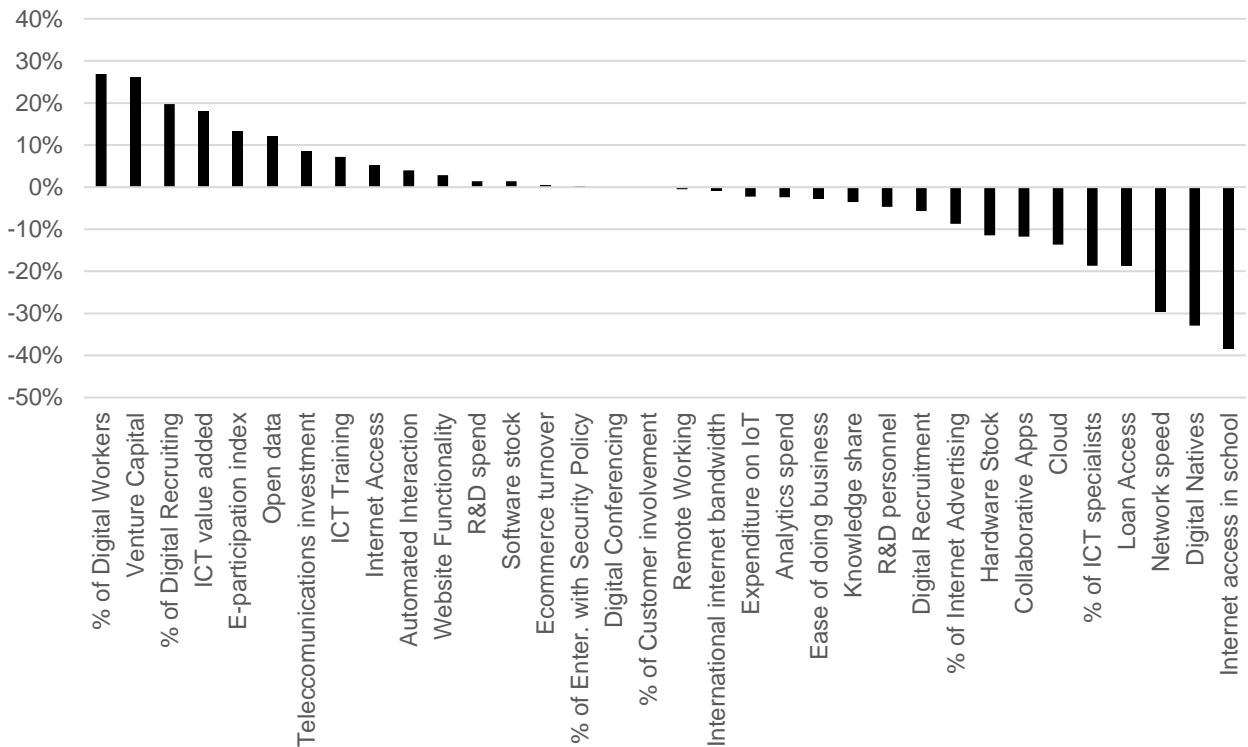
(%) Difference



Source: “2016 Digital Economic Opportunity Index” – Accenture & Oxford Economics

The results at sub-indicator level show that Spanish companies are prioritizing the recruitment of digital talent within their organizations (Digital Skills lever). On the other side, network speeds, expenditure on "collaborative applications software" and the % of productive capital stock in hardware are the metrics in which Spain performs worst. Sub-indicators are sorted attending to the absolute difference between Spain and the European.

### Spain DEOI Sub-indicators CAGR 2014 - 2016



Source: "2016 Digital Economic Opportunity Index" – Accenture & Oxford Economics

When analysing the graph above, please note the DEO is a relative index, so any decreasing sub-indicator means that the average score of the group has increased more than Spanish metric.

Sub-indicators decreasing the most correspond to the % of Enterprises employing ICT specialists, the ease of access to loans, fixed broadband speed, the % of workforce born after 1980 and the internet access in schools. These metrics reflect a significant room for improvement in the telecommunications infrastructure and the incorporation of digital specialists.

The top metrics correspond to the % of workforce with basic ICT skills (digital workers) and the ease of access to venture capital, which reflects that efforts are being made both in the reskilling of workers and in economic investment, which will enable the growth of other metrics if efforts persist.



## 2.4 Causes of the Digital Transformation delay in Spain

Spanish DEO score shows a significant room for improvement in its Digital Transformation journey. We have identified some of the main causes of the digitalization delay in Spain and grouped them across the Digital Levers.

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*In the Retail industry, **the main challenges rely behind the internal organization within companies and the technological evolution from Legacy to Digital.** Amazon is the disruptor that has accelerated the need to innovate in the sector and players are investing their efforts towards an omnichannel customer experience, the information compilation, treatment and transformation and the implementation of digital back office processes. Spanish digitalization presents a significant delay when compared with Digital ecosystems like Shanghai (China), where mobility enables higher rates of digital commerce and operations.*

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**Juan Pedro Agustín - Head of Digital at DIA**

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### 2.4.1 Digital Skills

Given that the digital economy is knowledge-intensive, any country or hub that wants to focus on digitalization as a source of growth must have a high density of digital talent.

Digital transformation of the business ecosystem is increasing the demand for digital talent, which is not currently met by the offer, generating a scenario of scarcity. According to the forecast of the European Commission Report E-Skills for Jobs in Europe, in 2020 the unmet ICT jobs demand could reach over 900 thousand vacancies.

So far, there have been no truly relevant initiatives in Spain to address the challenge of the digital talent gap from a holistic perspective, by acting on talent, training provision, employers and market intermediaries. The Tech Partnership initiative, powered by a network of employers who collaborate to create skills for the UK digital economy, is an example of a holistic approach to the digital talent gap.

Beyond this, the digital labour market in Spain presents certain weaknesses that are limiting the absorption of talent by the companies. Some of these weaknesses are global, such as the rise of low-cost cloud workers that can discourage the development of new ICTs in the local market or the lack of structure of talent market (such as the homologation of skills or competency frameworks). However, there are also some local weaknesses to tackle:

- High level of youth unemployment in the digital labour market. According to Statist, the Youth unemployment in Spain in October 2016 was 43.6%, only below Greece (46.5%) in the European Union and well above Germany (6.9%).
- ICT salaries are still below the main digital hubs. A recent study from Open Data Albania based on data from Eurostat and Telecentre

**Digital Talent demand is not met across Europe, generating a 900k vacancies by 2020**

Europe, shows that the average salary for ICT employees in Spain (average between technician, specialist and manager level) is around 2.380 € / month, ranking in the lower level within Europe countries, being Denmark at the TOP with 5,200 € / month.

- Digital hubs such as Barcelona, Madrid or Valencia that concentrate most ICT employment have difficulty attracting talent from other geographies due to low demographic mobility. According to INE (Instituto Nacional de Estadística), only four out of every 100 unemployed people agreed to change their Residence in 2016 to work.

In the field of training and reskilling, we also identify some causes of the delay. The legacy of the 2008 financial crisis triggered a reduction in training spending (including training in digital skills). From a structural standpoint, corporate needs and training offer in digital skills should be further aligned. It is important to note that while Spain has business schools at the top of the international rankings, universities and ICT training centres are still far from the top positions.

Finally, cultural resistance might be also a factor in the lack of digital transformation. To harness digitalization opportunities needs an entire overhaul of the organizations, requiring a suitable change management.

### **2.4.2 Digital Technology**

According to the Barometer 2017 on the digitization of Spanish companies developed by Divisadero and IE Business School, only 38% of executives say they have an ongoing plan to digitize their business. Thus, the lack of digital vision of top management is still one of the main causes of poor digital technology adoption in Spain.

Because of this limited vision, low level of investment in digital innovation is impeding the full deployment of digital technologies in business. Per Cotec's "2016 R&D&I in Spain", R&D&I investment in Spain during 2014 was EUR 12,821 million, 1.5% less than in 2013. The investment came from Public Sector (28.1%) and Private Sector (53.1%), being the contribution from Private Sector well below the European average (63.2%). In the SME segment, the investment capacity in technological innovation is even smaller.

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*Our experience reveals that uncertainty in the profitability of the use of digital technology, lack of a specific digital strategy and the operational complexity to adapt changes in business processes are the key causes of the Spanish Digital Transformation delay of Spanish companies. Thus, being digital business skills and culture the main challenge to face.*

*Digitization, robotization and digital technologies as a whole, brake traditional value chains, changes customer behaviours and have an impact on economic flows locally and across the globe. Technology revolution is an economic and a social revolution. The key for top managers is to develop digital mindsets to understand the impact of these digital technologies on the economy, businesses and society. Only then, they will be able to develop a strategy to face digitization, maximize the return on investment based on technology and minimize risks.*

*Most organizations only digitize processes, but if it does not challenge its status quo – its value proposition, business model, strategy, user experience and capabilities – on its role in the digital era it will be sooner than later out of the business.*

**Carlos Cuffi - Director of the GoingDigital Program at MWCB**

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Digital technologies developed in research centres are not taking full advantage of their potential. Despite having a powerful network of research and technological centres, one of the challenges is to increase the volume of research projects linked to digital innovation eventually transferred to the market (license, spin-off, etc.).

The scarce of corporate ventures that bring the start-ups ecosystem closer to corporations and the lack of maturity of certain technologies (IoT, Blockchain, AI, Drones, etc.) are also identified as significant causes of the delay of the digital density of the Spanish economy.

**Regulation, financing and corporate venturing have negatively impact the Digital Transformation in Spain vs. the peer group**

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*Most Spanish companies are still **far from adopting and benefiting from corporate venturing tools** to accelerate innovation, pursue technology adoption and access digital talent. On one hand, these tools (ranging from “hackathons” to merge and acquisition initiatives) are generally geared towards large corporations. This is a clear limitation in an economy where SMEs account for more than 99% of the Spanish companies and generate 65% of the country’s GDP.*

*In addition, not all sectors of the Spanish economy are harnessing the disruptive capacity of digital start-ups. While sectors such as Travel, Hospitality, Auto or Media are transforming their businesses - in part thanks to a dense ecosystem of new digital start-ups that bring innovation to traditional players - relevant sectors such as Energy are not taking full advantage of the potential to collaborate with new digital businesses.*

**Adrià Batlle, former mVenturesBCN Director, the Acceleration and Tech Transfer Program of MWCB**

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### 2.4.3 Digital Accelerators

The emergence of new digital technologies, products and business models generate new requirements from the regulatory point of view, but regulatory frameworks do not evolve as fast as technology; raising barriers to digital acceleration around a myriad of topics such as data ownership or collaborative economy.

The ease of access to finance represents one of the main accelerators of the digital transformation of an economy. However, especially during the financial crisis that affected Spain from 2008 on, the liquidity of the financial markets came to a sudden halt and the effects are still being digested.

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*Start-ups have become a key player in the digital transformation of the economy. They are facilitating the innovation and incorporation of digital talent in off-line sectors through different schemes such as customer-supplier relationships or open innovation programs.*

*The emergence of disruptive start-ups also stimulates traditional market players to digitize their value chain to respond to the new paradigm.*

*However, there are still major challenges for the full deployment of the entrepreneurial potential in Spain. For instance, **the regulatory framework shows room for improvement** in areas such as tax paying, international talent hiring, creation of a single digital market or enabling certain business models such as the sharing economy.*

#### **Miquel Martí, CEO at Barcelona Tech City**

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The behaviour of demand (i.e. consumer and digital user) is also a relevant factor when it comes to boosting the implementation of digital technologies in companies. For example, the market share of e-commerce, although growing double-digit, remains far from the top-ranking countries (China, UK, Denmark, South Korea ...).

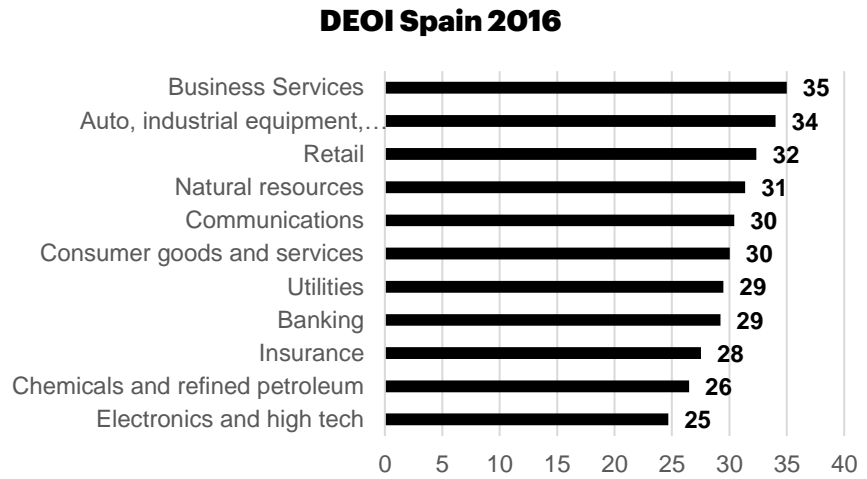
In addition, in certain sectors such as distribution (i.e. supermarkets) the profitability of the digitization of sales channels in traditional players is still in doubt. As reported by Postnord in its "Ecommerce in Europe 2016" report, 72% of Spanish individuals shop online with an average spend of €435/ year, far from other European countries such as Netherlands, with 89% of individuals shopping online and an average Spend € 454 / year, or UK, with 88% of individuals shopping online and an average spend of €1,118/year.

## 2.5 Digital Transformation in Spain per industry

The digital profile of an economy presents a significant variance between industries. In Spain, the industries accounting for a higher Digital Economic Opportunity are “Business Services” and “Auto, Industrial equipment & Infrastructure”, which have a higher contribution of the technology component to the DEO than the rest of industries.

On the other hand, we have the “Electronics and high tech” and “Chemicals and refined petroleum” industries, which have a lower DEO characterized by a minimal contribution of the technology lever to their DEO. The reason behind the low score relies on the nature of the business model of these companies, in which there is a great investment in machinery and physical assets.

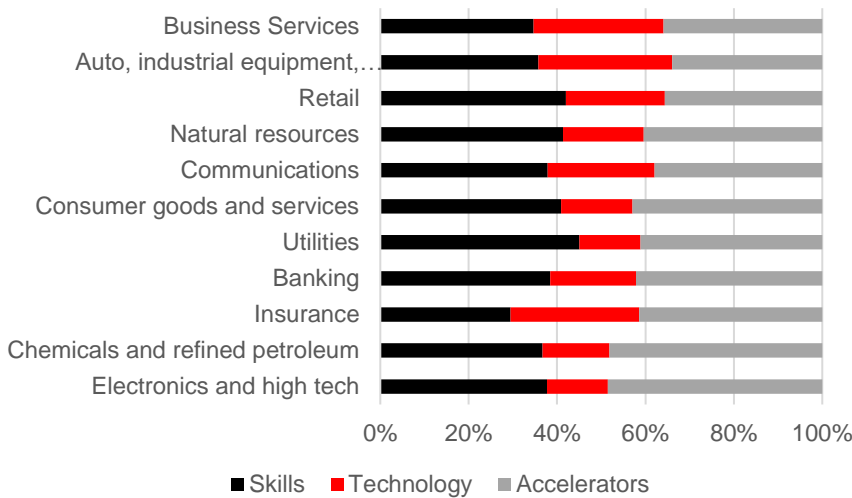
**“Business Services” and “Auto, Industrial equipment & Infrastructure” are the leading industries in the DEOI in Spain**



Source: “2016 Digital Economic Opportunity Index” – Accenture & Oxford Economics

The DEOI reflects differences between industries, with scores fluctuating from 25 points for Electronics and High Tech to 35 for Business Services.

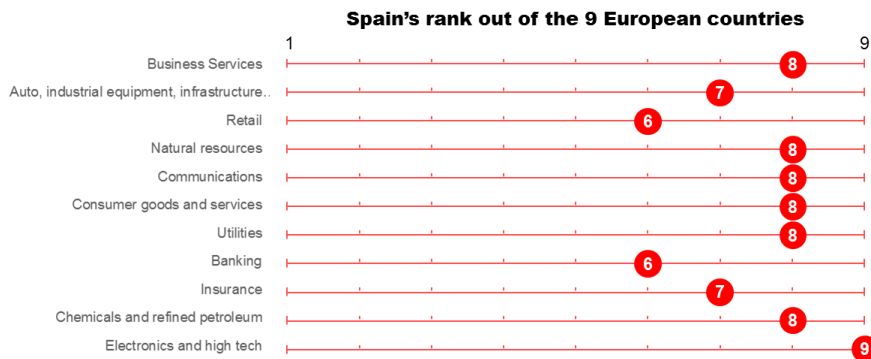
### DEOI Spain 2016 - Pillars Contribution



**The contribution of the Digital Levers to total DEOI of an industry is also different attending to the nature of the industry**

Source: "2016 Digital Economic Opportunity Index" – Accenture & Oxford Economics

We have selected 9 European Union countries compare Spanish industries' DEO with similar markets in terms of geography, demographics, economy and regulation. The next graph shows Spain's rank for each industry:



**Retail & Banking are the best relatively positioned industries**

Source: "2016 Digital Economic Opportunity Index" – Accenture & Oxford Economics

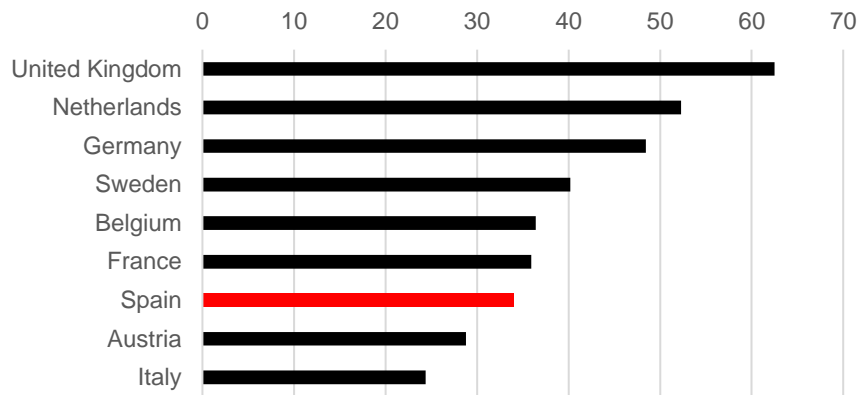
Even "Business Services" and "Auto, Industrial equipment, infrastructure and Transport" hold the highest DEOI due to the nature of the industry, Spain is at the bottom in the European ranking in these industries (8th and 7th respectively). As it is shown in the graph above, Retail & Banking rank the highest among analysed industries (6<sup>th</sup> position out of 9).

### 2.5.1 Auto, Industrial Equipment, Infrastructure and Transport

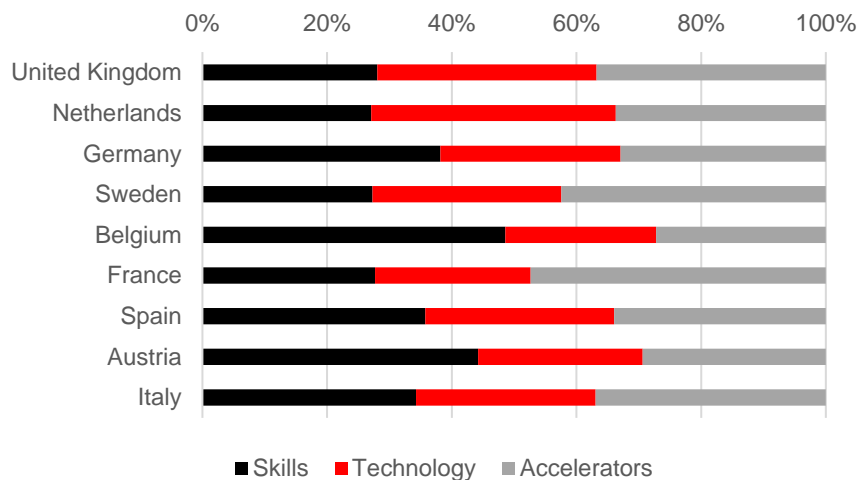
Driving growth and profitability is proving to be increasingly difficult due to limited flexibility and the huge capital requirements, partially because IT and operational efficiency investments are not contributing enough value. Thus, this set of industries will go through significant end-to-end transformations urged by external factors, where Industry 4.0 will be especially relevant.

Spain ranks 7th out of the 9 European countries analysed with a score of 34, far from the leader, UK (62).

**DEOI 2016 - Auto, industrial equipment, infrastructure and transport**



**Digital levers - Auto, industrial equipment, infrastructure and transport**



**The biggest contribution to the DEOI comes from Digital Skills (36% of the score)**

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*Digitalization has taken longer to reach the automotive sector globally, in part due to longer product life cycles compared to those of other industries, such as consumer electronics. The resulting disruption that digitalization is driving in the sector is the largest seen in more than 130 years of automotive history.*

However, there have been cases of digital transformation advancing in certain markets, including Spain. In fact, **leading manufacturers, such as SEAT, are digitalizing their entire value chain.**

**Fabian Simmer, Digital Officer at SEAT**

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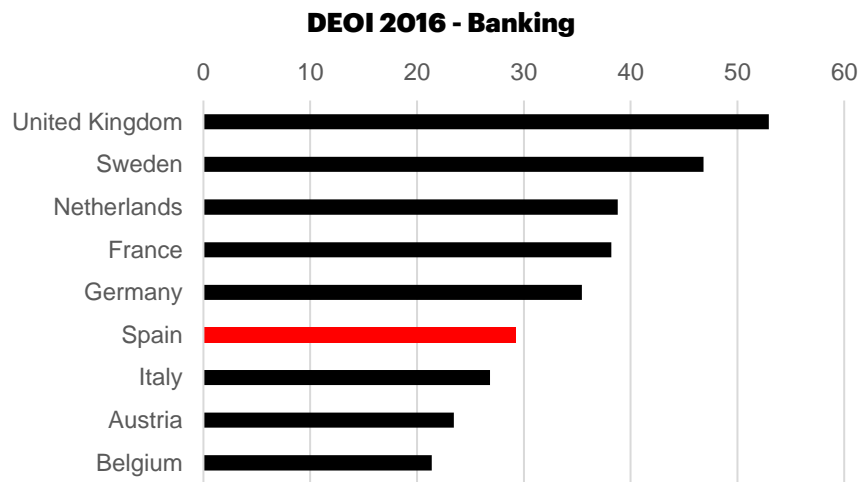
### 2.5.2 Banking

A combination of regulatory pressures, improved customer interaction and convergent disruption is leading to a structural change in the banking industry as the rapid consolidation continues; 15-25% of today’s banks will be gone by the year 2020.

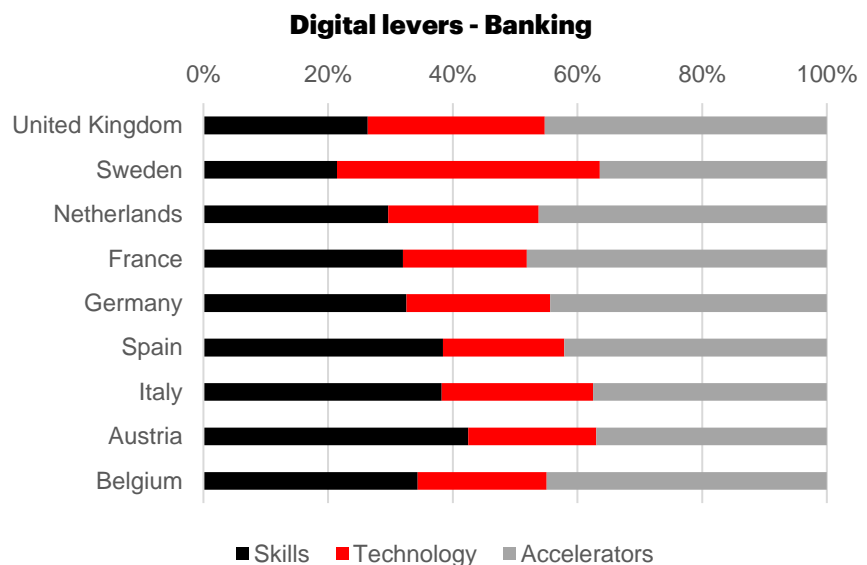
Ongoing convergence is increasing cross-industry competition, where retail, telecom, and banking are looking for new ways of doing business, new revenue opportunities (e. g. serving traditionally unprofitable customers) and a complete redefinition of customer offers.

Spain is still a traditionally highly bankarised economy in which non-banking financial institutions still find difficulties to expand its market shares in comparison to countries such as USA or UK where the non-banking institutions share can reach over 70% of the market.

**Spain achieves its best position within the European countries analysed in the Banking industry, with a score of 29 and a 6<sup>th</sup> position**



**Digital technologies lever has a low DEOI within the Spanish Banking industry, but the Skills and Accelerators levers balance the total score**



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**Banking industry's innovation trends respond to the "New Customer" demands and preferences.** *Our clients change from being "balance sheet consumers" to "platform users". Examples are "mobile first", value proposition customization leveraging data intelligence, new business models or operations enhancement applying levers such as robotics or cognitive solutions.*

*Innovations need to be accompanied by the up-skilling of employees and the entire society, which should be empowered by the Public Sector and companies. But, ultimately, each individual is self-responsible of his/her learning curve and the digitalization has democratized the access to education through free online universities. Hence the negative impact of digitalization on employment can be mitigated in the long term through a labour force better prepared to perform higher value tasks.*

**Ruediger Schdmit – CTO at Banc Sabadell**

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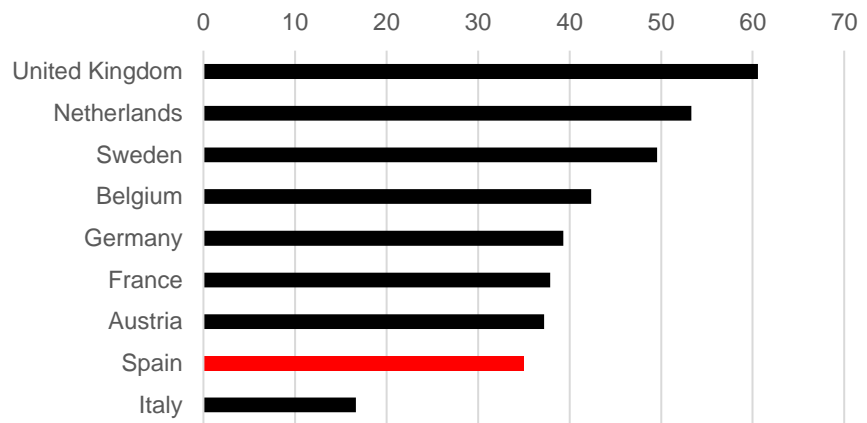
### 2.5.3 Business Services

Business Services’ main challenges rely among the reskilling of their workers. These companies (consulting companies, law firms, audit companies, etc.) need to balance their industry and business knowledge with the digital knowledge through reskilling and a meticulous recruiting strategy.

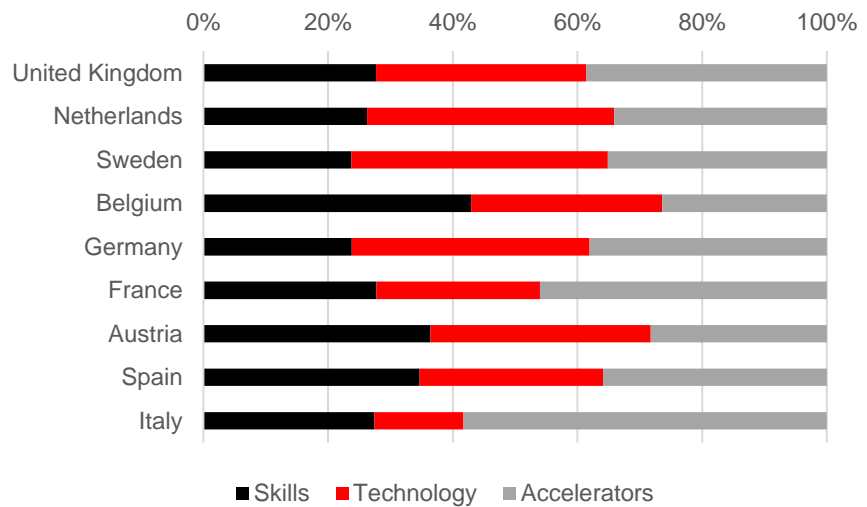
Business Services’ Digital Transformation does not require significant capital investments, so it is one of the most agile industries to adopt digital changes.

Business Services in Spain has the highest industry’s score within the country but, when compared with the European countries analysed, ranks at the bottom, only ahead of Italy

**DEOI 2016 - Business Services**



**Digital levers - Business Services**

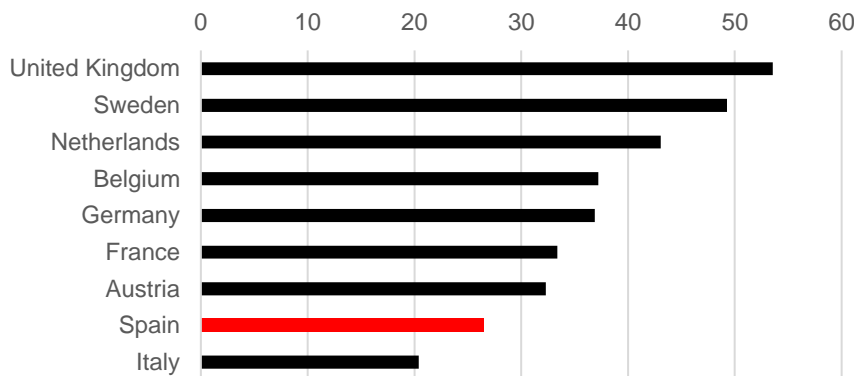


**In Spain, the 3 digital levers contribute in similar terms to the industry’s total DEOI**

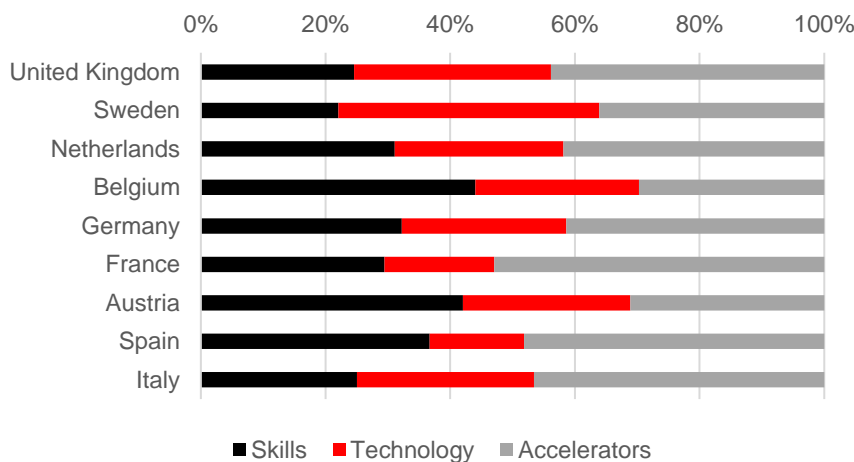
### 2.5.4 Chemicals and Refined Petroleum

This industry ranks 10 out of 11 within Spanish industries, reflecting one of the greatest room for improvement in terms of Digitalization. Comparing with peers, Spain ranks 8th out of 9 selected countries.

**DEOI 2016 - Chemicals and refined petroleum**



**Digital levers - Chemicals and refined petroleum**



**Digital Technology lever (4pts.) is significantly lower than peers: 2 points below the next country and 16 points below the leader (Sweden)**

Key digital challenges in the industry are primarily around workforce reskilling and data management.

On one hand, master data consolidation is a challenge due to multiple M&A operations, platform complexity and fragmentation to achieve a greater reporting transparency, optimize asset utilization, develop dynamic pricing, protect Intellectual Property, drive customer loyalty and comply with new regulations.

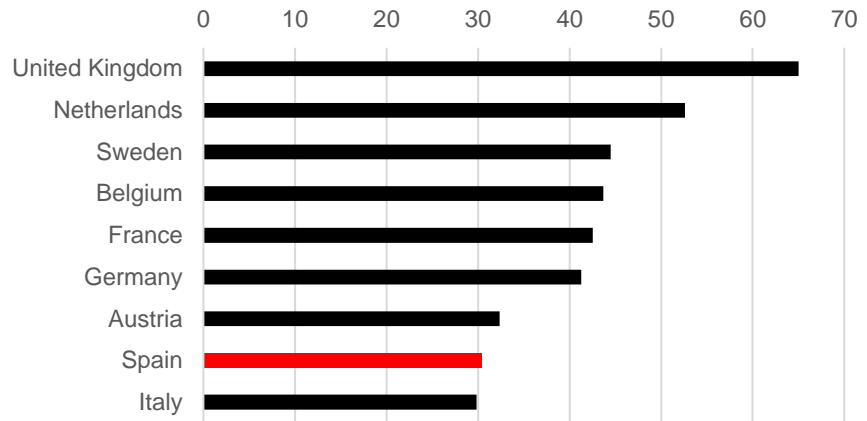
On the other hand, there is a relevant need for a reskilling of the workforce, as there currently exists a heavy dependency on narrowing & aging workforce and a difficulty in attracting and retaining millennials.

### 2.5.5 Communications

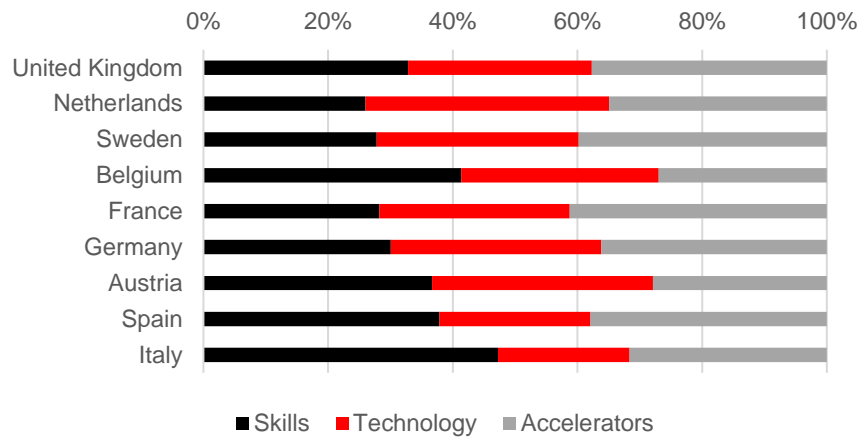
Communications Industry has been a pioneer in digital growth; ever since the first telegraph to the latest Machine-to-Machine Internet of Things revolution. Now, the focus is all about providing the right information to the right person at the right time.

**The clear leader in DEOI in the Communications industry is UK (65 points), well ahead of Spain (30 points), which ranks 8<sup>th</sup> out of 9.**

**DEOI 2016 - Communications**



**Digital levers - Communications**



Digital Skills and Digital accelerators are equally developed within the Spanish communications industry, which has the biggest room for improvement in Digital Technologies.

The digital challenges faced by Communications companies are:

- Margins are narrowing due to commoditization, increasing the pressure to find new business models and revenue streams beyond the communications services (e. g. seamless convergent products, smart services).

- Customer expectations are rising, so personalized and consistent customer experience is key to build digital trust (privacy & security).
- Reduce costs through digital channel shift, automation and real-time data supported decision making processes.
- Companies must bridge the digital gap in their workforce (lack of digital talents and skills and a strong resistance to change).

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*Technologies such as IoT become key enablers of digital transformation. However, the most value-added element in the IoT field is not the sensor nor the connected device, but the **company's ability to manage the data gathered and to monetise it.***

*For example, the IoT facilitates the implementation of new business models such as an evolution from product-to-service. But this requires completely reorienting the organization towards this new model. Many companies (especially SMEs) are not prepared for this challenge and policies need to be deployed to help them.*

**Oscar Pallarols, Innovation & Product Strategy Director at Cellnex Telecom**

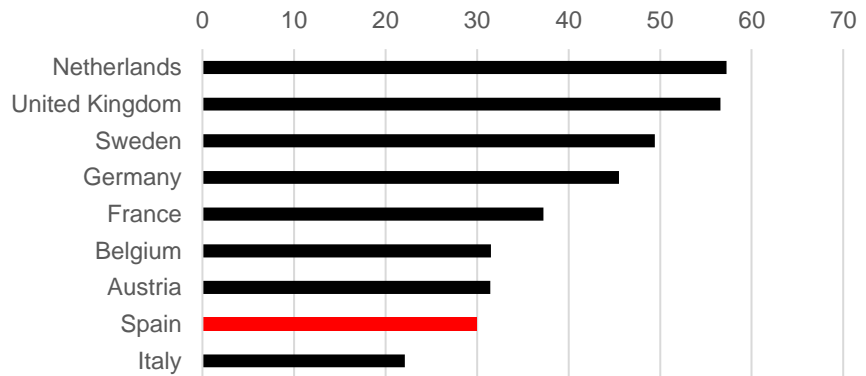
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### 2.5.6 Consumer Goods and Services

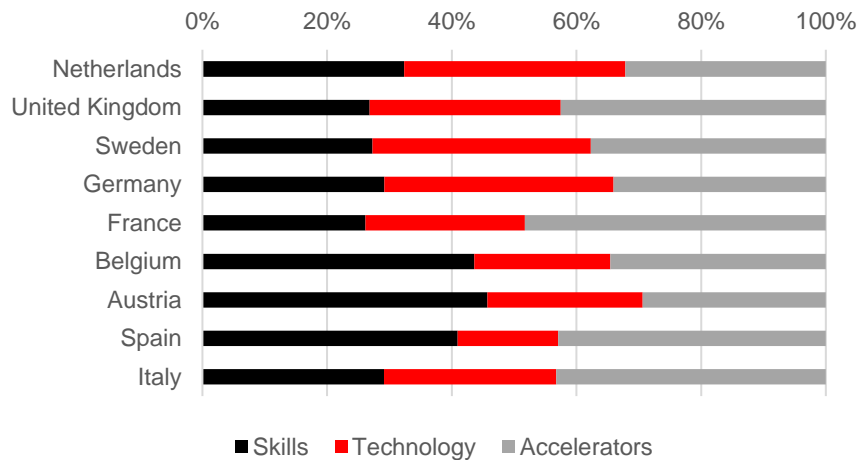
Spain ranks 8<sup>th</sup> out of 9 within the Consumer Goods Industry DEOI, scoring 30 points and only ahead of Italy. Still very far from the leading country, Netherlands (57 points).

**Spain, with a score of 4,8, has the lowest score of all analysed countries in the Digital Technologies lever, reflecting an opportunity to invest in these.**

**DEOI 2016 - Consumer goods and services**



**Digital levers - Consumer goods and services**



The industry is facing two major sources of digital challenges. On one hand, digital disruptors may change the rules of the game through digitalization and convergence (i.e., Amazon or Uber). On the other hand, consumers are changing their expectations towards products and services.

Thus, profitable growth is increasingly difficult as past growth sources also slow down (i. e. rapid expansion into emerging markets leveraging brands' globalization).

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*Within the Tourism industry, a digitalization of the interactions among the different actors is taking place: final service providers (hotels, transportation companies, etc.), intermediaries, informational sites and customers. Key innovations are related with new business models (e.g. hotels by hours), ratings, mobility, augmented reality and Big Data & Analytics. **The main transformation barrier is the initial disbursement** of all players to become Digital.*

**Álvaro de Nicolás, CTO at Hotelbeds Group**

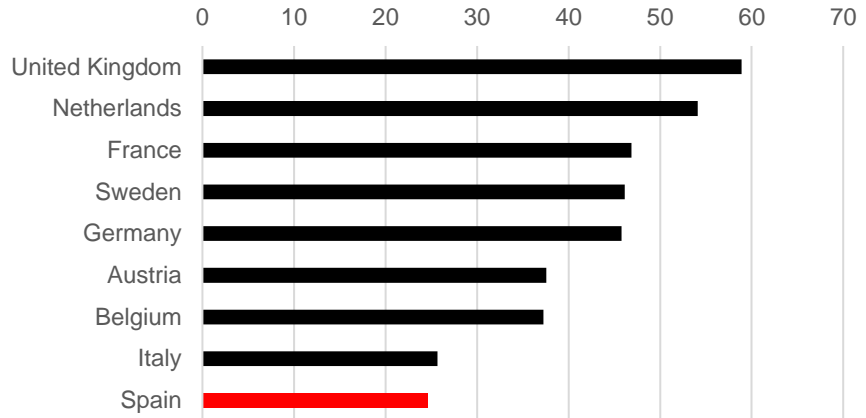
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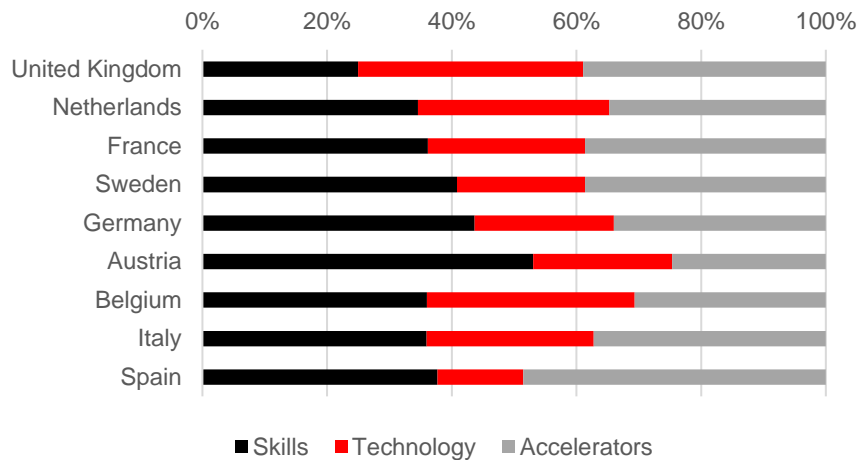
### 2.5.7 Electronics and High-tech

Electronics & High Tech is the industry with the lowest DEOI in Spain and, in fact, Spain ranks last within the countries analysed, which stated the need of digitalization within the industry.

**DEOI 2016 - Electronics and high tech**



**Digital levers - Electronics and high tech**



**Digital Technologies is the lever with the lowest score**

Our study reveals that the challenge of the industry is to translate the digital investments in cloud, analytics, mobile and other new technologies into better financial performance and business growth.

Most CEOs in the high-tech industry are making major commitments to the digital technologies that are transforming business, but our research shows that many high-tech industry players continue to apply digital to drive efficiency and preserve the core business, rather than on expanding into new digitally contestable markets or emerging “as a service” delivery models.

Our analysis indicates that 60% of high-tech companies have survived in the past without building up digital capabilities. In contrast, only 9% of companies have achieved 'digital high performance'.

To win in the changing industry landscape, high-tech incumbents need to accelerate the renewal of their core business while investing in building new platforms and "as-a-service" business models.

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*The Aerospace industry presents 4 main areas of innovation: integration of functional and industrial design based on modelling and simulation, evolution of Manufacturing Execution Systems to integrated and connected models complemented with Virtual and Augmented Reality, centralization of product and operation data within data lake models and the generation of new business and support models based on the real-time data exploitation that digitalization enables. Digitalization in the next years will change not only the products and services we offer, but the way we do and behave.*

**Francisco Sánchez Segura – VP, Head of Manufacturing Engineering & Industrial Innovation Military Aircraft. Airbus**

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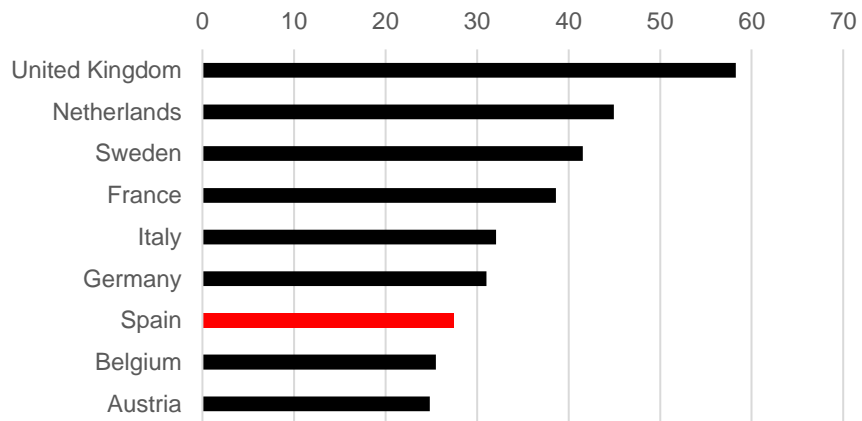
### 2.5.8 Insurance

Insurance companies have based their business in the trust built between the sales agent with the customers. Digital brings a disruption in the core of the insurance model, as the relationship between the customer and the company is increasingly digital. This, complemented by the loss of customer loyalty and the ease of comparing prices and conditions, forces them to be transparent, price competitive and, most importantly, to provide its customers with a satisfying experience throughout their end to end interaction.

The irruption of new competitors is also a challenge, forcing the traditional players to adapt their offer in a rapid way through partnerships with third parties such as start-ups or non-conventional insurance players.

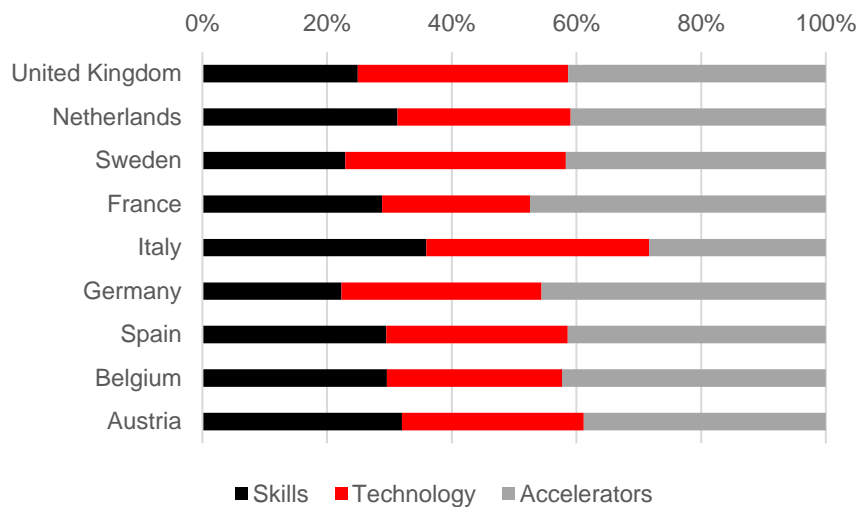
**Spain ranks 7 out of 9 within the Insurance industry's DEOI, only ahead of Belgium and Austria**

**DEOI 2016 - Insurance**



**The lever with higher DEOI within the insurance industry is the Digital Accelerators one, in which Spain achieves a score of over 11**

**Digital levers - Insurance**



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*Insurance companies have been traditionally conservative and its role was mainly to be a middleman between the customer and the service covered by the insurance. However, in the health insurances field, new markets and social trends, such as a more connected and demanding customer, the increase in life expectancy (with baby boomers' generation reaching its retirement) or the rising of costs due to the technification of medicine are forcing companies to find **new innovative ways to create value** while ensuring its sustainability.*

*To this regard, digital technologies are becoming key enablers to redefine business models and to move towards a more preventive healthcare-oriented approach.*

**Julio Lorca - Development Director at DKV Health and Medical Insurance**

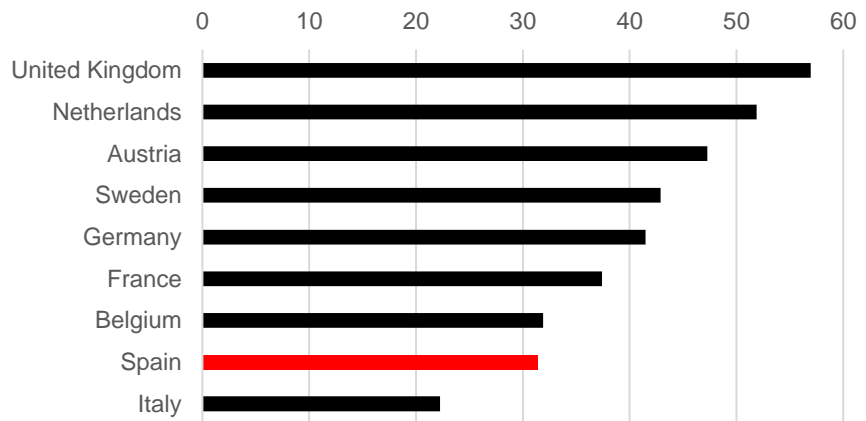
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### 2.5.9 Natural Resources

The core business of natural resources company is far from digital but the players gaining competitive advantages are the ones who are implementing digital to optimize their processes and organization. The key digital challenges the Natural Resources companies are facing are related to occupational hazards (how can companies leverage digital to reduce their accidents) and to processes (efficiency, asset lifecycle, quality, etc.).

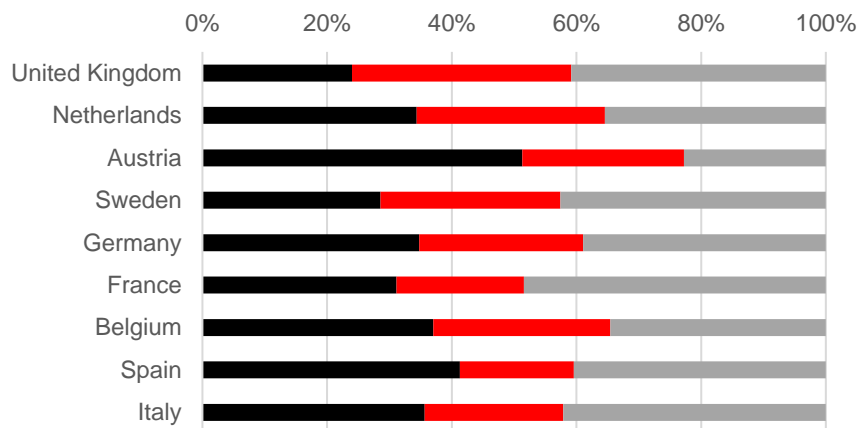
According to Jesús Mayordomo – CIO at Celsa Group - Digital innovation in Spain is at an initial stage and focused on final consumer with a great space for innovation in industry solutions as seen in other countries as Finland. It is important to distinguish between digitization - which is doing the same as always in a digital format- and digitalization – which consists on leveraging on digital assets to innovate in business models and processes.

**DEOI 2016 - Natural resources**



**Spain ranks 8 out of 9 countries within the Natural Resources industry, achieving a DEOI score of 31, far from the leader, UK, with a score of 57**

**Digital levers - Natural resources**



**The lever with lower DEOI within the Natural Resources Industry corresponds to Digital Technologies**

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*In Spain, we have great Business Schools training our talent and, to maximize the digital reskilling and its contribution to economy, **we need to create an ecosystem in which they operate in conjunction with Companies, Public Sector and Administration.***

*They key innovation initiatives launched within Celsa are related to Energy storage, Traceability in the supply chain, 3D printing, Smart Steel (incorporation of IoT within materials and final products) and the Circular Economy, especially with waste management.*

**Ignasi Salvador – Innovation Director at Celsa Group**

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### 2.5.10 Retail

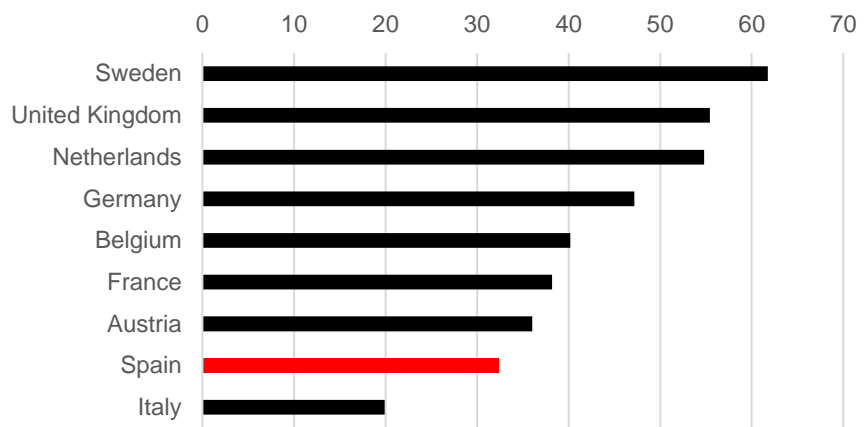
Retail companies are facing key challenges derived from the evolution of the Digital Customer, who is more demanding and informed than ever.

Thus, interaction with customers is a key differentiator; retailers must ensure a satisfying experience in every touchpoint with customers, especially when referring to a shopping experience (stock, ordering, timing, delivery, etc.).

The rise of online retail activity is bringing a competitive challenge throughout the shopping process: omnichannel experience (on & offline, including mobility), in-store stock optimization, ecommerce security and logistics.

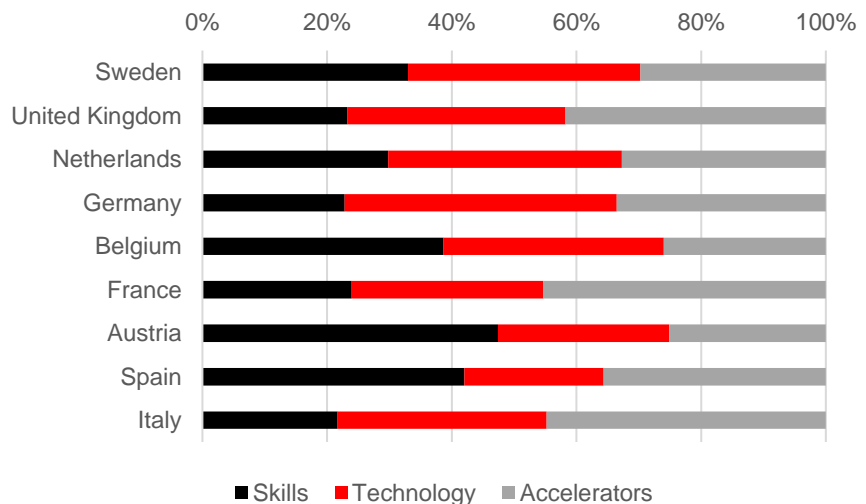
**Spain ranks 8 out of 9 countries within the Retail industry, achieving a DEOI score of 32, far from the leader, Sweden, with a score of 62**

**DEOI 2016 - Retail**



**The lever with lower DEOI within the Retail Industry corresponds to Digital Technologies**

**Digital levers - Retail**



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*In recent years, the retail sector in Spain has become much more complex and competitive. The main driver of change has been the digital transformation, which is **imposed by changes in consumer buying behaviour**. Consumers' needs, desires and buying habits have changed and, thus, companies have been forced to adapt their business model to the new scenario.*

*Spanish retail companies have taken a giant step in understanding the new way of consuming: the current customer no longer distinguishes between the online and offline world, has much more immediate needs, is sensitive to prices and is up to date with new technologies. However, in such a changing landscape, the challenge is no longer just to adapt to new consumer demands, but to do so in a constant and agile way.*

*One of the factors that has caused the delay in the digital transformation has been the economic crisis suffered in our country in recent years. The recession has meant a decrease in the investment in digital resources (talent, training and technology). With this, the companies have not been able to adapt the processes and procedures at the same speed in which the environment has evolved.*

**Alejandro Codina, Chief Digital Officer at Media Markt Spain**

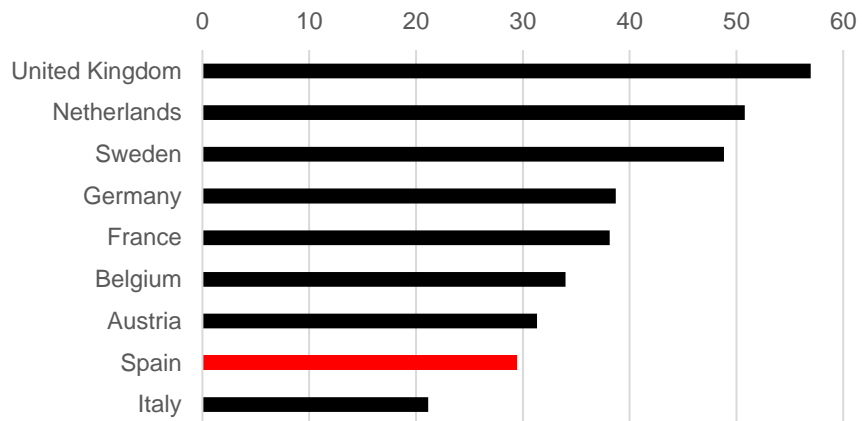
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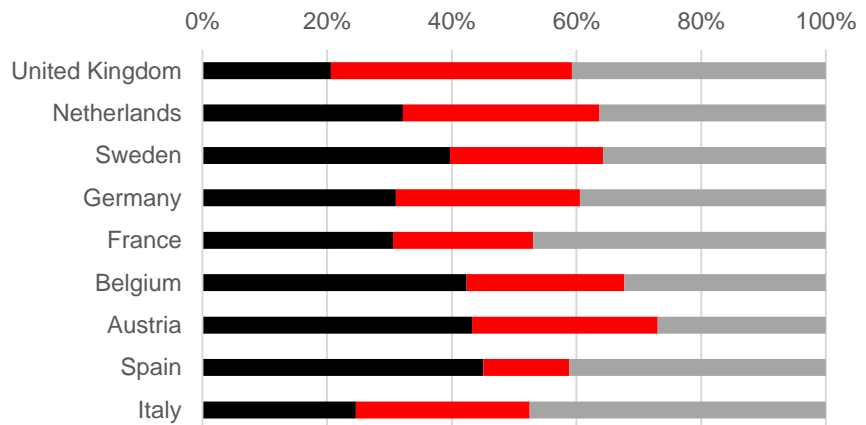
### 2.5.11 Utilities

Utilities companies face several digital challenges. First, higher customer expectations derived from digital experiences in other industries create the need for new digital customer channels and services. Second, the accelerated impact of distributed and variable energy sources in the power system create the need to explore new technologies and new business models. Last, the explosion of real-time asset data and customer information will drive the use of big data.

**DEOI 2016 - Utilities**



**Digital levers - Utilities**



**The lever with the lowest DEOI within the Utilities Industry is Digital Technologies**

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*Irruption of smartphones, the increase in capacity of telecommunication networks, the proliferation of cloud based services and the massive use of social apps are **changing the way in which companies operate and interact with their customers**, which is evolving towards mobility.*

*Key digital trends within the Utilities industry include the substitution of traditional meter boxes with Smart meters enabling customers to control their consumption, development of Artificial Intelligence to optimize relationship with customers, electric vehicle and distributed generation. All these trends will require key digital elements to drive adoption, where smartphones will play an essential role once again.*

**Maite González – Director of Customer Service and Digitalization Plan at Endesa**

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## 2.5.12 Public Sector

As previously stated, one of the main actors supporting the Spanish Digital Transformation is the Spanish Government, which approved the Digital Agenda for Spain (February 15<sup>th</sup> 2013). The Ministry of Energy, Tourism and the Digital Agenda and Ministry of Finance and Public Function lead it to achieve the goals of the Digital Agenda for Europe in 2015 and 2020.

The objectives, action lines and plans established pretend to encourage the creation of employment opportunities and economic growth through the smart adoption of digital technologies, thus contributing to the collective effort of promoting the economic recovery of the country. The Agenda adopts 32 indicators, which comprise both Digital Agenda goals for Europe and specific goals for Spain, tackling the key digital challenges the Public Sector is currently facing in Spain:

- Increase productivity and efficiency in the internal operation of the Administration as an element of national competitiveness.
- Go deeper into the public administrations' Digital Transformation, making the digital channel the preferred channel for the relations of citizens and companies with the administration, as well as the ideal environment for public workers to carry out their work, improving the quality of the provided services and the transparency of the internal functioning of the Administration.
- Achieve greater efficiency in common ICT services within the entire Administration, obtaining synergies for the use of shared media and services and enabling allocation of resources for innovation and services enhancement.
- Implement an intelligent Corporate Management of Information and Data, capitalizing this asset by the improved efficiency of Administration and the improved citizens' digital security.
- Adopt a corporate strategy of security and usability for Digital Public Services to increase confidence in them and, therefore, their use.

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*Beyond the digitization of public administration itself, **the public sector can and must play a significant role in boosting the digital transformation of the economy.***

*The main challenges of the Spanish economy in the digital field, as the indicators of the DESI index show, are the lack of digital talent, the use of digital technologies in SMEs and the density and consolidation of new tech-based companies.*

**Alejandro Tosina – Digital Economy Director at Red.es (Public entity in charge of the Deployment of the Spanish Digital Agenda)**

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## **Digital Transformation in Health Sector**

Within the Public Sector rely business areas in which digitalization is changing the traditional business models. One of the key cases in Spain is the Health Sector, of which **Joan Cornet – former MWCB mHealth Competence Centre Director – and Bárbara Vallespín, MWCB dLAB program Director** – analyse the situation and trends in this study:

- *Related to the current situation of the Digital Transformation in the Health sector in Spain, our experts from MWCB state that Public healthcare in Spain is one of the best in Europe in terms of its Digital Technologies, as there have been consolidated services such as the electronic digital history, the digital diagnostic image and the digital prescription. The Spanish society is getting used to using mHealth Apps, some of which include, additionally to the monitoring of activity and health data, pre-diagnosis of patients. Workers from the Health sector are used to work in digital environments, being at a further step in Digital Reskilling of workers compared with other industries.*
- *The key barriers encountered to digitalize the Health sector comprise the conservative profile of the industry, the lack of empowerment of digital activity through the healthcare incentive system and the absence of socio-political consensus on patients' data exploitation.*
- *For the net years, key trends within the Health industry include the development of remote assistance services through digital tools, the integration of mHealth solutions and Apps into the Health system, proactive initiatives from private Health insurance companies to prevent diseases through monitoring, the use of Big Data & IOT and 3D printing for organs modelling or implants, amongst others.*
- *In order to empower the acceleration of the Digital Transformation, main initiatives involve the review of the financing models of public and concerted healthcare implementing incentive systems oriented to results instead of activity, the assurance of socio-political consensus in Big Data models management and the cultural change management.*
- *From an employment point of view, main expected changes rely behind the exponential interaction between technology and Health professionals and the appearance of new professions related with healthcare, such as Data Analysts.*

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### **03. *Digital Economy***

## 3 Digital Economy

### 3.1 Digital Economy definition

Accenture & Oxford Economics have developed a framework to evaluate the total contribution of Digital to the economy. Under this framework, we define the Digital Economy as the value added by digital goods and services not just at the point of production, but all the way through the supply chain.

The size of the “digital economy” reflects the proportion of total economic output that is derived from digital inputs. Digital inputs are:

- the share of total productive capital stock invested in hardware, software and telecommunications infrastructure;
- the share of labour inputs contributed by those labelled “digital workers” under our criteria (i.e. all workers for whom digital knowledge is required and deemed important to the job they do);
- the intermediate goods and services flowing from other digitized sectors of the economy.

We use supply side models and national accounting frameworks to produce an entirely new approach to traditional examination of the digital economy via a rigorous, internationally comparable and scalable framework.

### 3.2 Digital contribution to Spanish economy

We measure the Digital Contribution of an economy by capturing the value added by digital goods and services throughout the entire value chain in a rigorous, comparable and internationally scalable framework.

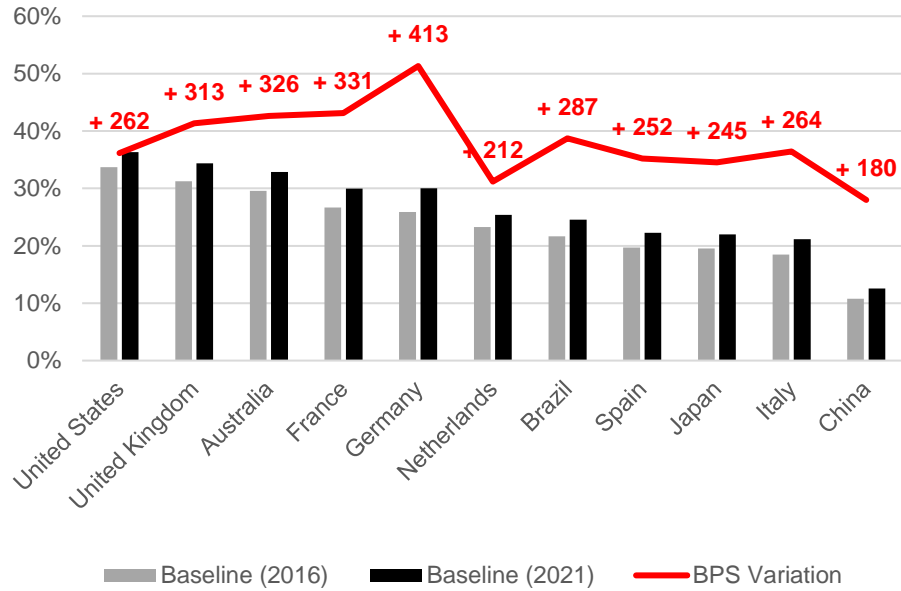
The digital contribution size reflects the part of total economy production derived from digital inputs, which can be resumed as:

- Percentage of productive capital invested in hardware, software and telecommunications infrastructure.
- Percentage of labour contributions coming from “digital workers” (all those workers requiring digital skills to perform their jobs).
- Intermediate goods and services from other digitalized industries.

**We define Digital Economy as the value added by Digital goods and services all the way through the supply chain**

### Digital Contribution to GDP (2016 and 2021)

**USA is the most digitalized economy with a 34% of Digital contribution to GDP, while Spanish Digital contribution is still below 20%**



Source: “2016 Digital Economic Opportunity Index” – Accenture & Oxford Economics

USA is the most digitalized economy (34% of Digital Contribution), followed by UK (31%). Spain is in the back pack of the group (19.7%) and the gap regarding the most digitalized economies will keep on widening as the expected growth of Digital Contribution in Spain will fall behind the leading group (+252bps variation: +USD 50.000 Million).

This significant difference in the digitalization levels must serve as a “wake up call” for companies and public institutions to accelerate the Digital Transformation.

### 3.3 Digital contribution to employment

The digital transformation of the economy will have a significant impact on the labour market. The technologies of the so-called fourth industrial revolution, such as artificial intelligence, robotics, 3D printing, big data or IoT, have the capacity to perform cost-effectively many of the functions currently being carried out by human beings.

Routine and manual activities are the most likely to be replaced by automation. The study “The future of employment: how susceptible are jobs to computerisation” pointed out that jobs such as telemarketers, receptionist, information clerks and retail salespersons are over 90% likely to be replaced by machines in the coming years.

On the other hand, digitisation is increasing the demand for talent endowed with the required skills to transform digital technologies into value for

companies. In fact, the demand for digital talent is growing faster than the supply available in the market, generating a scenario of scarcity. According to the report *E-skills for Jobs in Europe* published by the European Commission, it is estimated that by 2020 about one million jobs will not be covered due to the digital talent gap. This phenomenon is also happening in Spain, where most of the leaders interviewed in this study recognise that they have difficulties in hiring talent with digital skills.

In addition, this shortage is causing an increase in salaries of professionals with digital skills, contributing to the divide of salaries in the most digitised economies.

However, there is no consensus among economists about the expected net balance of jobs due to digitisation. In fact, there are two counter-streams of thought. On one hand, those who consider that digitisation will have a positive impact on the total employment figure, since productivity growth will unleash the creation of new sectors and the development of new products and services, which in turn, will require more employment. On the other hand, those who believe that the new professional opportunities generated by digitisation will not cover the jobs destroyed due to the deployment of digital technologies.

When the experts who have participated in this study have been asked about the expected impact of digitisation on the employment of their sector, they generally foresee an evolution of the role of employees instead of a net destruction of employment.

For instance, in natural resources and industry sector, they expect a reduction of employees in factories but an increase of data analysts who will manage the real-time performance of the plant from the offices. In retail, they expect the automation of jobs in the cashier function but an increase of employees at the point of sale oriented to improve the buyer experience. And finally, in the utilities sector, telemetry will entail the replacing of current employees that are manually checking customers' consumption, but will require more technicians to manage this data.

In this scenario of uncertainty, one thing is clear: as concluded in this study, if Spain wants to maintain or increase its competitiveness and GDP, it will need to make greater efforts to increase the digital talent available.



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## **04. *Digital Transformation Acceleration***

## 4 Digital Transformation Acceleration

### 4.1 Optimal combination of DEO impulse

In our study, we have analysed the impact of a 10-point increase in the DEO for every country in scope. This increase has been optimized by country allocating the 10 points through the 3 digital levers to maximize the impact on the GDP. This allocation of efforts does not necessarily mean a higher investment over the current plans, since the upfront investments are perceived as a barrier to Digital Transformation.

We have investigated the impact of the increase of 1 point in the score of every lever (skills, technology and accelerators) on the GDP. After that, we have allocated this additional point to the lever with the highest impact and we have repeated this exercise 10 times for every country to find the optimal combination of a 10-point growth in DEO. In the case of Spain, the optimal combination is as follows:



Source: "2016 Digital Economic Opportunity Index" – Accenture & Oxford Economics

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**If Spain conducts a digital transformation acceleration with the optimal combination of efforts, we estimate an impact of USD 48.506 M of Spanish GDP in 2021 (+3,6% vs current scenario), moving from a GDP of USD 1.353.920 M to USD 1.403.426 M. Digital Contribution would grow in USD 20.876 M (22,2% of GDP to 22,9%), growing nearly 7%, but also non-digital GDP would grow in USD 27.630 M (+2,6%).**

#### **4.1.1 Digital Skills**

The key drivers of Digital Skills are:

- Use of ICT Specialists, measured by the % of enterprises employing ICT specialists.
- Role of digital workers and digital natives, measured by KPIs such as % of workforce with basic ICT skills ("Digital Workers").
- Investment in digital skills training, measured by the % of enterprises that provide ICT training.
- Digital recruitment, measured by KPIs such as % of enterprises trying to recruit personnel with ICT skills.
- Focus on mobility, measured by KPIs such as % of employees with remote access to enterprise's IT systems.
- Knowledge sharing culture, measured by the use of social media to exchange views, opinions or knowledge within the enterprise.
- Innovation, measured by KPIs such as expenditure on R&D as % of GVA (Gross Value Added).

#### **4.1.2 Digital Technology**

The key drivers of Digital Technology are:

- ICT hardware stock, measured by % of productive capital stock in hardware.
- Software stock, measured by the % of real fixed assets that is in software.
- Digital collaboration in business, measured by KPIs such as Expenditure on "collaborative applications software".
- Connection with customers, measured by KPIs such as the Use of virtual social networks.
- Use of the cloud, measured by the expenditure on cloud computing services as a % of GDP.
- Use of analytics, measured by the Expenditure on analytics software as a % of GDP.
- Use of IoT measured by the Expenditure on IoT as a % of GDP.

According to "Accenture Technology vision 2016" study, which includes a global survey answered by more than 3.100 IT and Business executives, 86% of executives foresee an exponential growth with no precedents for the next 3 years of the technological change.

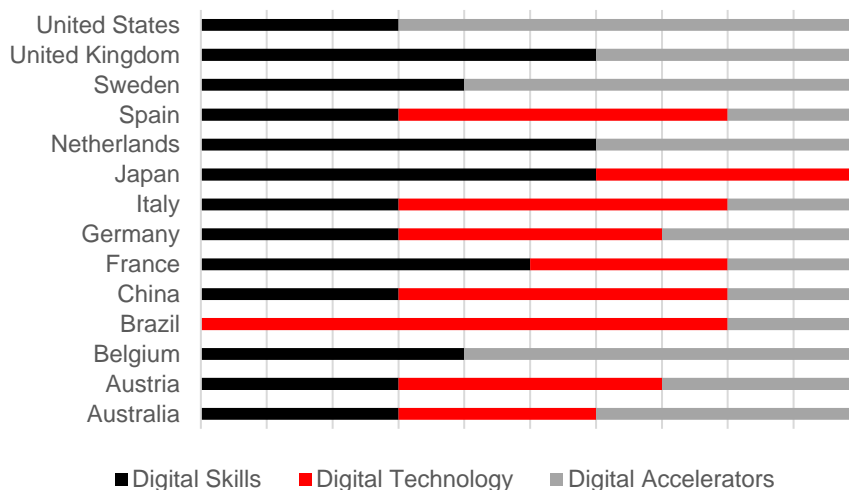
### 4.1.3 Digital Accelerators

The key drivers of Digital Accelerators are:

- Reach of internet access, measured by KPIs such as % of individuals with internet access.
- Quality of internet access, measured by KPIs such as the International internet bandwidth.
- Investment in Open data, measured by Open data barometer index.
- Digital Service Provision, measured by E-participation index.
- Digital Leadership, measured by Importance of ICT in government vision.
- Ease of doing business, measured by KPIs such as Ease of access to loans and venture capital.
- Maturity of online marketplace, measured by KPIs such as Ecommerce turnover as a % of total turnover.
- Dynamism of local ICT sector, measured by ICT Patent applications per person.

The optimal combination is different for every country depending on their digital transformation degree, their digital environment, their culture and their combination of industries. For example, the Global Digital leaders, USA and UK, don't need any investment points allocated to Digital Technologies.

#### Optimal allocation through digital levers of a 10 points increase in DEO



**The optimal combination of efforts is different for every country depending on their digital maturity, digital environment, culture and combination of industries**

Source: "2016 Digital Economic Opportunity Index" – Accenture & Oxford Economics

## 4.2 Digital Transformation acceleration key guidelines

Based on our experience, we consider 5 key guidelines to accelerate the Digital Transformation across our 3 Digital Levers.



Digital Transformation is driving growth both to the economy and the employment leveraging primarily on new consumer needs and habits, but future potentially negative impacts remain uncertain. In the Insurance space, trends like Big Data and mobile-first customer interaction are already a reality, while Internet of Things (IoT), Artificial Intelligence, Insurtech and Collaborative Economy are still too young to have a material impact on our business.

**Translating these massive trends into business results require 3 key ingredients:** (1) Digital Strategy must be fully aligned to the Corporate Strategy, (2) Full and explicit support from the President & CEO and (3) execute at speed with no mistakes.

**Aitor del Coso – Chief Digital and Innovation Officer at Mutua Madrileña**

### 4.2.1 Leadership

The involvement of every organization’s executive team will determine the pace at which the organization transforms and value is created.

In the process, it is necessary to establish a new form of leadership, in which there must be a focus on team management and new business models. There are several levers we can trigger to support transformation:

- Involve professionals in decision-making and in the entire change process.
- Promote a new culture based on horizontality, transparency and productivity.
- Ensure alignment between jobs and required profiles.

**Strong leadership support is key to accelerate Digital Transformation**

- Communicate efficiently to align the company with its objectives and action plan.
- Enable the required investment to face the process.

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*Key digital trends within retail industry are the evolution to e-commerce, the Digital Marketing and the relevance of content. However, talent is the main asset for the digitalization, reflecting that the Digital Transformation will bring a reskilling of workers. In that sense, Spain is ready for an acceleration of the Digital Transformation as we have the assets and the talent.*

**One key factor for a successful Digital Transformation is the sponsorship of companies' leadership;** as it has been the case of Carrefour, where the leadership has created the Digital Committee to empower our digitalization

**Javier López Calvet - CFO & Ecommerce at Carrefour Spain**

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#### **4.2.2 Digital Strategy**

Digital Strategy sets the vision of the Digital Transformation roadmap across the company. This vision is essential for a successful transformation and we organize it around 2 key themes:

- **Go Digital**, including customer experience, products & services, business models, sales and service.
- **Be Digital**, including organization & governance, operations & cost structure, partner ecosystem, technologies & platforms and information architecture.

#### **4.2.3 Investment & Execution**

Investment in innovation is crucial for digital transformation, but investments should be properly analysed and planned to maximize the impact.

In Spain, the "Secretariat of State for Information Society and Digital Agenda" (Secretaría de Estado para la Sociedad de la Información y la Agenda Digital) has planned to launch digital initiatives for an approximate amount of EUR 67 million between 2014 and 2020 within the "Operating Program for Intelligent Growth 2014-2020", in direct collaboration with the ERDF (European Regional Development Fund). These initiatives are aimed to boost investigation, technology development and innovation.

According to Eurostat, in 2013 Spain invested 1,2% of its GDP in R&D&I (28% came from Universities, 19% from the Administration and 53% from the private sector), compared to the 2,9% in Germany or the 2,2% in France. The difference with the European peers is still remarkable.

Once investments are secured, companies must focus on executing and realizing value at speed to deliver on the digital promise. Excellence in

**Digital Strategy  
sets the North Star  
for all the  
organization  
during the whole  
transformation**

execution is key to get the organization on board and demand further investments to accelerate the Digital Transformation.

#### **4.2.4 Digital Talent & Organization**

Digital reskilling of workers is key to profit from the digitalization of processes and tools, where the Public Sector has a primary role to reinforce and redirect our education system to build our future digital professionals. In the meanwhile, business ecosystem must bridge the digital talent gap to accelerate Digital Transformation.

The main skills we will need to develop are:

- Information management
- Technical knowledge
- Digital teamwork
- Trends identification
- Online customer orientation

Thus, the workforce must adapt to new ways of working and organizing, staying proactive and open to potential collaborations and alliances, such as research centres, Open innovation models, etc.

Digital Transformation is contributing to an evolution of the most demanded workers, currently being the web analysts, specialists in web positioning and e-commerce, apps developers, Business Intelligence experts, etc.

In fact, according to ESIC's "Digital Economy Institute (ICEMD)", 26% of companies have created specific positions to cover their digital needs, 64% of companies know fundamental digital functions, 78% of executives is not up to date in digital competencies and 70% of companies will invest in digital transformation over the next years. This data clearly states the shift to Digital that companies are undertaking.

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*Key challenges in the Utilities industry are related to the economic, regulatory and technological impacts, the combination of traditional business models with incoming business models and new competitors from inside and outside the industry; all of them complemented with the evolution of traditional customers to digital customers, which want to take greater control of their own energy supply needs and demand personalized products. **Leveraging digital skills and talent across the organizations and building a new internal culture are key** to succeed in an era of digital disruption.*

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**Roberto Marijuan – Head of IT Digital at Iberdrola**

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#### **4.2.5 Government support**

Favourable regulatory frameworks and government support are key to foster Digital Transformation and attract investment.

At European level, the European Commission set the foundations for the acceleration of the Digital Transformation with the “European Single Digital Market” aimed to tearing down regulatory walls and moving from 28 national markets to a single one. This could contribute €415 billion per year to European economy and create hundreds of thousands of new jobs.

At country level, Spanish government has launched several initiatives to facilitate Spanish Digital Transformation in addition to previously mentioned “Spanish Digital Agenda”:

- There have been launched 2 norms to ensure digital transformation, electronic administration and electronic management in the Public Sector in Spain (39/2015 of the common administrative procedure and 40/2015 of the legal regime).
- “Transformación Digital de la Administración General del Estado 2015-2020” Plan aimed to achieve a 100% digital administration by 2020.
- In March 2014, Spain launched a financing initiative focused on SMEs based on the result of the European Council meetings of June and October 2013, which highlighted the financing needs of the European economy and in particular of SMEs. We estimate this initiative will benefit more than 32,000 companies across Spain, of which at least 2,700 will be new companies. The SME initiative will also generate some 6,400 new jobs and it will help consolidate more than 120,000 jobs.

**Governments play a key role to accelerate the Digital Transformation through favorable regulatory frameworks and public investment**

### **How public sector is boosting the digital transformation of the economy**

*Red.es is the public entity in charge of deploying the digital agenda of the Government of Spain. In addition to carrying out transformation projects in the public sector, Red.es boosts the digital transformation of the market, focusing its efforts on the main challenges of Spanish digitization.*

*In relation to talent, for instance, they have recently launched the program “Profesionales Digitales-Empleo Joven”, which holds funds of € 20m to finance training paths defined and delivered by companies that demands talent. The program requires at least 30% of the participants to be hired by companies after finishing the program.*

*Regarding the adoption of technologies in SMEs, different instruments have been deployed, such as “Súbete a la nube”, a program that finances the adoption of cloud technologies by SMEs as well as the development of new cloud solutions by technological suppliers.*

*Finally, regarding to the creation of start-ups, Red.es will launch a program that will lean on a network of advisors to help high-potential digital start-ups to shape their business models in order to tackle solidly their target market and the initial rounds of funding.*

**Alejandro Tosina - RED.ES**



### 4.3 Digital Transformation acceleration initiatives

According to Spanish Digital Transformation situation, the guidelines for the transformation and the insights from the different experts consulted, we have identified, analysed and prioritized the key Digital Transformation initiatives both at national and industry level through the 3 Digital Levers and on an industry level.

At a national level, we have identified, analysed and prioritized the following initiatives:

#### 4.3.1 Digital Skills

##### **Accelerate Reskilling People**

- Reskilling at the top of the house: preparing the workforce for digital doesn't exclude the higher echelons of the organization. Accenture research shows a general shortage of technology experience in boardrooms: Only 10 percent of board members surveyed report having professional technology experience.
- But keep building on what you have: retraining of current workers with digital and innovative skills instead of incorporating all the new skills from outside the organization.
- Changing the mindset to "learning as a way of life": promote a shift in behaviour within This shift in behaviour from point-specific training to lifelong learning makes workers and organizations nimbler. Readily adaptable to volatile markets. It could be argued that lifelong learning is the most critical skill to impart: OECD evidence shows that 65 percent of children today will do jobs that haven't even been developed, underscoring the need for a highly adaptive workforce.
- Using Digital to learn Digital: Not only are digital technologies good teachers, but there are a wide range of digital tools that can be paired with workers' learning styles, circumstances and environments. From MOOCs (massive open online courses) to wearable technologies that enable real-time learning at the point of need.

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*According to our experience, the main challenges to tackle when undertaking a digitization project in insurance businesses has to do with people and technology.*

*First, the project must be sponsored by the top management. The change management becomes also a key lever: **you need your workforce to be digitally skilled** but also to engage key stakeholders such as network-affiliated doctors and the final users (for example through gamification tools). Tapping into digital technologies enables to supply a more customer-oriented experience; for example, IoT gathers new streams of data, AI can be used to foresee patterns of behaviour and social media establishes a more dynamic relationship with the customer.*

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**Julio Lorca - Development Director at DKV Health and Medical Insurance**

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### **Redesign work to unlock Human Potential**

- Creating a more flexible workforce model: Rigid, formal job structures do not support the speed and agility demands needed in the face of digital innovation. Redefining and co-creating employment opportunities through more responsive role-based and gig-like work is a reality. These opportunities need to be available to both full-timers and freelancers.
- Embracing collaborative design: Rapid experimentation trumps designing and piloting. Instead of trying to get the entire organization to move to new practices, test them “on the fringes” and keep them away from the institutional culture whose immune system will squash them. But support that fail fast culture with new digital ways of working. Like collaborative design or crowdsourcing.
- Enabling change through ecosystems and platforms: Savvy organizations will create physical and virtual networks to facilitate community building, deliver access to valuable skills training, generate feedback and create access to potential new roles and projects.
- Tapping into boomers for a knowledge boost: Tap current wisdom workers and recently retired executives to coach new talent coming up through the ranks.

### **Strengthen the talent pipeline**

- Fostering national and cross-border programs: For example, in 2015, France forged a partnership between Pôle emploi, the National Labour Agency, and Open Classrooms allowing free access to MOOCs. Jobseekers can access hundreds of online courses in everything from web development to digital art.
- Bringing personal influence to bear on industry groups: By banding together, companies can wield greater influence. Take NASSCOM for example. It’s India’s engineering industry group that’s helping the public sector create new courses on data science and analytics, automation and internet of things (IOT) in academics.
- Collaborate with academia: Influence the academic agenda from the beginning—and not just in engineering programs. That includes higher education, community colleges as well as nondegree programs. Accenture teamed with Harvard Business School and Burning Glass Technologies in the United States to develop recommendations for employers as well as academia and policy makers to plug the gap in U.S. “middle skills” jobs, those that require more education and training than a high school diploma but less than a four-year college degree.
- Deploy massive training programs to achieve an early engagement of young boys and girls in STEM education and to stimulate its interest in technology. Regarding this challenge, MWCB's program mSchools, launched in 2012, supports students and teachers effectively integrating mobile technologies into the classroom, aiming to improve participant's digital skills and entrepreneurial spirit. Last year, more than 24.000 students participated in mSchools initiatives

## **Digital Transformation at Enagás**

*At Enagás we have started a Digital Transformation journey involving organization, resources, processes and culture aimed to optimize our operating model. This is being implemented following initiatives such as design thinking workshops, paperless culture across the company, asset maintenance, cybersecurity or investigation partnerships with Universities (Enagás sponsors the “Chair for Connected Industry” launched by the Comillas Pontifical University ICAI-ICADE”). To monitor the digitalization of our company, we are launching a “Digital Cockpit” which contains metrics such as the number of digitalized processes, the investment versus the expected benefits, the presence in social media or the hours of digital training*

**Olga Núñez – Digitalization Director at Enagás & Víctor Gimeno – Digital Transformation Lead (HR) at Enagás**

### **4.3.2 Digital Technology**

#### **Strengthen infrastructure & investment**

- Pursue Universal Internet Coverage: access to Internet in Spain remains below European average. Increasing the number of individuals with internet access from the current 80,6% and improving Schools internet access’ quality to European levels, would lead to an improvement of Spanish Digital Economic Opportunity.
- Deployment of the 5G networks through the development of use-cases: due to its high speed, low latency or resilience, 5G promises to be a key lever for the digitization of the economy. Nevertheless, as the 5G Manifesto for timely deployment of 5G in European states, scale of investment is required to achieve 5G and an industrial collaboration between Telco and Industry stakeholders is required to ensure 5G can create substantial value by offering digital solutions that meet genuine business needs at European and global scale and across a variety of use cases.
- Ensure investment in intelligent infrastructure: analytics, big data, Smart cities, Internet of things, cloud computing, etc.
- Promote a higher proportion of private sector investment in R&D&I against Public investment.
- Involve companies’ leadership as sponsors of the technological innovations.

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*Our clients demand proximity and personalized experiences and we must respond with a solid omnichannel strategy and leveraging on the amount of information available.*

Over the next 3 years, **digitalization will be marked by Big Data & Analytics** which will evolve to Machine Learning and in a medium-large term to Artificial Intelligence. In retail, this will materialize in Smart Stores and the evolution of “sensor experience” services. This will run in parallel with the collaborative economy, which integrates the “aaS” model.

There is a big challenge ahead as we need to change the Airplane’s engines during the flight and with full passage on board.

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### **Mosiri Cabezas – CDO at IKEA Spain**

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#### **Build ecosystems**

- Keep widening the ecosystem of digital start-ups. The start-ups have been proved as key multipliers of both, digital talent employment and digital technologies spread. Efforts must be focused on enable the creation and acceleration of high-tech start-ups and to promote a closer collaboration between B2B start-ups and corporations.
- Keep fostering the transfer of technology from research centres to the market: many of the digital technologies that have transformed the economy and society, such as the internet itself, GPS systems or voice recognition software, were born in research centres financed by the public sector. Although Spain enjoys a powerful network of research centres, the valuation of its technologies is still far from its potential.

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**We must continue to strengthen the start-ups ecosystem** as one of the driving forces behind the digitization of the economy, for example through: enabling pulls of professionals and entrepreneurs who would collaborate with researchers to bring technologies to the market; promoting a partnership relationship rather than a customer-supplier one when start-ups and corporations collaborate, in order to avoid financial strains; or encourage the attraction of Smart money to ecosystems.

Regarding the positioning of Spanish innovation hubs, there should be a clear orientation towards those industries where there are greater competitive advantages and knowledge. Likewise, ecosystems should have physical spots where trusted relationships between the different ecosystem actors can emerge. All this should be reinforced by the development of the brand awareness of innovation hubs competing internationally like Barcelona or Madrid.

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### **Miquel Martí, CEO at Barcelona Tech City**

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### 4.3.3 Digital Accelerators

The main actors who can impact Digital Accelerators are the Public Sector and Institutions, and they can do it by:

#### **Incentives**

- Facilitating companies' transformation projects through tax deductions and subsidies for Digital Transformation activities.

#### **Regulation**

- Ensuring an appropriate legal framework without unnecessary barriers
- Guaranteeing security in the Internet and data protection.

#### **Education & innovation**

- Fitting learning in education centres to actual requirements and adapting their infrastructure to a digital education.
- Creating innovation observatories to empower digital transformation of companies and society.

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*Water management's objective is to provide population with access to an essential resource, declared universal right by the United Nations. In a context of climate change and demographic growth, the key challenge is to efficiently manage this resource in cities, agriculture and industrial processes. **It is necessary to accelerate Digital Transformation** and water disruptive technologies development to revolutionize water reutilization and achieve a greater efficiency in its management.*

**Pablo Peralta – Head of Digital Transformation at Suez**

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In addition to the transversal initiatives, companies have different needs depending on their size and the industry in which they operate.

If we analyse companies' digital needs according to their size, we can see that, over the last years, Corporate companies have undertaken a deep digital transformation process across all their business areas. They have transformed their processes, implemented new technologies and reskilled their staff. Therefore, their DEO is well above county's average and they are already in the path to Digital.

On the other hand, stand SME companies. This companies, still carry along with them the difficulties brought by the economic crisis, so they present a certain delay if compared with big companies. SME companies account for the 99,8% of total companies in Spain, so their digitalization degree is representative of the country's digitalization.

According to a survey carried out by “*Movement impulsando PYMEs*”, 99% of SMEs claim to be aware of the need to initiate or continue the digital transformation process. 77% of them unsure to have already started and 14% expects to start during 2017. They will invest between 3.000€ and 20.000€ in Business Intelligence, TIC improvement, Cloud, IoT, Big Data and Analytics.

In the roadmap for SME digitalization, the first step is to overcome their current barriers:

- Low degree of cybersecurity
- Limited Digital Talent within the organization
- Financing barriers
- Bureaucratic environment and legal limitations

So, SME should action first the digital technologies lever to train, reskill and attract digital workers and take advantage of accelerators (advances in regulation, growth in digital investment, etc.). Digital Native Start-ups don't face most of the barriers and they can serve as an example for the rest of SME in their way to digitalization.

If we analyse companies' digital needs by industry, we can better select key initiatives for the acceleration of the Digital Transformation of all of them:

## 4.4 Digital Transformation acceleration initiatives by industry

### 4.4.1 Auto, Industrial Equipment, Infrastructure and Transport

We have identified three key themes in which the future of digital value will manifest itself within the automotive and industrial resources industries.

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*When discussing digital transformation of the automotive industry in the coming years, commonly cited trends include the electric car, connected car and autonomous car. A fourth trend that should be considered in this group is the concept of urban mobility, which is related to improving the commuter experience in cities, thanks to real-time data management and predictive capacity.*

**Fabian Simmer - Digital Officer at SEAT**

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#### **Connected traveller**

“Twenty-five to thirty years ago it was seats, the steering wheel, stereo...There wasn't a lot of value in the interior cabin area. Move forward 30 years... good chance up to half the value of the vehicle is electronic content.” -Michael Robinet, Managing Director, HIS Automotive. This theme comprises the following initiatives:

- **Infotainment.** Infotainment is evolving into both a location-based and condition-based service where products and services come to passengers based on where they are, who they are with and what their preferences are. Along with multimodal integrated services, another digital initiative under the connected traveller theme, location-based services can give customers end-to-end intelligent route planning across all modes of transportation, both automotive and non-automotive.
- **Usage-based insurance.** The world's major insurers are already adapting to the expanding digital universe, modifying and customizing policies based on individual driving behaviours.

#### **Autonomous driving**

“I think it's just going to become normal. Like an elevator. They used to have elevator operators, and then we developed some simple circuitry to have elevators just come to the floor that you're at, you just press the button. Nobody needs to operate the elevator. The car is just going to be like that.” – Elon Musk, Chief Executive Officer and Product Architect, Tesla Motors. This theme comprises the following initiatives:

- **Assisted driving.** With each model year, new driver-assist functions become options or standard features and no longer just available on premium models. This gradually moves the driving public from the

current position where we are actively ‘in the driver’s seat’, to a new era where we are passive participants in the process of conveyance, which has become fully automated.

- **Self-driving.** Several technology companies are working on creating vehicles capable of navigating themselves through mixed traffic conditions on all roads and highways. Best known among the projects now in development is from Google Auto LLC,<sup>35</sup> a subsidiary of Alphabet and Google X.

### **Digitizing the enterprise and ecosystem**

Digitization will likely drive substantial improvements to the value chain through enhanced efficiencies, reduced costs, greater collaboration and more innovation. As Original Equipment Manufacturers (OEMs) seek to expand from business-to-business through their dealerships to a business-to-consumer model, there will be new ways to engage with customers, partner with suppliers and interact with data. The increasingly connected vehicle will alter business strategies from selling a product to providing a customer experience-centric value proposition.

- **Connected supply chain.** The primary benefit from interconnecting the supply chain is cost reduction through a better managed end-to-end process.
- **Digital manufacturing.** On the assembly line, robots now work alongside humans. New-generation robots can do multiple assembly tasks. Robotics, artificial intelligence and the Internet of Things have all become part of a new industrial revolution.
- **Disrupted retail.** Relationships across the entire retail landscape are being altered by the digital revolution. OEMs, dealers and customers are dynamically redefining how they interact with each other, with consumers increasingly expecting a seamless experience across both digital and physical touchpoints, regardless of who they are interacting with.
- **Connected service and maintenance.** Predictive maintenance: Increasingly sophisticated in-vehicle diagnostic systems, smart components and ubiquitous connectivity allow the vehicle and even some components to proactively signal when they need maintenance or replacement. Continuous data analysis creates new opportunities for preventive maintenance. This dramatically reduces critical, unanticipated failures and reduces the frequency and severity of recalls.
- **Transformed digital aftermarket.** To better facilitate software and hardware upgrades, manufacturers and suppliers will be expected to make their systems forward compatible.
- **Automotive data marketplace.** The commercial promise of more precisely targeted customer offers, new business models, and increased efficiency from data and analytics make these new businesses a veritable gold mine for automotive players.
- **Connected infrastructure.** V2V and V2I are key enablers of intelligent transportation. Sensors, transponders and RFID readers in the road, traffic lights, bridges and parking lots will create an integrated communications network of continuously moving digital information to increase safety and improve traffic flow.

**Digitization will not only bring new features but also new mobility related business models and ecosystems**



## **Digital transformation at SEAT**

*SEAT aims to be the front runner of the Volkswagen group in regards to the development of the connected car and urban mobility.*

*In relation to connectivity, beyond the already available functionality of smartphone integration (through the Full Link infotainment system), SEAT is developing solutions that will enable a better customer experience. This will allow SEAT to offer a tailor made experience through a specific SEAT ID, as well as to provide SW and HW services on-demand, boosting new business models.*

*Likewise, SEAT has launched Metropolis: Lab Barcelona, a research hub for mobility solutions. Thanks to the collaboration of the Barcelona City Council, its activity will begin with the exploration of 3 use cases: predictive navigation using cross-city data, optimization of the city's mobility management services and detection of free parking spots.*

#### 4.4.2 Banking

Driven by the future context, banking companies must evolve and elevate the role of operations through a more strategic vision that takes into account six key levers:

- **Digital Transformation:** Native digital omnichannel processes with analytical capabilities. Transform operations to support the rotation of customers to the digital channels, processes and services with an advanced information analysis.
- **Talent & Culture:** New capabilities and fewer, if any, organizational silos. Promote more sophisticated capabilities and talent within the operations workforce and implement highly flexible, cross-functional organizational structures.
- **Quality:** Focus on end-to-end customer life cycle. Ensure support for a seamless bank customer experience where internal and external customer insight is a key driver of management decisions.
- **Industrialization:** Agile straight-through processing and zero back office. Improve Process Cycle Efficiency through extension of the BPM suite, integration of robots and adoption of next-generation core banking systems (Banking as a Service).
- **Risk Control:** Migration to digital-based risk control. Adopt a proactive and cost-efficient approach to rebalancing controls from operative to a more technological focus due to increased automation and cyber threats.
- **Sourcing & Execution:** Globalization and automatic execution. Draw on outsourcing (through utilities) to address flexibility and scalability needs, keeping high-value tasks in the operations area and enhancing operational functions.
- Beyond that, fintechs, including P2P financing models, while they have been able to grow fast in less bankarized markets such as UK, still have a long way to go in the Spanish economy. Even though this kind of financial institutions might be seen as a disruptive threat for the traditional players, they represent also an opportunity to co-create new business models and keep pushing in banking digitization.

**Banking industry must lift the traditional role of operations through a more strategic vision**

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At Banco Sabadell, **innovation is one of our top priorities** and we have consistently been pioneers in the adoption of new technologies, such as the creation of first native solution for tablets and smartphones, the organization of Blockchain Hackathons, Open APIs, market and company business performance reporting service to our b2b customers (Kelvin Solution) or the integration of instant payments with messenger apps.

We truly believe that digitalization starts with our people, so we have launched a program aimed to promote workforce digitalization and innovation adaptation within our employees, as well as optimizing our incentive model to make them accountable / ambassador towards product and service innovation.

**Ruediger Schdmit – CTO At Banc Sabadell**

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**Digitization is changing both the offerings and the work culture of Professional services companies**

### 4.4.3 Business Services

Disruptive technologies are fundamentally changing the economics of Professional Services. Four themes will be central to capturing digital value for the industry and wider society:

- **Business Model Transformation:** Digitalization empowers firms to change every facet of how they go to market, including their services, value proposition, target customers and prices. Key initiatives are Enhancing Go-to-Market Strategy and Fostering a Digital Environment.
- **Intelligent Automation:** Emerging technologies such as blockchain, artificial intelligence and deep learning are augmenting professionals' abilities to "do", "think", "learn" and "feel". Major initiatives include Modularizing Work and Augmenting Human Intelligence.
- **Digital Agility.** Companies with an agile work culture and smart infrastructure can react quickly and adapt strategies and processes to disruptive events. Important initiatives are Developing a Flexible Workforce, Nurturing an Agile Culture and Investing in Smart Infrastructure.
- **Talent Empowerment.** In a digitalized world, there is a need to reimagine what it means to be an employee and revisit the employee value proposition for the workforce. Key initiatives include Reimagining Hiring, Training Talent and Designing the Employee Experience.

### 4.4.4 Chemicals & Refined Petroleum

The industry's contributions allow other sectors to turn innovations into sophisticated products that enable digitalization. Three themes are central to the sector's own efforts to capture the value of digital transformation.

- **Digitalize the Enterprise:** Advanced digital technologies, such as the Industrial Internet of Things, automation, analytics and artificial intelligence, will take core operational functions to the next level (e.g. research and development [R&D], manufacturing and supply chain), and will augment workforce capabilities. Key initiatives are Digital R&D, Digital Supply Chain, Digital Plant and Augmented Workforce.
- **Go Beyond the Molecule:** Digitalization presents the industry with opportunities to launch new digitally enabled offerings, create outcome oriented business models and improve customer interaction. Major initiatives are Digitally Enabled Offerings and Business Models, Advanced Customer Interaction, and Accelerated Circular Economy.
- **Collaborate in Ecosystems:** Accelerated innovation cycles will drive the industry to build flexible and interconnected innovation ecosystems. Intense collaboration and data sharing along the value chain will help to better address customer requirements and manage volatility. Key initiatives include Innovation Ecosystem and Value Chain Collaboration

#### 4.4.5 Communications

Our analysis has identified four digital themes that we expect to have the greatest impact on digitization in the industry over the next decade:

##### **Networks of the Future**

Virtualization and an abstraction of the physical hardware layer promise to fundamentally change the basis of future technological differentiation by creating networks that will be self-aware, self-optimizing, self-healing and self-secure. This theme comprises the following initiatives:

- **Software-differentiated networks.** Network functions traditionally implemented on costly hardware will be replaced with lightweight software solutions, led by technologies built on and enabled by the cloud.
- **Autonomous (zero-touch) networks.** The rapidly increasing capabilities and computing power of machine-learning technologies pave the way for networks that are self-aware, self-optimizing and self-healing.
- **Cyber-resilience.** Recently, the scale of cyberattacks has been increasing globally at an alarming rate: >1 billion Records of personally identifiable information stolen in 2014 and \$3.8 million Average total cost of a data breach, up 23% from 2013 to 2015
- **Extending connectivity.** Global internet penetration stood at 43% in 2015, meaning that more than half of the world, predominantly in emerging markets, is yet to join the digital economy. We expect to see an increasing push to connect the unconnected. However, as these untapped markets often exist in small clusters in remote regions, extending traditional network access is not economical for network operators, given a high cost per bit and limited ability to monetize data usage.

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*The expected increase in the consumption of mobile content or in the number of connected devices will not be a sufficient reason for telecom operators to fully deploy the 5G standard. In a context of narrow margins, to justify high investment in new networks, it will be necessary to identify enough use cases in which network speed and low latencies are critical. The connected car or remote surgery could offer some examples.*

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**Oscar Pallarols, Innovation & Product Strategy Director at Cellnex Telecom**

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##### **Beyond the Pipe**

The increased digitization of consumers and businesses presents the telecom industry with important opportunities to extend revenue streams beyond just connectivity – through IoT, digital services and entirely new models of digital communication. This theme comprises the following initiatives:

- **Integrated on IoT.** IoT is likely to be the next major value opportunity across industries. As providers of key connectivity – between sensors, devices, data centres and people – the telecom ecosystem will be integral to the proliferation of the “internet of everything”.
- **Digital services.** As digital disruptors and OTT players attack traditional communication revenues, communications providers are pursuing opportunities to move up the digital stack to the services layer. Telecom operators will try to take on the role of digital services providers, often emerging as disruptors to other industries.
- **Winning the battle of ecosystems.** There are growing signs that the next wave of digital competition will not be between organizations or industries but between large, cross-industrial ecosystems aggregated around specific consumer use cases.
- **Reimagining communication.** Innovations ranging from natural user interfaces and holography to augmented reality (AR) and virtual reality (VR) show the potential to change how we interact with one another and the world around us. These technologies point to the future of smartphones – and maybe beyond.

### **Redefining Customer Engagement**

To win the race for customer loyalty and mindshare, the telecom industry will need to increasingly deploy features and tools that deliver delightful digital experiences. This is especially important as customers now expect the high-quality service they receive in one industry to be matched by companies in other sectors.

- **Delighting the digital customer.** Firms across the digital domain are developing smart algorithms that analyse customer data in real time to deliver customized and contextualized experiences to millions of customers simultaneously.
- **Brand atomization.** As digitization intensifies the race for customer mindshare, companies are allowing their brands to be distributed through a wide range of service providers, relinquishing control of every single user experience.

**Telcos must keep on moving beyond connectivity towards high-value digital services**

### **Bridging the Gap on Innovation**

The need for rapid innovation, greater convergence and new services means that telecom service providers must fill key capability gaps using new innovation models and revamped talent strategies for a digital workforce.

- **“Outside in-novation”.** The need to develop and deploy new services at scale are driving companies to review innovation strategies that keep the development of new technologies within internal R&D teams.
- **Transforming for digital talent.** A key differentiator in today’s competitive, digitally enabled world is access to the right skills and knowledge in your workforce. What is needed is not just analytical, coding or engineering skills; digital natives are transforming industries through an inherently innovative culture that celebrates internal disruption, flexibility and collaboration.

## **How Cellnex Telecom is enabling digital transformation**

*Cellnex is a tech-based company that enables digital transformation of third parties through connectivity services. Among its current lines of service, outstands the IoT communications delivered thanks to a partnership with SigFox, the only operator of a cellular network fully dedicated to the IoT in Spain.*

*Currently there are over 1 million devices connected to this network, leveraging IoT in fields such as smart cities (smart services enabled by the connection of objects powered by a long-life battery, such as outdoor parking spots management, optimisation of waste management...); security (solutions for secure communication in security forces, home alarm systems...), utilities (sensorisation of infrastructures and pipelines) or industries such as automobile.*

*Besides this, the deployment of many more uses in the future is expected to boost digital transformation and IoT in industries such as healthcare, intelligent infrastructure, telecontrol and many other markets currently under development.*

#### 4.4.6 Consumer goods and services

Four key digital transformation themes have been identified that are expected to shape consumer industries over the next decade (each theme comprises several transformation initiatives):

##### **Consumer data flow and value capture**

The shift to digital customer interaction models creates significant opportunities for companies to access consumer information, while the potential for disintermediation by new entrants will surface where incumbents lag. An important challenge for consumer industries will be developing successful data control and data monetization models. The rising importance of consumer and enterprise data will draw increased scrutiny and activism from consumers and regulators, as society puts an even higher premium on data privacy and transparency. This is materialized through several initiatives such as:

- **Data as an Asset.** Leveraging consumer data to understand consumer's behavioural patterns, generating value for the company and the customer himself.
- **Data Privacy and Transparency.** Consumers are becoming more aware of the usage of their personal data, making it necessary to build trust relations through the protection of the consumer's privacy and transparency.
- **Data to improve the experience.** Using consumers' insights to enrich their journey, adding value in a way they perceive the convenience and the benefits of sharing their data.
- Within these theme, an Advanced Commercial Intelligence and New Data Sources, powered by Analytics, are key to enhance Revenue Management Agenda and therefore, value capture: a redefined Commercial Strategy (Route-to-Market, Portfolio, Promotions, Pricing, Trade Terms) and new skills for early visibility on Commercial Operations (Point of Sale Management, Trade Promotions Management, Demand Sensing, Digital Merchandising).

##### **The experience economy**

Goods will evolve into services, and services into experiences, with data serving as the backbone of the delivery. In fact, 89% of business leaders surveyed by Gartner (*Customer Experience is the new competitive battlefield* – November 2016) believe that customer experience is already becoming their main point of competition. Continuous engagement between brands and consumers throughout a product's life cycle will become the norm. Creating new revenue models is an opportunity in an environment where revenue could potentially be decoupled from output and more closely linked to outcomes for individuals and society. This is materialized through several initiatives such as:

- **Hyper-personalization in goods:** digital transformation enables personalizing consumer experiences at scale.
- **From products to services and experiences.** With recent advances in technology, the digital economy is now able to deliver a wider range of services and experiences that people are looking for.

- **Goods and services driven by health and well-being.** The cost of caring for people with chronic diseases is increasing (accounting for 75% of health spending in the United States) and driving the growth in healthcare spending. With many consumers looking to live healthy lives, companies offering health-based services will have significant opportunities. For example, the market for wearable healthcare devices is expected to grow by 30% a year until 2019.
- A holistic approach to a redefined Consumer Experience, truly listening to 'The Voice of the Customer', based on facts brought by Analytics and new Data Sources of Information, is key to support the FMCG industry to current trends.

### **Digital operating model**

The Internet of Things will continue to drive the evolution of smart supply chains and smart factories, enabling the mass customization of products and omni-channel experiences. Having an operating model designed to manage consumer experiences – a model such as 'omni-channel support', 'agile supply chain', 'mass customization' or 'workforce of the future' – will be important for companies trying to gain a competitive advantage. This is materialized through several initiatives such as:

- **Smart supply chains.** In the digital world, supply chains need to become more agile to thrive in an environment of shorter lead times, and higher frequency and uncertainty of demand.
- **Talent management.** Talent recruitment and development structures at consumer companies have tended to focus on hiring those with skills related to sales and marketing, as these functions have traditionally been important at the companies. As every aspect of a company's operations becomes digital – from vendors and factories to distribution networks – the skills required by company workforces will change dramatically.
- **Smart factories.** Like smart supply chains, the smart factory concept builds on the technology behind the Internet of Things. The smart factory will have cyber-physical machines that combine electronic and mechanical systems to form a modular, adaptable production line. Start-ups will have the chance to begin with a blank slate, building state-of-the-art smart factories on greenfield sites.



## **Digital transformation at Hospital Sant Joan de Déu**

*Sant Joan de Déu is a highly specialized hospital in maternity and paediatric care, so most of its users are young people. According to Jorge Juan Fernández García, Director of E-Health, this has been a key factor in boosting the digital transformation of the centre, since it has allowed them to understand the expectations of digital natives and develop a digital experience geared to their needs.*

*The supply of e-health services is one of the pillars of the Hospital's digital strategy. For example, they have implemented gamification in the remote treatment of pathologies such as childhood obesity through mobile and wearables tools, achieving significant impacts (program PrevenGO). Also they have developed apps that offer tools for children's care. They use telemedicine intensively in order to collaborate with hospitals locally and around the world in evaluating patient cases.*

*The Hospital has also developed different online patient communities such as Faros, Guía Metabólica and Guía Diabetes. Also, RareCommons, a digital research project that brings together families and doctors to improve scientific knowledge of rare diseases.*

*Finally, they have been pioneers in the use of social networks to boost patient engagement and prescription of health content. To this must be added the dedicated effort in digital marketing, which has contributed to a significant attraction of international patients.*

*The next steps in the development of the Hospital's digital strategy is the assurance of a homogeneous customer experience in the different channels as well as the exploitation of data through big data and artificial intelligence to increase the quality and personalization of the service offered*

#### **4.4.7 Electronics and High-Tech**

Companies within EHT industry can leverage the following digital transformation initiatives:

##### **Intelligent Automation**

- Introduce intelligent automation to manage complexity of pervasive digital change.
- Seamlessly harness and integrate, at scale, new products, services, technology tools, business models, alliances, ecosystems and more.

##### **Liquid Workforce**

- Look beyond just updating skills and become agile at each level of business: skills, projects, and organizations.
- Embed the assumption of constant change enterprise-wide to access critical skills sooner, innovate faster, and operate more effectively.

##### **The Platform Economy**

- Back office, front office, and digital technologies fuse to serve as a new blueprint for how companies build, connect, and deliver applications.
- Platforms are becoming highly industry optimized and integrated across all elements of the value chain.

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*The digital transformation at Airbus has been declared a basic pillar of the company's development and growth strategy in the coming years. Efforts are being made at all levels, with specific organizations dedicated to processes analysis and identification of technological evolutions to increase competitiveness across all design, production and customer services processes. The main transformation barrier we have encountered is to implement standard digital solutions across business lines.*

**Francisco Sánchez Segura – VP, Head of Manufacturing Engineering & Industrial Innovation Military Aircraft. Airbus**

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##### **Predictable Disruption**

- Digital ecosystems are the foundation of the next major stage of technology and economic disruption.
- Leverage partnerships within the ecosystem to develop end-to-end solutions to problems, not components or point-specific products and services.

##### **Digital Trust**

- Trust underpins business' ability to use and share customer data that directs their operations in digital economy.
- Possess strong cybersecurity and ethics at each stage of the customer journey to enjoy high levels of trust and guide the digital future.

## **Barcelona Tech City, a Digital Business cluster benchmark**

*Barcelona Tech City (BCN TC) is a non-profit organization that represents Barcelona's digital and technological sector. Its main goal is to showcase Barcelona as a main hub in the global tech scene.*

*The organization holds over 400 members, encompassing digital start-ups, VC firms and Business Angels networks, incubators and accelerators, engineering and business schools, multinational corporations or public sector institutions among its partners. BCN TC organizes activities continuously focusing in: promoting the Barcelona's tech brand; creating a suitable framework for digital companies; attracting local and international investment; connecting young talent with companies; and empowering digital companies as driver for the digital transformation of off-line sectors.*

*BCN TC launched in 2016 Pier01, one of the largest facilities for tech companies in Europe, housing over 80 tech companies (including tech based companies and off-line companies boosting its own digital transformation), and more than 1000 professionals in a single spot. The hub hosts office spaces, coworkings, showrooms and common areas to foster innovation and collaboration.*

#### 4.4.8 Insurance

Insurance companies can gain competitive advantage by offering personalized services to their customers by leveraging on Big Data & Analytics.

An innovative trend within insurance companies is to become a platform of experiences in which they complement their products with third party's products to offer a complete experience to their customers.

In order to collect data from their customers, insurance companies can offer dynamic pricing based on their behavioural data collected by wearables or connected devices.

As it is happening in the banking market, new business models and emerging new entrants (such as insurtechs) are expected to reshape the market; they will be competing in innovative ways, such as offering extremely personalized services or harnessing big data acquired from connected devices.

**Big Data & Analytics allow Insurance companies to offer tailored solutions, while emerging pure-tech players keep on pushing innovation forward**

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*Our Digital Strategy at Mutua Madrileña is intimately connected to the Corporate Strategy and is fully supported by our president, Ignacio Garralda. We are focused on 5 pillars: (1) Online Channel boosting to reinforce customer loyalty, (2) Online Marketing development to generate awareness & demand, (3) Internal processes' digitization to gain efficiency, (4) Big Data to develop new products and address cost-reduction opportunities and (5) Innovation to secure our growth in the long term. We are building Mutua of the future and obviously, this transformation requires new talent, but there is no secret sauce to attract it: you have to look in the right talent pools and talent attracts talent.*

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**Aitor del Coso – Chief Digital and Innovation Officer at Mutua Madrileña**

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#### **Digital transformation at DKV Health and Medical Insurance**

*Behind the strategic vision of the DKV digital transformation initiative lays the idea to become a partner instead of a payer for customers and stakeholders. DKV is rethinking its business model leveraging on new technologies and turning towards an ubiquitous model where new tools solve the patients' needs through multiple channels and locations.*

*This new approach takes the form of a platform ecosystem, in which converges both, the medical care and the self-care dimensions, enabled by a digital health framework. As an example, in the self-care dimension, the mobile app "quiero cuidarme" will enable the client to monitor and improve its health and nutrition habits. Regarding to medical care, the app "digital doctor" will provide automated diagnose orientations or will allow to be attended by a doctor through a video-conference.*

#### **4.4.9 Natural Resources**

The industry has a chance to move from incremental, digitally driven operational improvements to a broader embrace of digital technologies. Four themes will play a leading role in this transformation.

##### ***Digital Asset Life Cycle Management***

Connecting end-to-end operations across the value stream can ensure that all systems, equipment, sensors and data are communicating and learning from actions. This will lead to increasing efficiency, productivity and compliance with health, safety and environmental standards. Key initiatives are New Era of Automation, Advanced Analytics and Modelling and Connected Worker.

##### ***Circular Collaborative Ecosystem***

Digitalization will help with advanced and innovative collaboration models between producers, suppliers and society, as well as making operations transparent and driving out inefficient practices. Major initiatives are 3D Printing and Blockchain / Smart Contracts.

##### ***Beyond the Barrel***

Digital technologies open new avenues for customer engagement and provide additional services that help create new and innovative business models. Important initiatives are Digital Customer Services and Omnichannel Retail and Experience-based Services.

##### ***Energizing New Energies***

Digitalization promotes new energy sources and carriers, and innovative models for the optimization and marketing of energy. The Oil and Gas industry must understand the full impact of this, and stay connected with millennials. Key initiatives include Consumer Energy Choices.

## **How Celsa is boosting Digital Transformation through an accelerator program**

*Ingenium is an accelerator program embedded in the open innovation strategy of the Celsa Group, one of the top-four European steel-making groups. Its aim is to find new ideas from the start-ups ecosystem, as well as to attract talent with a digital mindset. The program is also an opportunity for Celsa employees to get skilled under new methodologies of project deployment. The program focuses on the challenge of digital transformation, seeking to receive creative ideas that incorporate the main disruptions in the market, such as big data, artificial intelligence and IoT.*

*The goal is to lead the transformation of the steel industry with innovations able to tackle energy storage, traceability in the supply chain, 3D printing, smart steel and the recycling of byproducts.*

*The selected start-ups attend a two-day “demo day” in which they get to know firsthand Celsa’s facilities, its people and the main challenges the group is facing. Later on, entrepreneurs are given the chance to develop a “pilot” of their product or service during a 6 to eight- month program offering mentorships and networking with professionals from the Celsa Group.*

*After this period, if entrepreneurs are successful and depending on the interest of both parties, Celsa offers a financing option through investment for equity and opportunity to scale as a strategic partner of the group.*

#### 4.4.10 Retail

Technology will transform retail's end-to-end value chain. The level of change in the next 10 years will far surpass what has been seen in the past 40 years. The main themes for the Retail Industry are:

##### **Omni-channel retail**

Traditional stores will undergo a metamorphosis to stay relevant in a world where online purchases are growing in most categories. Omni-channel strategies will help these retailers remain relevant. Inevitably, e-commerce will become globalized and oligopolistic, and provide a platform for small retailers and used goods sellers to coexist. Simultaneously, profitable niches in e-commerce will also emerge. This is materialized through several initiatives such as:

- **Physical store transformations.** While an increasing importance of e-commerce, physical retail still maintains its importance. Omnichannel in-store experiences bringing together the digital and physical worlds remains a challenge.
- **E-commerce penetration, globalization and consolidation.** With cross-border e-commerce expected to grow at more than 10% annually in the coming years, the battle to become one of the dominant retail platforms is set to involve Internet giants from different parts of the world. As the global ecommerce market consolidates around a few huge platforms, this development could also lead to possible cost savings (from economies of scale in inventory and technology costs) and greater revenues (through increased market share and enhanced transaction rates).
- **The sharing economy.** The explosive growth of the sharing economy has taken many by surprise. More than 400,000 people stay in Airbnb properties every night, and Uber is valued at almost \$50 billion, making it one of the 150 biggest companies in the world.

**Digital Transformation is blurring physical and online spaces, building a seamless customer experience**

#### **Digital Transformation at DIA**

*DIA's Digital Transformation journey started in 2012 with 3 focus areas:*

- 1. Mobility: we have created 3 groups within the APPs initiative (Customer, B2B, Store), whose main objective is to enable interactions with our customers via their smartphones.*
- 2. Digital Marketing: we are investing in Big Data and CRM technologies, in which the crucial lever is the online and real time information.*
- 3. Ecommerce: the online channel is starting to show results and we are focusing on it to optimize the experience and maximize the profit.*

**Juan Pedro Agustín – Head of Digital at DIA**

### **Maintain Engagement with the Empowered Customer**

Empowered consumers demand to be actively involved at every stage of their decision-making journey and expect increasing levels of choice, control and convenience.

### **Rapidly Adopt Disruptive Technologies**

Eight emerging technologies (IoT, autonomous vehicles/drones, robotics, 3D printing, artificial intelligence (AI), augmented reality / virtual reality, digital traceability and blockchain) will be particularly disruptive over the next decade. Though the pace of their development will vary, all will impact the value chain, and rapid adoption will be critical.

### **Evolve Business Models and Key Capabilities**

Emerging business models will fundamentally alter the retail landscape, impacting subcategories to varying degrees. The right capabilities will be needed to compete in this evolving environment.

### **Manage Societal Impacts**

Transformation in the retail sector has implications for labour, the environment and local communities, which will need to be managed.

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At Carrefour, **leaders from different areas take part in the Digital Committee**, created to ensure that we all have the digital processes, technologies and talent to empower the digital way of working throughout the company. This initiative is helping us to adapt to industry's trends:

1. *Ecommerce: there has been a huge acceleration of e-commerce and yet it is very far from saturation. At Carrefour, there are some categories in which the growth comes entirely from the online channel.*
2. *Digital Marketing: communication is rapidly evolving from a massive approach towards full customization.*
3. *Content: most customers search products before purchasing and the content plays a key role on the decision.*

**Javier López Calvet – CFO & Ecommerce at Carrefour**

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## **Digital transformation at Media Markt Spain**

*Consumers' needs, desires and buying habits have changed: hyperconnected, price sensitive, up-to-date new technologies, more immediate needs, etc.*

*With this, MediaMarkt has also changed its business model by carrying out a digital transformation plan which involves the renewal of 100% of the establishments between 2016 and 2018 and to which it allocates an investment of 47 million euros.*

*One of the initiatives that mark this digital transformation is the opening of the Digital Store in Barcelona, which combines all the advantages of the online world (comfort, speed, competitive prices, the latest products), adding the advantages of buying in a physical store (support of expert vendors, more than 200 different services, training courses and additional experiences to get the most out of the products).*

*The Digital Store responds to three premises:*

- Experience: the people who enter the establishment do it with the purpose of, above all, to live a experience, not only to make their purchases: to try the virtual reality, to listen to music, Social Wall, RFID technology, etc.*
- Proximity: located in the urban centre, it serves a metropolitan client with more immediate purchase needs. For this reason, new services have been launched, such as Stop & Go, which allows the customer to pick up their order with the car after having made the purchase online; Or the delivery service within two hours of making the purchase on the web.*
- Digitization: allows you to obtain information about the customer's buying process through predictive analytics.*

#### 4.4.11 Utilities

Within the Utilities industry the four main themes identified as trends are asset life cycle management, grid optimization and aggregation, integrated customer services, and beyond the electron.

##### **Asset life cycle management**

Asset life cycle management encompasses the technology solutions that enable real-time, remote control or predictive maintenance for extending the life cycle or operating efficiency of assets. Some utilities have projects underway and are deploying technologies such as smart sensors on generation and distribution assets. However, many assets still lack the capacity to collect and transmit data and are not connected to a central platform.<sup>13</sup> A marginal improvement in operating efficiency of generation, transformers or power lines will have an exponential effect once scaled across the industry. This theme comprises the following initiatives:

- **Asset performance management.** Includes condition monitoring, predictive forecasting and reliability-centre maintenance, all enabled by analytics and robotics.
- **Digital field worker.** The focus of this digital initiative is to use digital technology to improve field workers' performance and productivity by empowering them with data and tools to drive operational efficiencies.
- **Smart asset planning.** It covers the use of predictive analytics, machine learning and robotics to improve capital-project execution, including site and asset selection, installation and decommissioning.

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*In a market with so much regulation as the Water market, companies are leveraging on Digital Transformation to maximize their impact on resource sustainability, process optimization and to reduce non-revenue water. At a global level, there are 3 main trends: Smart Water, Digital Asset Management and Evolution of the relationship model with its customers, the citizens. The global industry needs to reduce its conservative profile and to reveal the true cost of water.*

*To accelerate the Digital Transformation in the sector it is necessary to strengthen the overall governance, to align public and private investment and to reveal in water's price the effect of a stock break.*

**David Hernández Tosca – Smart Solutions Director at Suez Advanced Solutions Spain**

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##### **Grid optimization and aggregation**

This theme epitomizes the shift of a utility toward a 'commitment to optimize', tackling inefficiencies and waste in the transmission and distribution grid through a number of digital initiatives. Optimization of the grid is made possible through real-time load balancing and network controls, enabled by

connected devices and advanced monitoring capability. This theme comprises the following initiatives:

- **Energy aggregation platforms.** In this digital initiative, the utility serves as an aggregator of locally generated power. Platforms for energy aggregation bring small-scale distributed-energy sources – renewables such as PV, wind, biomass, combined heat and power, or diesel – onto a single platform, enabling a cluster of generators to act as one large power plant. These platforms can both deliver electricity when it is required and store any surplus power, thereby balancing the grid.
- **Real-time network controls.** The function of this digital initiative is to enable real-time adjustment to changing loads. Such adjustments can also be made to increases or decreases in generation and to failure conditions of the distribution system. It allows two-way communications and operational signals with the market.
- **Connected and interoperable devices.** This digital initiative focuses on device-to-device connectivity and collecting and displaying energy consumption points for the utility. These can then be linked into the distribution network.

### **Integrated customer services**

Electricity companies will move from being ‘energy-centric’ to ‘customer-centric’, using increasing volumes of customer data to better understand behaviour.

A tremendous opportunity exists to develop innovative digitally enabled products and services, bundled to provide an integrated customer service. Energy companies will start to play a bigger role in how consumers optimize the home, choose tariffs, manage consumption and payments, and embed self-generation. This theme comprises the following initiatives:

- **Energy storage integration.** Technology solutions that enable integrating energy storage devices into the grid, including those in a domestic setting, are the focus of this digital initiative.
- **Energy solution integration.** Branded solution integrators will provide new services that will help customers not only optimize energy production and use, but also allow for greater control and cost savings.
- **Energy management.** This digital initiative will see prosumers provided with the energy-information displays and controls they need to manage generation, storage and flow.
- **Digital customer model.** Customers will increasingly interact with their electricity provider through multiple channels, including Web, mobile and social. The customer interaction model will be transformed through embedded customer analytics within services that accelerate digital migration and improve customer engagement.

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Digital Transformation is being empowered throughout Endesa with our CEO - José Bogas - support. **Our core initiatives are aimed to optimize customer experience** (e.g. cutting-edge 360º customer platform “Endesa Clientes”, enhanced Digital Bill experience or digitalization of technical assistance at customers’ home improving the service level) **and to boost our own internal transformation** (e.g. working spaces and collaborative culture through our Open Power Space, “Eres Digital” survey in which workers’ digital skills are evaluated or “E-Talent” digital training).

**Maite González - Director of Customer Service and Digitalization Plan at Endesa**

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### **Beyond the electron**

Electricity companies can look beyond the electron by providing a hyper-personalized, connected service that adapts to the changing consumer, business and citizen. As the provision of electricity moves from being a commodity to becoming an experience, it will be managed not by a single utility but by cross-industry partners – the key differentiator of this theme from integrated customer services. This theme comprises the following initiatives:

- **Living services.** Living services describe the cross-industry digital services that can be offered to consumers by combining sensors, the cloud, connected smart devices and real-time analytics to deliver a new layer of integrated consumer experience.
- **Industrial services.** In this digital initiative, business customers will be offered a suite of engineering services, such as manufacturing and industrial processes, energy, power, data security, lighting and safety. All operate from a single platform and continually evolve, using insights from data analytics.
- **Municipal services.** A full integration of services for citizens is covered, such as providing those for transportation, emergencies, food, sanitation, waste management and electricity. Citizens will experience real-time interactions with service providers and receive tailored, individualized service.

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To face Digital challenges and meet the Digital Customer expectations, at Iberdrola we are implementing innovation initiatives that optimize our processes and the customer experience, such as: smart metering and grid digitization, operation control centres with real time information, connected field workers, personalized products and services based on information collected from our customers, etc. Effective leadership is the key to successful digital transformation and in Iberdrola our Digitalization process is directly sponsored by our president, Ignacio Galán, who empowered the launch of an intra-entrepreneurship initiative that encourages our professionals to design the Iberdrola of the Future.

**Roberto Marijuan – Head of IT Digital at Iberdrola**

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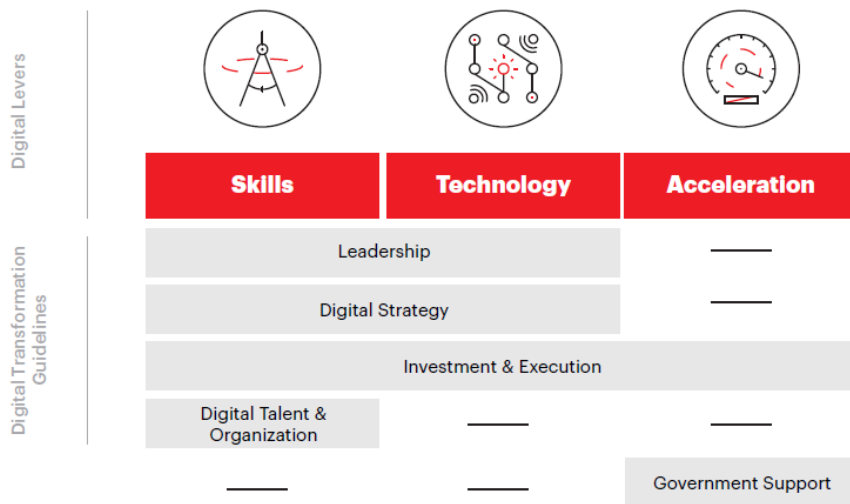
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## **05. Conclusions**

## 5 Conclusions

The Digital Disruption is rapidly changing the way we live, work, and relate to one another. In fact, the business leaders interviewed during this study see a profound change in human habits and behaviours driven by new technologies that is forcing them to evolve their business models and the way they relate with their customers and employees.

Many of these technologies are impacting all sectors; Big Data, Artificial Intelligence, IoT, mobility and cloud computing are top-of-mind trends when talking about the digital transformation, but a successful digitalization goes far beyond technology and, based on our experience, we consider 5 key guidelines to accelerate the Digital Transformation across our 3 Digital Levers:



Launching digitalization initiatives leveraging these key guidelines will be key to accelerate the Digital Transformation in Spain, which is clearly delayed compared to other European peers due to several causes -from financial crisis in 2008 to the digital talent gap.

However, the opportunity ahead is huge for the Spanish economy. In fact, if we accelerate the digitalization in Spain through the optimal allocation of efforts across the 3 digital levers, there is an estimated opportunity of incremental GDP up to USD 48.500 million by 2021.

Now, it is time to double down Digital Transformation efforts across the business ecosystem and the public sector to realise this opportunity.

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## **06. Annex**

## 6 Annex

### 6.1 Key definitions

- Artificial Intelligence: the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.
- Autonomous vehicles: vehicles that are capable of sensing their environment and navigating without human input.
- Big Data, Analytics & Cloud:
  - Big Data: term for data sets that are so large or complex that traditional data processing application software are inadequate to deal with them.
  - Analytics: is the discovery, interpretation, and communication of meaningful patterns in data. Especially valuable in areas rich with recorded information, analytics relies on the simultaneous application of statistics, computer programming and operations research to quantify performance.
  - Cloud: is a type of Internet-based computing that provides shared computer processing resources and data to computers and other devices on demand.
- Custom Manufacturing and 3D printing:
  - Custom Manufacturing: is the process of making products or product lines based on each customer's unique set of specifications.
  - 3D Printing: also known as additive manufacturing (AM), refers to processes used to synthesize a three-dimensional object in which successive layers of material are formed under computer control to create an object.
- Internet of Things (IoT) and connected devices: is the internetworking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these connected objects to collect and exchange data.
- Robots and drones:
  - Robots: they are machines—especially ones programmable by a computer—capable of carrying out a complex series of actions automatically.
  - Drones: an unmanned aerial vehicle (UAV), commonly known as a drone, unmanned aircraft system (UAS), or by several other names, is an aircraft without a human pilot aboard. The flight of UAVs may operate with various degrees of autonomy: either under remote control by a human operator, or fully or intermittently autonomously, by onboard computers.
- Social media and platforms: they are computer-mediated technologies that allow the creating and sharing of information, ideas, career interests and other forms of expression via virtual communities and networks.



## 6.2 Methodology

### 2016 DEO INDEX FRAMEWORK

Pillar	Key Aspect	Indicator	Sub-Indicator	Data Source
Digital Skills	Stock of digital skills	Use of ICT specialists	% of enterprises employing ICT specialists	Eurostat, Accenture
		Role of digital workers and digital natives	% of workforce with basic ICT skills ("Digital Workers")	Digital Economy Project
			% of workforce born after 1980 ("Digital Natives")	Eurostat
	Digital skills development	Investment in digital skills training	% of enterprises that provide ICT training	Eurostat, Accenture
		Digital recruitment	% of enterprises trying to recruit personnel with ICT skills	Eurostat, Accenture
			% of enterprises using internet to recruit employees	Eurostat, Accenture
	Digital ways of working	Focus on mobility	% of employees with remote access to enterprise's IT systems	Eurostat
			% of enterprises with embedded policies for using digital conferencing instead of physical travel	Eurostat
		Knowledge sharing culture	Use of social media to exchange views, opinions or knowledge within the enterprise	Eurostat
		Innovation	Expenditure on R&D as % of GVA	OECD
R&D personnel as % of total employment	OECD			
Digital Technologies	Digital capital stock	ICT hardware stock	% of productive capital stock in hardware	EU Klems
		Software stock	% of real fixed assets that is in software	EU Klems
	Digital engagement	Digital collaboration in business	Expenditure on "collaborative applications software"	IDC
			% of enterprises with business processes automatically linked through supply chain	Eurostat, Accenture
		Connection with customers	% of enterprises that have a website providing online ordering/reservation/booking	Eurostat
	% of enterprises advertising on the internet		Eurostat, Accenture	
	% of enterprises that involve customers in development or innovation of goods or services		Eurostat	
	Digital enablement	Use of the cloud	Expenditure on cloud computing services as a % of industry GVA	IDC
Use of analytics		Expenditure on analytics software as a % of industry GVA	IDC	
Use of IoT		Expenditure on IoT as a % of GVA	IDC	
Digital Accelerators	National communications infrastructure	Reach of internet access	% of individuals with internet access	ITU
			Internet access in schools	WEF - GCI
			Annual investment in telecommunications services	ITU
		Quality of internet access	International internet bandwidth	ITU
			Fixed Broadband speed	ITU
	Government prioritisation of digital	Open data	Open data barometer index	Open data barometer
		Government prioritisation of digital	E-participation index	UN
	Digital business environment	Ease of doing business	Ease of doing business index	World Bank
			Ease of access to loans and venture capital	WEF
		Maturity of online marketplace	Ecommerce turnover as a % of total turnover	Eurostat, Accenture
% of enterprises with an ICT security policy			Eurostat, Accenture	
Role of domestic ICT sector	Value-added from domestic ICT sector	OE Databank		

### 6.3 Interviewees

Company	Interviewee	Role
<b>Airbus</b>	Francisco Sánchez Segura	VP, Head of Manufacturing Engineering & Industrial Innovation Military Aircraft
<b>Barcelona Tech City</b>	Miquel Martí	CEO
<b>Carrefour Spain</b>	Javier López Calvet	CFO & Ecommerce
<b>Cellnex Telecom</b>	Oscar Pallarols	Innovation & Product Strategy Director
<b>Celsa Group</b>	Ignasi Salvador	Innovation Director
<b>Celsa Group</b>	Jesús Mayordomo	CIO
<b>DIA</b>	Juan Pedro Agustín Martín	Head of Digital
<b>DKV Health and Medical Insurance</b>	Julio Lorca Gómez	Development Director
<b>Enagás</b>	Olga Núñez	Digitalization Director
<b>Enagás</b>	Víctor Gimeno	Digital Transformation Lead (HR)
<b>Endesa</b>	Maite González	Director of Customer Service and Digitalization Plan
<b>Hospital Sant Joan de Deu</b>	Jorge Juan Fernández	Director of E-Health
<b>Hotelbeds Group</b>	Álvaro de Nicolás	CTO
<b>Iberdrola</b>	Roberto Marijuan	Head of IT Digital
<b>IKEA</b>	Mosiri Cabezas	CDO
<b>Media Markt Spain</b>	Alejandro Codina	CDO
<b>Mutua Madrileña</b>	Aitor del Coso	Chief Digital and Innovation Officer
<b>MWCB</b>	Adría Batlle	Former mVenturesBCN Director
<b>MWCB</b>	Joan Cornet	Former mHealth Competence Centre Director
<b>MWCB</b>	Bárbara Vallespín	dLAB program Director
<b>MWCB</b>	Carlos Cuffi	Director of the GoingDigital Program
<b>Red.es</b>	Alejandro Tosina	Digital Economy Director
<b>Sabadell</b>	Ruediger Schmidt	CTO
<b>Seat</b>	Fabian Simmer	Digital Officer
<b>Suez</b>	Pablo Peralta	Head of Digital Transformation
<b>Suez Advanced Solutions</b>	David Hernández Tosca	Smart Solutions Director

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## About Mobile World Capital Barcelona

Mobile World Capital Barcelona is an initiative driving the mobile and digital transformation of society while helping improve people’s lives globally. With support of the public and private sector throughout Barcelona, Catalonia and Spain, MWCapital focuses on three areas: the empowerment of new generations, professionals and citizens in the use of digital technologies; the digital transformation of industries; and the acceleration of innovation through digital-based entrepreneurship. Collectively, our programmes are positively transforming Education, Industry and the Economy.

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