Digital Entrepreneurship Scoreboard 2015
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This report was prepared for the European Commission, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, by:

EY and IDC

EUROPEAN COMMISSION
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Foreword

Europe's industry is characterised by creative, competitive manufacturing and innovative high-quality services. Together they are the engine of Europe's economy. Europe needs to capitalise on these strengths through continued investment and innovation to create growth and new jobs.

Advanced digital technologies and new disruptive business models are evolving rapidly and re-defining the rules of the global economy, creating new markets and unprecedented business opportunities. The key challenge for Europe is to ensure that traditional industry and services companies can fully capture the opportunity and value of digitalisation. European businesses are lagging behind in the uptake of advanced digital technologies, with companies slow to adopt new digital technologies. This is a challenge for business and necessitates action at local, national and European level.

The Commission has taken action to support digital transformation, placing this issue at the core of many key policy initiatives. The Digital Single Market addresses the many challenges European companies are facing in a digital era, taking action to help them have greater certainty and operate across the EU. The European Fund for Strategic Investments is designed to fill the investment gap created by the economic and financial crisis. It will mobilise over €315 bn with the ability to support industrial investments around digital modernisation. The Single Market Strategy will upgrade the European Single Market, strengthening enforcement, promoting the provision of cross-border services and improving the business environment.

We are working closely with Member States to raise the profile of the issues on the modernisation and digital transformation of industry. National governments understand the importance of this agenda with many developing their own ambitious policies to support business and industry and accelerate their modernisation. A broad spectrum of actions are being adopted, from broadband infrastructure deployment, entrepreneurial culture, access to finance and skills to more targeted initiatives.

Our Digital Entrepreneurship Scoreboard measures national progress in the digital transformation of European industry throughout the 28 EU Member States. It identifies key success factors and proposes country-specific policy recommendations. This is the first in a series of annual releases that will allow the tracking of progress on this critically important issue.

What this scoreboard and our wider research demonstrate is the importance of this work to support European jobs and growth. It demonstrates that ambitious and coordinated action is needed by all to create a stable business environment to support modernisation initiatives and boost business investments.

This work requires collaboration among political and business leaders, academia and civil society. I invite all involved to join forces in pursuing these ambitious objectives, to develop a modern, entrepreneurial, digital European economy, generating sustainable long-term growth and jobs in Europe.

Commissioner Elżbieta Bieńkowska
Internal Market, Industry, Entrepreneurship and SMEs
# Table of Contents

Executive summary ........................................................................................................... 4  
List of figures .................................................................................................................. 9  
Abbreviations used .......................................................................................................... 12  
1. Introduction ................................................................................................................ 13  
   1.1. Overview of the objectives ...................................................................................... 13  
   1.2. Structure of the Digital Entrepreneurship Scoreboard .................................... 14  
2. Digital entrepreneurship in the Member States ....................................................... 18  
   2.1. The framework conditions for digital entrepreneurship .................................. 18  
   2.2. The output dimensions of digital entrepreneurship ........................................... 26  
3. Indicator by indicator analysis ................................................................................. 31  
   3.1. Framework dimensions ......................................................................................... 31  
   3.2. Output dimensions ............................................................................................... 62  
4. Conclusions ................................................................................................................. 80  
5. Annexes ....................................................................................................................... 83  
   5.1. Country reports .................................................................................................... 83  
   5.2. Definitions used in this research ........................................................................ 153
Executive summary

The Digital Entrepreneurship Scoreboard

Digital Entrepreneurship is intended to embrace the digital transformation of businesses from all sectors, as well as the creation of new digitally driven companies, through the use of digital technologies (social technologies, mobile, big data, and cloud solutions) to innovate and improve the performance.

Based on this broad definition, the Digital Entrepreneurship Scoreboard provides a comparative assessment of the enabling factors which in the EU 28 Member States (MS) create a fertile ground for digital entrepreneurs to thrive and operate successfully, the degree of digitalization of European businesses and the performance of the digital economy across the EU.

Introduced for the first time on a pilot basis, the measurement framework distinguishes between 2 main dimensions – (i) the framework conditions for digital entrepreneurship and (ii) the output dimensions -, and it uses a total of 7 components and 25 indicators to analyse the performance of the EU 28 MS.

The first dimension, the framework conditions for digital entrepreneurship, captures the environmental factors which favour digital entrepreneurship and covers 5 components: Digital knowledge base and ICT market, Digital business environment, Taxation & financial environment, Digital skills and e-leadership and Entrepreneurial mindset.

The output dimension aims at measuring the Digital Entrepreneurship in itself, i.e. the achievements in terms of: digital transformation of businesses, the share of turnover deriving from e-commerce in the EU28 MS, and the business dynamic in the ICT sectors, looking at the birth rate of new ICT start-ups, their capacity of growing and creating new jobs.
Creating favourable framework conditions: a scattered picture across the EU

The progress among Member States reveals a scattered picture, with many countries lagging behind in the creation of favourable conditions for digital entrepreneurship.

Based on the analysis of the framework components, the MS fall into four different types of enabling environments.

The Nordic Countries - Denmark, Finland and Sweden – represent the “Best enabling environments”, outperforming all the other groups. These few countries seem to have been able to prompt a virtuous circle: the high levels of R&D expenditure triggers a continuous innovation process (as witnessed by the sound level of patenting activities) that, coupled with the access to appropriate financial instruments and the provision of highly specialized training, has a direct impact on firms’ performance and the attraction of additional financial sources from foreign investors.

A significant group of MS (UK, Ireland, Luxembourg, the Netherlands, Belgium, France, Germany, Austria and Cyprus) falls in the “Good enabling environment” cluster, where the ease of doing business and access to the appropriate technological infrastructure represent the key ingredients for success. However, the good knowledge base is not always accessible to firms’ employees on a day-to-day basis, hindering the direct impact that new digital tools could have on the performance of firms. This softens the return of R&D investment and makes it more challenging for innovative companies to access fresh financial resources.

The remaining MS, and the majority of them, fall in the “Moderate enabling environment” group, where digital entrepreneurs are faced with less business-friendly environments, a relative backwardness in the innovation knowledge base and the sometimes unsurmountable difficulty of accessing finance. Two sub-groups are identified: in the “Moderate enabling environment 1”, the poor scores for all the dimensions are partially offset by a strong propensity to become entrepreneurs; the “Moderate enabling environment 2” is relatively stronger in digital skills and e-leadership and Taxation & financial environment, but much remains to be done to build a better entrepreneurship mindset and create a more friendly business context.

The figure below displays the distribution of the EU28 MS across the four groups identified.
Mapping of countries belonging to each of the groups

The Output dimension: only a small part of businesses fully exploits digital technologies

Countries that perform better in terms of enabling factors are also the ones adopting faster novel technologies such as big data and mobile solutions. The comparison among the five countries, for which data was available, clearly shows how MS with good enabling environments (UK, France and Germany) outperform the countries with weaker enabling environments (Spain and Italy).

However, the overall picture is not encouraging. There is still a large number of firms (around 40%) that do not use any technology associated with digital entrepreneurship (social, mobile, cloud, and big data). These firms are typically SMEs operating in sectors such as mining, construction, manufacturing, transport and storage and utilities.

At the other end of the spectrum there is the group of companies which fully leverage digital, by adopting all the four technologies: these represent a mere 2%, and are typically large firms operating in the sector of finance. Despite their potential to dramatically change the business performance, big data technologies are the least common among European businesses, big data being the greatest divide between fully digital companies and the rest.

E-commerce remains limited across the EU, although some MS outperform

On average in the EU28 MS, 13.6% of enterprises’ turnover comes from e-commerce.

Again, countries with a better enabling environment tend to have firms achieving better results in terms of e-commerce: the majority of countries above the EU28 average are those belonging to the best or good performing groups (see figure below). E-commerce is more diffused in countries with higher levels of R&D expenditure and stronger patenting activities. In addition, IT skills represent a relevant condition to boost e-commerce: firms achieving larger shares of e-commerce tend to be located in countries with formalised educational institutions for the provisions of IT skills.
ICT start-ups are fostered by a stronger entrepreneurial mindset

Unsurprisingly, the birth rate of start-ups is higher in countries with a stronger entrepreneurial mindset. However, another tendency is also clear: the results strongly depend on the initial size of the ICT sector. Apart from France, the top performers are Latvia, Poland, Lithuania, and Slovenia (which are at least 50% above the EU28 average), where the contribution of the ICT sector to the national economy is relatively limited.

Countries with an already well-established ICT sector could experience lower birth rates simply because of the reduced spare space for new ICT firms in the economy, given the relatively high number of incumbents with an important market share.

Methodological note

The structure of the scoreboard has been developed on the basis of a theoretical framework that has been gradually improved after iterated rounds of discussions with a number of stakeholders involved (including DG GROWTH, DG CONNECT, DG REGIO, EITO, Eurostat, Insead, JRC, OECD).
Digital Entrepreneurship Scoreboard 2015

The measurement framework used the most recent available data from Eurostat and other internationally recognised sources, in order to ensure the comparability and consistency of data.

Regarding the measurement of the digital transformation of businesses, we considered the adoption of four key technologies – Cloud, Mobility, Social Media and Big Data - by the firms. Data are based on the IDC 2012 European Vertical Markets' Survey, conducted in five countries (France, Germany, Italy, Spain and the UK).
List of figures

Figure 1: Overview of the general approach to the scoreboard ........................................ 15
Figure 2: Selected indicators for the framework dimensions ............................................... 16
Figure 3: Selected indicators for the output dimensions ...................................................... 17
Figure 4: Overview of the four clusters identified based on the five framework dimensions  18
Figure 5: Mapping of countries belonging to each of the groups ....................................... 20
Figure 6: Pillar I – Digital knowledge and ICT market ....................................................... 21
Figure 7: Pillar II – Digital business environment ............................................................. 22
Figure 8: Pillar III – Taxation & financial environment ...................................................... 23
Figure 9: Pillar IV – Digital skills and e-leadership ............................................................. 24
Figure 10: Pillar V – Entrepreneurial Mindset .................................................................. 25
Figure 11: Percentage of firms according to their degree of technologies adoption .......... 27
Figure 12: Percentage of firms adopting each of the four technologies ......................... 28
Figure 13: Share of enterprises’ turnover from e-commerce .............................................. 29
Figure 14: ICT Start-ups ............................................................................................... 30
Figure 15: 2010 European high technology patents per million inhabitants .................. 32
Figure 16: 2011 number of Enterprises within the IT sector in Clusters ......................... 33
Figure 17: 2010 business enterprise R&D expenditure in all NACE activities from high-tech sectors ..................................................................................................................... 34
Figure 18: 2010 ICT sector (NACE Rev. 2) value added as a percentage of GDP ............... 35
Figure 19: 2011 FDI in the reporting economy (inward) in the information and communication sector ................................................................................................................ 36
Figure 20: Pattern of convergence in direct investment as a percentage of GDP exhibited by EU 28 MS over the period 2010-2011 ......................................................... 37
Figure 21: 2011 investments of telecommunications sector (NACE Rev. 2) in networks as percentage of revenues ............................................................... 40
Figure 22: pattern of investments of telecommunications sector (NACE Rev. 2) in networks as percentage of revenues in relation to the 2010-2011 growth rate .......... 41
Figure 23: 2012 percentage of enterprises who have ERP software package to share information between different functional areas ......................................................... 42
Figure 24: pattern of percentage of enterprises who have ERP software package in relation to the 2010-2012 growth rate ................................................................. 43
Figure 25: 2012 percentage of enterprises using Customer Relationship Management to analyse information about clients for marketing purposes ......................................................... 44
Figure 26: Pattern of convergence in percentage of enterprises using Customer Relationship Management to analyse information about clients for marketing purposes exhibited by EU 28 MS over the period 2010-2012 ......................................................... 45
Figure 27: 2012 internet bandwidth .................................................................................. 46
Digital Entrepreneurship Scoreboard 2015

Figure 28: 2012 total tax rate ................................................................. 48
Figure 29: 2010 total tax rates exhibited by EU 28 MS in relation to annual growth rate over the period 2010-2012 ................................................................. 49
Figure 30: 2010 share of total persons employed that have ICT specialist skills........... 54
Figure 31: 2012 percentage of enterprises that provided training to ICT/IT specialists to develop/upgrade their ICT skills ................................................................. 55
Figure 32: 2012 percentage of enterprises that had no hard-to-fill vacancies for jobs requiring ICT specialist skills ................................................................. 56
Figure 33: Percentage of individuals who have obtained IT skills through formalised educational institution in 2011 ................................................................. 57
Figure 34: Percentage of respondents that would prefer to be self-employed if they could choose between different kinds of jobs in 2012 ................................................................. 59
Figure 35: 2012 percentage of respondents that would set up a new business or take over an existing one if they had the means to start their own business, including sufficient funding. ................................................................. 60
Figure 36: 2012 percentage of respondents that have a broadly favourable overall opinion about the entrepreneurs ................................................................. 61
Figure 37: Digital adaption rates, 2012 ................................................................. 63
Figure 38: Digital adaption rates by size of companies, 2012 ................................................................. 64
Figure 39: Percentage of companies adopting digital technologies by status of digital adaption, total market, 2012 ................................................................. 64
Figure 40: Percentage of companies adopting digital technologies by status of digital adaption, SMEs, 2012 ................................................................. 65
Figure 41: Percentage of companies adopting digital technologies by status of digital adaption, Large companies, 2012 ................................................................. 65
Figure 42: Percentage of Non-digital companies by industry sector, 2012 ................................................................. 66
Figure 43: Percentage of Digital beginners by industry sector, 2012 ................................................................. 66
Figure 44: Percentage of Digital followers by industry sector, 2012 ................................................................. 66
Figure 45: Percentage of Digital mature by industry sector, 2012 ................................................................. 67
Figure 46: Percentage of Fully Digital by industry sector, 2012 ................................................................. 67
Figure 47: Percentage of companies relying on social media for business purposes by industry sector, 2012 ................................................................. 68
Figure 48: Percentage of companies relying on social media for business purposes by company size, 2012 ................................................................. 68
Figure 49: Reasons to adopt social media, total market 2012 ................................................................. 69
Figure 50: Reasons to adopt social media, SMEs 2012 ................................................................. 69
Figure 51: Reasons to adopt social media, Large companies 2012 ................................................................. 70
Figure 52: Percentage of companies adopting public cloud by industry sector, 2012 ................................................................. 70
Digital Entrepreneurship Scoreboard 2015

Figure 53: Percentage of companies adopting public cloud by company size and type of solution, 2012
Figure 54: Percentage of companies adopting Big data technologies by industry sector,
Figure 55: Percentage of companies adopting Big data technologies by industry sector,
Figure 56: Percentage of companies adopting Mobile solutions by industry sector, 2012
Figure 57: Percentage of companies adopting Mobile applications by company size and type of application, 2012
Figure 58: 2012 share of enterprises' total turnover from e-commerce
Figure 59: Pattern of convergence in share of enterprises' total turnover from e-commerce exhibited by EU 28 MS over the period 2010-2012
Figure 60: Pattern of convergence in share of enterprises' total turnover from e-commerce exhibited by EU 28 MS over the period 2010-2012
Figure 61: 2010 information and Communication Technology Birth rate (NACE Rev. 2)
Figure 62: 2010 employment share of Information and Communication Technology enterprise (NACE Rev. 2)
### Abbreviations used

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<thead>
<tr>
<th>Acronym</th>
<th>Name</th>
<th>Acronym</th>
<th>Name</th>
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<td>Republic of Korea</td>
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<td>CH</td>
<td>Switzerland</td>
<td>JRC</td>
<td>Joint Research Centre</td>
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<td>CIP</td>
<td>Competitiveness and Innovation Framework Programme</td>
<td>LT</td>
<td>Lithuania</td>
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<td>CN</td>
<td>China</td>
<td>LU</td>
<td>Luxembourg</td>
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<td>CRM</td>
<td>Custom relationship management</td>
<td>LV</td>
<td>Latvia</td>
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<td>CY</td>
<td>Cyprus</td>
<td>ME</td>
<td>Montenegro</td>
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<td>CZ</td>
<td>Czech Republic</td>
<td>MK /FYROM</td>
<td>Former Yugoslav Republic of Macedonia</td>
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<td>DE</td>
<td>Germany</td>
<td>MT</td>
<td>Malta</td>
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<tr>
<td>DG CONNECT</td>
<td>European Commission’s Directorate-General for Communications Networks, Content &amp; Technology</td>
<td>NL</td>
<td>Netherlands</td>
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<td>DG GROWTH</td>
<td>European Commission's Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs</td>
<td>NO</td>
<td>Norway</td>
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<tr>
<td>DG REGIO</td>
<td>European Commission's Directorate-General for Regional and Urban Policy</td>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<td>Denmark</td>
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<td>EITO</td>
<td>European Information Technology Observatory</td>
<td>RO</td>
<td>Romania</td>
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<td>EL</td>
<td>Greece</td>
<td>RS</td>
<td>Serbia</td>
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<td>ERP</td>
<td>Enterprise resource planning</td>
<td>SE</td>
<td>Sweden</td>
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<td>ES</td>
<td>Spain</td>
<td>SG</td>
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<tr>
<td>EU28 MS</td>
<td>28 Member States of the European Union</td>
<td>SI</td>
<td>Slovenia</td>
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<td>FI</td>
<td>Finland</td>
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<td>HU</td>
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1. **Introduction**

1.1. **Overview of the objectives**

The Scoreboard is created to support the development of the knowledge-base on Digital Entrepreneurship. The objective of the Scoreboard is to present the degree of digitalization of enterprises, the quality of the enabling factors in EU 28 Member States and ICT start-ups performance.

The pilot Scoreboard focuses on indicators for the EU28 MS. The time coverage is 2010-2012.

The Digital Entrepreneurship Scoreboard offers a comprehensive framework for the measurement of Digital Entrepreneurship. This includes capturing the determinants of Digital Entrepreneurship as well as measuring Digital Entrepreneurship in itself\(^1\). The rationale for considering several indicators is to better synthetize the multi-faceted nature of Digital Entrepreneurship.

To date, 25 indicators have been included. The factors affecting Digital Entrepreneurship can either relate to boosters of entrepreneurial activity in a broad sense, or to specific elements that pertain more specifically to Digital Entrepreneurship. The indicators describing the performance of digital entrepreneurs are all specific to the ICT sector or to aspects directly related to Digital Entrepreneurship.

For the construction of the Digital Entrepreneurship Scoreboard, we have analysed a broad set of 118 candidate indicators. Some indicators have great potential to be included in future editions of the Scoreboard, but have not been considered for this first pilot edition due to integrity reasons.

The purpose of this report is to provide an overview of the feasibility of a “Digital Entrepreneurship Scoreboard” and to present a first version of the EU28 Members States performances.

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\(^1\) This framework reflects the structure for the measurement of entrepreneurship of the Entrepreneurship Indicators Programme as described in the report Entrepreneurship at a Glance 2013, published by the OECD.
1.2. Structure of the Digital Entrepreneurship Scoreboard

The Structure of the scoreboard has been developed on the basis of a theoretical framework that has been gradually improved after iterated rounds of discussions with a number of stakeholders involved (including DG GROWTH, DG CONNECT, DG REGIO, EITO, Eurostat, Insead, JRC, OECD). Discussions have been focusing on finding best ways of measuring digital entrepreneurship, which has been defined as follows:

"Digital entrepreneurship is about putting digital technologies at the heart of business and harnessing their power to generate value and growth, innovate and create jobs. It embraces the digital transformation of businesses from all sectors, as well as the creation of new digitally driven companies, through the use of digital technologies (social technologies, mobile, big data, and cloud solutions) to innovate and improve the performance."

The Digital Entrepreneurship Scoreboard 2015 distinguishes between 5 framework dimensions and 2 output dimensions (Figure 1)
1.2.1. The framework dimensions

The framework dimensions capture the environmental factors for digital entrepreneurship and are subdivided into five main pillars. The five pillars covering the enablers of Digital Entrepreneurship are:

- **The digital knowledge base and ICT market**, including factors supporting digital innovation and commercialisation as well as indicators of country competitiveness in the production of ICT related products also shown by the ability of investing abroad in ICT related activities;
- **Digital business environment**, describing the degree of development and use of infrastructures enabling the use of digital tools as well as determinants for an improved business environment;
- **Taxation & financial environment**, including all indicators that capture the ease of finding the necessary financial resources for entrepreneurial investments;
- **Digital skills and e-leadership**, describing the efforts of companies in hiring and training professionals in the domain of digital skills as well as the possibility of acquiring such skills through formalised educational institutions.
- **Entrepreneurial mindset**, encompassing aspects related to the entrepreneurial impetus of society.
## Framework dimensions

<table>
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<tr>
<th>Framework dimensions</th>
<th>Pillar I</th>
<th>Pillar II</th>
<th>Pillar III</th>
<th>Pillar IV</th>
<th>Pillar V</th>
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<tr>
<td>Digital knowledge base and ICT market</td>
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<td>SPECIFIC</td>
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<td>GENERIC</td>
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| European High Technology Patents per million inhabitants | | | | | |%
| Number of Enterprises in Clusters – IT sector | | | | | |%
| Business enterprise R&D expenditure in all NACE activities from high-tech sectors | | | | | |%
| ICT sector (NAE Rev. 2) value added as a % of GDP | | | | | |%
| Direct investment in the reporting economy (inward) in the Information and communication sector (sector J) (NACE Rev. 2) | | | | | |%
| Digital business environment | GENERIC | | | | |%
| Ease of Doing Business | | | | | |%
| Cost of Tax Compliance | | | | | |%
| Total Tax rate | | | | | |%
| Venture Capital Availability | | | | | |%
| Ease of Raising Money Through Local Equity Markets | | | | | |%
| Ease of raising money through loans | | | | | |%
| Taxation & Financial environment | SPECIFIC | | | | |%
| % of enterprises that have ERP software package to share information between different functional areas | | | | | |%
| Entrepreneurs mindset | GENERIC | | | | |%
| % of total persons employed that have ICT specialist skills | | | | | |%
| % of enterprises that provided training to ICT/IT specialists to develop/upgrade their ICT skills | | | | | |%
| % of enterprises that had no hard-to-fill vacancies for jobs requiring ICT specialist skills | | | | | |%
| % of individuals who have obtained IT skills through formalised educational institution (school, college, university, etc.) | | | | | |%
| % of respondents that would prefer to be self-employed if they could choose between different kinds of jobs | | | | | |%
| % of respondents that would set up a new business or take over an existing one if they had the means to start their own business, including sufficient funding | | | | | |%
| % of respondents that have a broadly favorable overall opinion about the Entrepreneurs | | | | | |%

**Figure 2: Selected indicators for the framework dimensions**
1.2.2. Output dimensions

The two output dimensions identify and quantify digital entrepreneurs in Europe. These 2 dimensions consist of the following:

- **Digital transformation**, capturing the firms that are adopting/using four novel digital technologies – Cloud, Mobility, Social Media and Big Data - as well as the share of firms’ turnover deriving from e-commerce;
- **Digital start-ups**, describing the birth rate and employment shares of digital start-ups.

**Figure 3: Selected indicators for the output dimensions**

<table>
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<tr>
<th>Output dimensions</th>
<th>DIMENSION I: DIGITAL TRANSFORMATION</th>
<th>DIMENSION II: ICT START-UPS</th>
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<td>Digital penetration rates (measured as % of companies falling in the following different clusters):</td>
<td>Information and Communication Technology Birth Rate</td>
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<td>Share of Non Digital companies among all companies (incl. Government and healthcare sectors)</td>
<td>Employment share of Information and Communication Technology enterprise</td>
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<td>Share of Digital Beginners among all companies (incl. Government and healthcare sectors)</td>
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<td>Share of Digital Followers among all companies ((incl. Government and healthcare sectors)</td>
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<td>Share of Digital Mature among all companies ((incl. Government and healthcare sectors)</td>
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<td>Share of Fully Digital among all companies ((incl. Government and healthcare sectors)</td>
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<td>Within companies that adopted several digital solutions, combinations of solutions adopted by the different companies’ clusters</td>
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<tr>
<td></td>
<td>Percentage of companies adopting cloud solutions</td>
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<td>Percentage of companies adopting enterprise applications (CRM+ERP)</td>
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<td>Percentage of companies adopting other solutions in the public cloud</td>
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<td>Percentage of companies relying on social media for business purpose</td>
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<td>Percentage of each of the 10 reasons that were given by the companies for adopting social media</td>
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<td>Percentage of companies adopting Big Data</td>
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<td>Percentage of companies adopting mobile solutions</td>
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<td>Percentage of companies adopting mobile solutions for external usage</td>
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<td></td>
<td>Percentage of companies adopting mobile applications for internal usage</td>
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<td></td>
<td>Percentage of turnover from e-commerce</td>
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2. Digital entrepreneurship in the Member States

2.1. The framework conditions for digital entrepreneurship

Four types of enabling environments are identified as a result of a hierarchical cluster analysis conducted on the five composite indicators representing the framework components. The countries within each of the four groups exhibit similar levels of development and/or comparable strengths and weaknesses across the five dimensions. Figure 4 provides at quick glance the characterisation for each of the clusters in a comparative perspective.

Figure 4: Overview of the four clusters identified based on the five framework dimensions
The analysis clearly detects the presence of four groups, whose general characteristics are:

The **Best enabling environment** is performing far better than all the other groups in all the enabling dimensions with the exception of entrepreneurial mindset. Countries belonging to this cluster seem to have been able to prompt a virtuous circle. The high levels of R&D expenditure prompt a continuous innovation process as witnessed by the sound level of patenting activities. This coupled with the access to appropriate financial instruments and the provision of highly specialized training, has a direct impact on firms performance. The good achievements represent the main engine for reiterating the circle, with the high return on R&D investment attracting fresh resources also from foreign investors.

The **Good enabling environment** including countries with a relatively good ease of doing business and access to the appropriate technological infrastructure tend to lag behind in digital knowledge base and ICT market as well as in the provision of appropriate digital skills and access to sound financial resources. The good knowledge base does not always correspond to innovation accessible to firms’ employees on a day-to-day basis, hindering the direct impact that new digital tools could have on the performance of firms. This softens the return of R&D investment and makes it more challenging for innovative companies to access fresh financial resources.

The **Moderate enabling environment 1** exhibits the lowest scores for all the dimensions partially offset by a strong propensity to become entrepreneurs as witnessed by the entrepreneurial mindset where this group has the highest average score. The relative backwardness in the innovation knowledge base and the sometimes unsurmountable difficulty of accessing finance represent two major restraints for filling the gap with respect to better performing countries.

The **Moderate enabling environment 2** is relatively stronger than the other moderate environment in digital skills and e-leadership and taxation & financial environment, for which it has scores in line with the good enabling environment. The relatively small size in terms of extension and population of these countries could lower fixed costs to improve their knowledge base and to render their environment more business friendly. The return on initial investments could be possibly magnified by the already available set of skills and relatively good taxation & financial environment.

Figure 5 displays the distribution of the EU28 MS across the four groups identified.
There is a correspondence between the way countries are grouped and their geographical location. Best performers countries are the Nordic Countries - Denmark, Finland and Sweden. The good enabling environment is concentrated in Northern and Central Europe - including the UK, Ireland, Luxembourg, the Netherlands, Belgium, France, Germany, Austria. The only country representing an exception in terms of its geographical location is Cyprus. The first moderate environment includes peripheral MS – Italy, Spain, Portugal, countries in the Balkans, such as Croatia, Greece, Bulgaria and Romania and some part of the Eastern European countries such as Poland, Lithuania and Latvia. The Moderate Environment 2 includes relatively small countries such as Malta, the Central Eastern group of small countries including Hungary, Czech Republic, Slovakia and Slovenia. Estonia also belongs to this group.

**Digital knowledge base and ICT market**

Pillar I is designed to capture the investment of government and/or the private sector to support knowledge creation and the performance of digital firms as an engine for diffusion and commercialization of new products.

Figure 6 shows the 2010-2012 average performance for the EU28 MS. The digital knowledge base represents one of the enablers where best performing countries have markedly higher scores with respect to all the other of the EU28. These results should be interpreted in light of the higher investments in R&D, which in turn explain the elevated number of patents per capita exhibited by the countries belonging to this group. Leaders tend to have a large share of the ICT sector on the overall economy and good levels of foreign direct investments (FDI).

It is interesting to note that the distribution of countries tend to closely follow the ordering of the four clusters of countries. Even though there is a great divide between the best and the other environments in terms of innovation, countries belonging to other groups tend to exhibit some advantages for some individual indicators. For example the UK is the country that attracts the highest level of inward FDI per capita, followed by the Netherlands, Spain and France. Poland and Italy are the first countries for the number of IT firms operating in clusters, followed by Sweden, the Netherlands and Germany.
Figure 6: Pillar I – Digital knowledge and ICT market

Note: Pillar I performance is measured using the 2010-2012 average score of a composite indicator based on five standardised indicators ranging from 0 to 1. The five indicators are: European high technology patents per million inhabitants, number of enterprises within the IT sector in clusters, business enterprise R&D expenditure in all NACE activities from high-tech sectors, ICT sector value added as a percentage of GDP and FDI in the reporting economy (inward) in the Information and communication sector. The EU28 MS average is indicated in black.

Digital business environment

Pillar II measures the digital infrastructure capabilities as well as the regulatory framework in its role to ease business and business development. This pillar focuses on the quality of connection infrastructures, the diffusion of integrated technologies supporting business processes and the perception of the business environment by entrepreneurs.

Figure 7 shows the 2010-2012 average performance results for the EU28 MS. Best and good performers are characterised by healthier business environments as captured by their higher scores in the ease of doing business. An additional factor characterising improved digital business environments is the more frequent adoption of ERP and CRM technologies by firms. Countries belonging to different groups tend not to differentiate themselves in terms of share of investment of the telecommunication sector in networks. In general, best performers have a much wider internet bandwidth infrastructure.

In general the performance of countries tends to follow the trends identified through the cluster analysis, with the majority of countries belonging to the best and good performing environments positioning themselves over the EU average and moderate enabling environments below it. Cyprus and the UK tend to have scores below the average of better performing environments due to the fact that the indicator on ERP and CRM does not include the financial sector, which is particularly prominent in these countries. With respect to other moderate environments, Portugal has a high-quality digital business environment with fairly high investments in telecommunication networks, a good internet infrastructure and a high share of companies adopting ERP technologies.
Note: Pillar II performance is measured using the 2010-2012 average score of a composite indicator based on six standardized indicators ranging from 0 to 1. The six indicators are: ease of doing business, investments of telecommunications sector in networks as percentage of revenues, percentage of enterprises who have ERP software package to share information between different functional areas, percentage of enterprises using Customer Relationship Management to analyse information about clients for marketing purposes, internet bandwidth and share of enterprises' total turnover from e-commerce. The EU28 MS average is indicated in black.
Taxation & financial environment

Pillar III measures the availability of financial resources through three channels – venture capital; equity markets and loans, as well as the fiscal environment for entrepreneurship and the cost borne by entrepreneurs to comply with local regulations.

Figure 8 shows the 2010-2012 average performance results for the EU28 MS. Countries exhibiting higher scores under this pillar, tend to have an efficient and fair fiscal system, with lower efforts required to be tax compliant and a lighter weight of taxes on commercial profits. The better fiscal environment is often coupled by an easier access to finance through all channels.

The overall distribution of countries is once again in line with the clusters identified. The good and best enabling countries tend to perform better than the EU28 average. Sweden, Finland and Luxembourg perform noticeably better than the EU28 average. Italy and Hungary have the bottom performances with scores below half the EU28 average. The poor performance of these two countries is due to the long time required to prepare, file and pay taxes on corporate income coupled with the relatively high tax rate, as well as the exacerbated condition in accessing financial resources. Malta tends to have higher scores with respect to the moderate group due to the good ease of accessing finance through the stock markets and through loans. Estonia tends also to stand out of the moderate environments, given the relatively light procedures to be tax compliant.

Figure 8: Pillar III – Taxation & financial environment

Note: Pillar performance is measured using the 2010-2012 average score of a composite indicator based on five standardized indicators ranging from 0 to 1. The five indicators are: cost of tax compliance, total tax rate, venture capital availability, ease of raising money through local equity markets and ease of access to loans. The EU28 MS average is indicated in black.
Digital Entrepreneurship Scoreboard 2015

Digital skills and e-leadership

Pillar IV allows to compare the development of digital skills realised through education and training. More specifically, it is designed to capture the distribution of ICT specialist skills, the degree of difficulty of companies in hiring ICT/IT specialists, the efforts of companies in training professionals in the domain of digital skills and the availability of professionals who have obtained IT skills through formalized educational institutions.

Figure 9 shows the 2010-2012 average performance results for the EU28 MS. ICT specialist skills appears to be the main variable driving these results, with best performers scoring markedly higher in this indicator.

For this pillar there is a clear distinction between the two moderate environments with the Moderate environment 2 performing markedly better than the moderate enabling environment 1. Best and good performers are the groups better at developing these skills with France lagging behind among good performers. Sweden, Denmark, the United Kingdom, Luxembourg and Finland performed noticeably better than the EU28 average (i.e. around 70% above the EU28 average). Within the moderate enabling environment 1, Romania and Italy experienced the bottom performances with scores around a quarter of the EU28 average.

Figure 9: Pillar IV – Digital skills and e-leadership

Note: Pillar performance is measured using the 2010-2012 average score of a composite indicator based on four standardized indicators ranging from 0 to 1. The four indicators are: the percentage of total persons employed that have ICT specialist skills, the percentage of enterprises that provided training to ICT/IT specialists to develop/upgrade their ICT skills, the percentage of enterprises that had no hard-to-fill vacancies for jobs requiring ICT specialist skills and the percentage of individuals who have obtained IT skills through formalised educational institution (school, college, university, etc.). The EU28 MS average is indicated in black.
Entrepreneurial mindset

Pillar V compares the EU28 MS entrepreneurial mindset. More specifically, it is designed to capture the desirability of being an entrepreneur, the perception people have about entrepreneurs and the extent to which individuals are ready to start their own business.

Figure 10 shows the 2010-2012 average performance results for the EU28 MS. In contrast to the other dimensions, countries with higher scores in this pillar belong to the moderate enabling environment 1. The second group of moderate performers is the one with the lowest propensity to be entrepreneurs. Sweden exhibits a feeble performance, similar to countries in the moderate enabling environment 2.

Figure 10: Pillar V – Entrepreneurial Mindset

Note: Pillar performance is measured using the 2010-2012 average score of a composite indicator based on three standardized indicators ranging from 0 to 1. The three indicators are: the percentage of respondents that would prefer to be self-employed if they could choose between different kinds of jobs, the percentage of respondents that would set up a new business or take over an existing one if they had the means to start their own business, including sufficient funding and the percentage of respondents that have a broadly favourable overall opinion about the entrepreneurs. The EU28 MS average is indicated in black.
2.2. The output dimensions of digital entrepreneurship

Digital transformation

To measure digital transformation we consider the adoption of novel technologies – Cloud, Mobility, Social Media and Big Data - by the firms, as well as the share of turnover directly deriving from the e-commerce.

Fully digital companies (or companies relying on all four technologies) represent just a small share of total companies in the 5 countries investigated, ranging from 1.2% in Italy to 2.6% in the UK. In most of countries, digital beginners (or companies relying just on one technology) account for the largest share of the market. In general, there is a positive correlation between the company size and the adoption of novel technologies (Figure 11). The larger the company, the higher the reliance on all four digital technologies. 20-30% of larger companies - depending on country - adopt three or four of the technologies, compared with only 4-11% of smaller companies. Indeed, up to 16% and 19% of large companies (>250 employees) in Germany and the UK are fully digital, while 52% of Italian SMEs (10-249 employees) have yet to start their digital journey (non-digital companies).
Similarly, industries dominated by large companies show a stronger digitalization. Digital mature (companies relying on three technologies) and fully digital companies are more likely to operate in finance, utilities, information and communications (particularly in the telecom and IT industries) and oil & gas upstream (within the mining industry). Non-digital companies prevail in construction and mining.

Familiar digital technologies such as Social Media, Mobility and Cloud have greater adoption rates than Big Data. Larger organisations show a greater adoption rate of the more difficult technology of Big Data. These organisations have sufficient infrastructure they can afford a specific IT role to focus on implementing Big Data sources and processes. In IDC’s opinion there will be an understanding gap for smaller companies and the benefits that can be associated with Big Data. Big Data can be defined by the four V’s: Volume, Variety, Velocity, and Value. Larger organisations are more likely to have the infrastructure in place to manage at least volume and velocity.

Cloud, Mobility and Social Media could be considered easier technologies to adopt as each of these is well established and understood among consumers through their personal use of mobile phones, personal tablets, Facebook and Twitter. Managers and decision makers in smaller organisations are also consumers so are likely to be less resistant to adopting these as technologies compared with Big Data.

The value of adoption of these technologies comes from the competitive advantage offered, improved efficiency, and increased access to customers. In the short to medium term the advantage will be for those organisations that implement these technologies. In the medium to longer term organisations are likely to be disadvantaged if they fail to use these technologies as each or several become the preferred way of conducting business among their customers. Those customers will choose companies with whom it is easier to conduct business.

Among the companies surveyed that adopted one or more of the technologies, they expect to see the specific benefits from each digital technology they embrace. The benefits of adoption for social media include: give customers increased awareness of the company and its products, easier management of customer relationships, identification of prospects or partners and gathering ideas and customer feedback. In the case of Big Data they expect to access large a volume of data, a wider range of data sources to understand customer wants and behaviour and speed of response to customer trend changes. For Cloud, the benefits expected include: Effective and efficient use of application and storage technology, standardisation of technology and processes and easily expandable resource. And in the case of Mobile, the companies surveyed expected flexibility of work, greater availability of resources and improved efficiency and effectiveness.

When analysing the results by country, we note that Italy shows different adoption behaviour to the other countries surveyed. There is little difference between the countries in adoption of

<table>
<thead>
<tr>
<th></th>
<th>Non digital</th>
<th>Digital Beginners</th>
<th>Digital Followers</th>
<th>Digital Mature</th>
<th>Fully Digital</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>26.8%</td>
<td>38.8%</td>
<td>23.7%</td>
<td>8.0%</td>
<td>2.6%</td>
</tr>
<tr>
<td>France</td>
<td>28.7%</td>
<td>36.9%</td>
<td>25.9%</td>
<td>6.1%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Germany</td>
<td>31.5%</td>
<td>41.3%</td>
<td>21.1%</td>
<td>4.2%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Italy</td>
<td>52.3%</td>
<td>28.7%</td>
<td>14.4%</td>
<td>3.3%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Spain</td>
<td>28.6%</td>
<td>41.6%</td>
<td>25.6%</td>
<td>3.0%</td>
<td>1.2%</td>
</tr>
</tbody>
</table>
Digital Entrepreneurship Scoreboard 2015

Social Media, Cloud, and Mobile – with France, Germany, Spain and the UK having similar levels of between 29% and 36% of companies adopting Social Media, 27%-31% adopting Public Cloud, and 27%-38% adopting Mobile solutions. However, there are two notable exceptions: Italy has notably lower adoption of Cloud and Mobile, and Big Data adoption is much lower among all the countries, especially Italy.

Italy has a greater share of its companies in the smaller size bands, and this could explain the different adoption behaviour. France, Germany and the UK have 96.1% to 96.4% of companies in the 10-249 employees size band, while Italy has 98.1%. Within this band Italy has 94.7% in the 10-99 employee size band compared with 89-91% for France, Germany, and the UK. This suggests company size matters, but larger companies in Italy also show lower adoption of each of the technologies when compared with similar size bands for France, Germany and the UK. It is therefore more likely that Italy’s adoption behaviour is more related to the types of industry segment that dominate Italian employment. Spain is a little better than Italy when comparing larger companies, but is comparable to the others when comparing smaller companies. Spain also has a greater share of smaller companies in its economy, but not as great as Italy.

The UK stands out in terms of digital maturity, having the highest adoption of Cloud, Big Data and Mobile. Italy lags behind; if more than one third of Italian companies rely on social tools for business purposes, just some 4% have already deployed Big Data technologies.

There is a close correspondence between the enabling technologies and digital transformation, the UK has the highest percentage of fully digital companies followed by France and Germany (all good performers) and Italy and Spain (moderate enabling environments). The great divider is created by the adoption of Big Data technologies and Mobile solutions, for which improved environments exhibit higher share of companies using these technologies (Figure 12).

Figure 12: Percentage of firms adopting each of the four technologies

<table>
<thead>
<tr>
<th></th>
<th>Social</th>
<th>Cloud</th>
<th>Big Data Technologies</th>
<th>Mobile Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>34.4%</td>
<td>31.0%</td>
<td>14.3%</td>
<td>37.9%</td>
</tr>
<tr>
<td>France</td>
<td>35.2%</td>
<td>29.4%</td>
<td>9.5%</td>
<td>33.4%</td>
</tr>
<tr>
<td>Germany</td>
<td>29.4%</td>
<td>26.7%</td>
<td>6.1%</td>
<td>34.4%</td>
</tr>
<tr>
<td>Italy</td>
<td>31.3%</td>
<td>16.7%</td>
<td>4.7%</td>
<td>17.9%</td>
</tr>
<tr>
<td>Spain</td>
<td>36.4%</td>
<td>29.4%</td>
<td>4.3%</td>
<td>27.1%</td>
</tr>
</tbody>
</table>

On average countries with a better enabling environment tend to have firms achieving better results in terms of e-commerce – the majority of countries above the EU28 average are those belonging to the best or good performing groups (Figure 13). Firms achieving larger shares of e-commerce on their turnovers, tend to hire more professionals with IT specialist skills or provide training for IT specialists in the firm. Such firms tend to be located in countries with formalised educational institutions for the provisions of IT skills. E-commerce is more diffused in countries with higher levels of R&D expenditure and stronger patenting activities.
**Digital start-ups**

The digital start-ups pillar allows us to analyse the birth of new enterprises in the ICT sector and the size of the ICT sector.

Figure 14 shows the 2010-2012 average performance of ICT start-ups in the EU28 MS. The number of ICT start-ups seems to be very related to the enabling factor of Entrepreneurial mindset, where the first group of moderate performers scores relatively high. This tendency is confirmed as well by the good performers that exhibit a relatively low number of start-ups with the exception of France and the Netherlands. Denmark is the country in the best performers group with the highest birth rate of firms in the ICT sector. This indicator should be put in relation with the initial size of the ICT sector to have a better understanding of results. Countries with an already established ICT sector could experience lower birth rates simply because of the reduced spare space for new ICT firms in the economy, given the relatively high number of incumbents with an important market share. Higher birth rates could be symptomatic of a higher turnover of companies within the economy.

In this case the ranking of countries does not relate to the groupings identified through the clusters' analysis. Latvia, Poland, Lithuania, France and Slovenia are the top performers among EU28 MS (i.e. at least 50% above the EU28 average). The United Kingdom performed just below the EU28 average. Slovakia and Croatia perform slightly better than the EU28 average. The bottom performers (i.e. 25% below the EU28 average) are in descending order Italy, Belgium, Austria and Ireland.
Figure 14: ICT Start-ups

Note: Dimension performance is measured using the 2010-2012 average score of a composite indicator based on two standardized indicators ranging from 0 to 1. The two indicators are: the Information and communication technology birth rate and the employment share of information and communication technology enterprises births. The EU28 MS average is indicated in black.
3. Indicator by indicator analysis

In this part of the report we present the data underlying each of the composite indicators discussed in the previous part of the report.

3.1. Framework dimensions

3.1.1. Pillar I: Digital knowledge base and ICT market

Pillar I to compares the state-of-the-art of framework conditions across MS in relation to the ICT sector as well as digital innovation and commercialisation. More specifically, it is designed to capture the following elements:

- The initiatives of government and/or private sector in supporting creation and development of new companies;
- The support brought to knowledge diffusion and exchange necessary for digital innovation;
- The performance of the ICT sector as an engine for diffusion and commercialisation;
- The degree of attractiveness of the national ICT sector for foreign investors.
**Digital Entrepreneurship Scoreboard 2015**

**Indicator 1: European high technology patents per million inhabitants**

The number of high technology patent applications per million inhabitants follows the International Patent Classification (IPC) and covers innovations in the subsequent technical fields: computer and automated business equipment, micro-organism and genetic engineering, aviation, communications technology, semi-conductors and lasers. The number of patents divided by the population measures the innovative intensity of a country and is used to proxy the knowledge creation performance of a country.

This indicator was standardized by the population to avoid country-size effects. Figure 15 shows the 2010 performance results for the EU 28 Member States. The following observations can be made:

- The best and good enabling countries perform better than the EU28 average while the two categories of moderate enabling countries perform lower than the EU28 average and are intermingled.
- Sweden is the top performer with a number of high-tech patent applications per-capita around 2.8 times the EU28 average. Finland, Germany, France and Denmark follow.
- United Kingdom and Ireland have a number of high-tech patent applications per inhabitants just below the EU28 average while Cyprus is clearly below the other good enabling environments.
- The performance of the other countries below the average is very heterogeneous, ranging from Italy performing 2.8 times below the EU28 average to Romania with a performance 67 times below the EU28 average.

The numbers of patents has exhibited a decreasing trend across the EU28 since 2007. This is not necessarily due to a decreasing R&D activity but rather to the increasing length of the procedures to register patents².

**Figure 15: 2010 European high technology patents per million inhabitants**

![Graph showing European high technology patents per million inhabitants](image_url)


Data limitation: data for Bulgaria, Latvia and Malta is not available. Eurostat indicates the 2010 values as provisional.

**Indicator 2: Number of enterprises within the IT sector in clusters**

The number of enterprises within the IT sector in clusters is sourced from the European Cluster Observatory by combining two dimensions - geography and industry. Clusters are defined as geographically proximate groups of interconnected companies and associated institutions in a

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particular field, linked by commonalities and complementarities. The number of IT companies in clusters is used as a proxy for the degree of knowledge spillovers and interconnections of companies within the IT sector.

This indicator was standardised by the population for the sake of the Scoreboard.

Figure 16 shows the 2011 number of enterprises within the IT sector in clusters in the EU 28 MS. The following comments can be made:

- The clusters are pretty mixed except the second category of moderate enabling countries (in green) that do clearly perform below the EU average.
- The countries with the highest scores also have the greatest surface extensions. The larger geographical distances could render more difficult the sharing knowledge across firms.
- Even if Poland did not have any official cluster policy until 2011, the European Secretariat for Cluster Analysis (ESCA) currently counts 7 ICT clusters in Poland. This is the third highest number of ICT clusters in the EU28 after Germany and Spain.
- Italy has the giant “Torino Wireless” ICT cluster. The Torino Wireless Foundation (TOWL) coordinates, develops and promotes the Piedmont Technology District, the ICT Innovation Cluster (Polo di innovazione ICT), the National Technological Cluster for Smart Communities and also acts as an official EC partner for R&D, collaborative and exploitation projects.
- Sweden has four diverse ICT clusters among which Europe’s biggest one: the Kista Science City and the Cluster 55° linking Danish and Swedish ICT actors.

Figure 16: 2011 number of Enterprises within the IT sector in Clusters

Source: European Cluster Observatory database (http://www.clusterobservatory.eu)
Data limitation: data for Greece, Hungary and the United Kingdom is not available.

Indicator 3: Business enterprise R&D expenditure in all NACE activities from high-tech sectors

Business enterprise R&D expenditure in all NACE activities from high-tech sectors in the EU28 MS captures the effort of firms in the creation of new products and processes within firms. This is particularly important in the science-based sectors (pharmaceuticals, chemicals and some areas of electronics). Figure 17 summarises the distribution of R&D expenditure of firms across the EU28 MS in 2010:

3 European Cluster Observatory
4 http://www.cluster-analysis.org/benchmarked-clusters/?industry=ICT
Digital Entrepreneurship Scoreboard 2015

- The distribution of R&D expenditure is highly concentrated. Five countries are accountable for around 75% of the European business R&D in high-tech sectors. Germany alone accounts for almost one third of the EU28 business R&D in high-tech sectors.

- Germany exceeds the EU28 average by more than 2.5 times. 15 countries have business R&D in high-tech sector levels below one tenth of the EU28 average. These countries are – expenditure by ascending level of R&D – Cyprus, Malta, Latvia, Lithuania, Bulgaria, Estonia, Croatia, Slovakia, Romania, Luxembourg, Slovenia, Hungary, Poland, Portugal and the Czech Republic.

- When compared to national GDP, high-tech sectors from best enabling countries invest much more in R&D (~2.3% of GDP) than other EU countries, followed by the good enabling environments (~1.2% of GDP), the second category of moderate enabling environment (0.5% of GDP) and the first category of moderate enabling environment (0.1% of GDP).

Figure 17: 2010 business enterprise R&D expenditure in all NACE activities from high-tech sectors

Data limitation: data for Greece is not available.

Indicator 4: ICT sector (NACE Rev. 2) value added as a percentage of GDP

The ICT sector value added as a percentage of GDP is defined as gross value added (at basic prices) minus other taxes less other subsidies on production. The ICT sector is defined by Eurostat as a group of activities defined according to the NACE rev. 2 classification. This indicator is used as a proxy for the dimension of the ICT sector within the economy.

Figure 18 presents the ranking of countries according to the size of the ICT sector GDP within their economies. The following observations can be made:

- The best and second category of moderate enabling countries (in green) perform better than the EU28 average while the first category of moderate enabling countries (in blue) perform below EU28 average, with the exceptions of Slovenia relatively low and Bulgaria particularly high. The good enabling countries perform around the EU average and are intermingled with the other clusters.

- Sweden, the UK and Hungary have the largest ICT sector shares of GDP among the 28 EU Member States. This proportion is around 6% for these countries, well above the EU28 average of 4.3% while Germany and France stand just below the EU28 average.

- Portugal, Slovenia, Spain, Latvia, Poland, Romania and Austria have an ICT sector accounting for between 3% and 4% of their national GDP. The Lithuanian ICT sector accounts for less than 3% of the GDP.
Indicator 5: Direct investment in the reporting economy (inward) in the information and communication sector

The foreign direct investments (FDI) in the reporting economy (inward) in the information and communication sector are the investments made by foreigners in enterprises in the information and communication sector (sector J following NACE Rev. 2 classification) that are resident in the reporting economy in order to acquire a lasting interest (at least 10% of the voting power). The notion considered in the context of this indicator is the FDI position (or stock) which denotes the value of the investment at the end of the period\(^5\).

The information and communication sector is used to proxy the ICT sector as it constitutes its main component. At the European level, the information and communication (sector J following NACE Rev. 2 classification) FDI amounts to around 60% of the EU ICT foreign direct investments\(^6\). This indicator is used as a proxy for country ICT sector attractiveness. This indicator was standardised by the gross domestic product (GDP) to avoid country-size effects.

Figure 19 provides an overview of the inward FDI performances in 2011:

- The best and second category of moderate enabling countries (in green) perform below the EU28 average. The two other clusters perform around EU28 average and are pretty intermingled.
- On average, the EU Member States received just below 15,000 M€ of FDI from the rest of the world in the information and communication sector. This amount represents 1.3% of their GDP on average.
- Spain, the Netherlands and France inward FDI exceeded 20,000 M€ with Spain attracting up to 26,550 M€;
- Malta is the only country with a negative inward FDI position (-45 M€). This happens when the loans from the direct investment enterprise to the parent exceed the loans – or even the original capital – given by the parent to the direct investment enterprise. It could be the case where conduits or treasury companies are involved\(^7\).

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7 Eurostat, [http://www.oecd.org/daf/inv/investmentstatisticsandanalysis/fdistatisticsanddata-frequentlyaskedquestions.htm#Q2](http://www.oecd.org/daf/inv/investmentstatisticsandanalysis/fdistatisticsanddata-frequentlyaskedquestions.htm#Q2)
Figure 19: 2011 FDI in the reporting economy (inward) in the information and communication sector

Data limitations: cf. Figure 20

Figure 20 shows the relation between the 2010 inward FDI national positions as a percentage of GDP and their growth rates between 2010 and 2011. The following observations can be made:

- The three best enabling countries are located in the bottom right quarter of the graph, having a high inward FDI position compared to the GDP but low growth rates. The other clusters are located in the bottom left quarter, having low inward FDI shares and low growth rates. The exceptions are Belgium and Portugal that are attracting a lower level of FDI compared to their GDP but have a high growth rate. Bulgaria is outstanding as well, positioned on the graph among best enabling environments;
- For all countries except Belgium, Portugal and Denmark, growth rates are negative – the majority of EU28 MS experienced a contraction in capital flows from foreign investors between 2010 and 2011;
- A phenomenon of convergence occurred between 2010 and 2011 as countries with highest FDI positions tend to have lower growth rates (cf. trend line). This tendency is particularly evident in the Netherlands where the share of ICT FDI in GDP dropped by 27% as this ratio went from 4.4% to 3.2% between 2010 and 2011. The convergence pattern across EU28 MS is also supported by the decreasing value of the standard deviation of EU national inward FDI between 2010 and 2011.
Figure 20: Pattern of convergence in direct investment as a percentage of GDP exhibited by EU 28 MS over the period 2010-2011


Data limitations for FDI data (Figure 19 and Figure 20): Data for Greece, Luxembourg and the UK are not available.

Austria: National data are without investments made or received by Special Purpose Entities and with geographical allocation according to the Ultimate Beneficial Owner.

Hungary and Cyprus: Investments made or received by Special Purpose Entities are excluded in the national FDI data.

The Netherlands: Investments made or received by Special Purpose Entities are not included in the national data. The contribution of the Netherlands to the EU aggregates is subject to substantial upward revisions since 2009 due to a regular benchmark update of the Dutch resident Special Purpose Entities population.

Moreover, national compilation methods are still undergoing changes with the aim to enhance harmonization or implement methodological developments.

National compilation methodologies have been undergoing changes (geared towards further harmonisation with other EU Member States) throughout the period for which data are available. The extent of breaks in national series depends on the extent of revisions undertaken by each country in response to such changes.
3.1.2. Pillar II: Digital business environment

Pillar II measures the digital infrastructure capabilities as well as the regulatory framework in its role to ease business and business development. More in particular this pillar focuses on:

- The quality of connection infrastructures;
- The diffusion of integrated technologies supporting various company processes;
- The perception of the business environment for entrepreneurs.

Indicator 1: Ease of doing business

Ease of doing business ranks economies from 1 to 189, with the first place being the best environment. A high ranking (a low numerical rank) means the regulatory environment is more conducive to the starting and operation of a local firm. The index averages the country’s percentile rankings on 10 topics covered in the World Bank’s Doing Business. The 10 topics taken into consideration are: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency. The ranking in each topic is the simple average of the percentile rankings in its component indicators.

Table 1 displays the ease of doing business ranking positions of EU28 MS. The following observations can be made:

- The best and good enabling countries perform better than the EU28 average, with the exceptions of Luxembourg and Cyprus. The best enabling countries perform above most of the good enabling countries. Finland and Cyprus are the only best and good enabling environments that have a positive growth rate. Most of the moderate enabling countries perform below the EU average and the two categories are rather intermingled;
- Denmark, the UK, Finland, Sweden and Ireland occupy the highest positions;
- The four countries above Denmark are Singapore, Hong Kong SAR, New Zealand and the United States;
- Romania, Italy, Greece, Croatia and Malta are the EU28 countries with the lowest positions;
- The calculation of a weighted (by the population) EU28 average gives a ranking of 39. The countries that are the closest to this average are Cyprus (36) and Spain (44);
- Half of the EU28 MS with the lowest scores (right part of the table) are exhibiting an improvement of their rank between 2010 and 2012. This means that these countries are catching up with the rest of the EU;
- Four countries experienced important changes in their ranking between 2010 and 2012: Greece, Cyprus and Italy considerably improved whereas Luxembourg considerably worsened its position.

http://data.worldbank.org/indicator/IC.BUS.EASE.XQ?page=1
### Table 1: 2010-2012 ease of doing business

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<td>Malta</td>
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</table>

**EU28 average 39 →**

Data limitations: No data available for Malta in 2010.
Indicator 2: Investments of telecommunications sector (NACE Rev. 2) in networks as percentage of revenues

This indicator includes tangible and intangible investments of telecommunication operators in telecommunication networks rescaled by the revenue of companies. This indicator is used as a proxy for the ICT sector level of investment in network infrastructures.

Figure 21 displays the level of investments of EU28 MS telecommunications sector in networks. The following observations can be made:

- The best and the first category of moderate enabling countries (in blue) perform higher than the EU28 average, with the exceptions of Sweden and Spain. The other clusters are pretty intermingled around the average;
- On average, EU28 MS telecommunication sectors invest 13.1% of their revenues in networks;
- Bulgaria, Luxembourg and Denmark have levels of investment in networks exceeding 20%;
- Slovenia is the only country with an investment level in networks under 10% (with a score of 9.8%).

Figure 21: 2011 investments of telecommunications sector (NACE Rev. 2) in networks as percentage of revenues

![Graph showing investment levels across EU28 MS](http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/database)


Data limitations: Data not available for Croatia

Figure 22 shows the relation between the 2010 levels of investments of the telecommunications sector in networks and their growth rates between 2010 and 2011. The following observations can be made:

- The clusters are very intermingled. No clear trend per clusters can be distinguished.
- In general, a phenomenon of convergence occurred between 2010 and 2011 as countries with the highest levels of investments in 2010 tend to have lower growth rates (cf. trend line). The convergence pattern across EU28 MS is also supported by the decreasing value of the standard deviation of EU telecommunication sector investments in networks between 2010 and 2011;
- The Czech Republic, Luxembourg and Lithuania had an annual growth rate in their investment level of at least 20% between 2010 and 2011. This improved significantly their relative position in 2011 compared to other EU28 MS (cf. Figure 21);
- Slovenia, Austria and Hungary had an annual growth rate lower than -20% between 2010 and 2011. This huge drop in relative investments led to their low relative position in 2011 compared to other EU28 MS (cf. Figure 21);
The UK, Germany, Ireland and Spain had a relatively low level of investment in 2010 and they experienced a relatively slow growth rate.

Figure 22: pattern of investments of telecommunications sector (NACE Rev. 2) in networks as percentage of revenues in relation to the 2010–2011 growth rate

Data limitations: Data not available for Croatia

Indicator 3: Percentage of enterprises who have ERP software package to share information between different functional areas

The percentage of firms that make use of enterprise resource planning (ERP) software packages to share information between different functional areas is an indicator based on a survey conducted by Eurostat on ICT usage and e-commerce in enterprises with 10 or more employees. ERP solutions are a bundle of integrated business management applications. They provide the backbone and operational applications making big organizations more efficient in achieving their goals. In the context of this Scoreboard, ERP are considered as an enabling tool supporting a more efficient use of the four digital technologies: Cloud, Mobile, Social Media and Big Data. In this regard, this indicator is used as a proxy for the diffusion of integrated technologies supporting the company’s internal processes.

Figure 23 presents the 2012 percentage of enterprises that have ERP software packages to share information between different functional areas. The following observations can be made:

- The best enabling countries perform higher than the EU28 average. The three other clusters are distributed around the EU28 average and are intermingled;
- On average, 22% of EU28 MS companies installed an ERP system inside their organisation. The EU28 MS can be classified into three ERP adoption groups: around the EU28 average, largely above and performing significantly below the EU28 average;
- Sweden, Finland, France, Denmark, Belgium and Portugal have all ERP usage rates above 30%, whereas Hungary, the UK, Estonia, Latvia and Poland all have ERP adoption rates below 15%. The remaining EU28 MS have ERP adoption rates around the EU average.

Figure 23: 2012 percentage of enterprises that have ERP software package to share information between different functional areas

Data limitations: Data not available for Greece in 2012

Figure 24 displays the relation between the 2010 percentage of enterprises that have ERP software packages and their growth rates between 2010 and 2012. The following observations can be made:

- The best and good enabling countries with the exception of the UK, Cyprus and Ireland are situated in the bottom right quarter, having high ERP adoption rates but low growth rates;
- In general, a phenomenon of convergence occurred between 2010 and 2012 as countries with highest level of ERP adoption in 2010 tend to have lower growth rates (cf. trend line). The convergence pattern across EU28 MS is also supported by the decreasing value of the standard deviation of ERP solution usage rates between 2010 and 2012;
- Bulgaria and Lithuania show high 2010-2012 growth rates as they increased their ERP adoption rates from 11% to 20% and 23% respectively;
- Between 2010 and 2012, the proportion of companies using ERP solutions in Belgium and Germany dropped by 9% whereas in Ireland and Italy it fell by 2.5% on an annual basis.
Figure 24: Pattern of percentage of enterprises that have ERP software package in relation to the 2010-2012 growth rate

Data limitations: Data not available for Greece in 2012

Indicator 4: Percentage of enterprises using Customer Relationship Management to analyse information about clients for marketing purposes

The percentage of enterprises using Customer Relationship Management (CRM) to analyse information about clients for marketing purposes comes from the Eurostat ICT usage and e-commerce survey in enterprises with 10 or more persons employed. CRM includes solutions for companies to better manage their customers. They aim to provide organizational effectiveness by reducing sales cycle and selling cost, identifying markets and channels for expansion, and improving customer value, satisfaction, profitability, and retention\textsuperscript{10}.

CRM are considered in the context of this Scoreboard as an enabling tool supporting a more efficient use of the four digital technologies: Cloud, Mobile, Social Media and Big Data. In this regard, this indicator is used as a proxy for the diffusion of integrated technologies supporting interactions with customers.

Figure 25 presents the 2012 percentage of enterprises using CRM to analyse information about clients for marketing purposes. The following observations can be made:

- The best and good enabling countries, with the exception of the UK and Luxembourg perform better than the EU28 average. The second category of moderate enabling countries (in green) perform around the EU average and the first category of moderate enabling countries (in blue) perform below the EU28 average, with the exception of Spain;
- On average, 19\% of EU28 MS companies implemented at least one CRM solution inside their business;
- Austria, Finland, Ireland and Sweden have the EU28 highest CRM adoption rates with usage above 25\%;
- Hungary, Estonia and Poland have the EU28 lowest CRM usage rates with scores below 13\%.

Figure 25: 2012 percentage of enterprises using Customer Relationship Management to analyse information about clients for marketing purposes

Source: Eurostat

Data limitations: Data not available for Greece in 2012

Figure 26 displays the relation between the 2010 percentage of enterprises using CRM to analyse information about clients for marketing purposes and its growth rates between 2010 and 2012. The following observations can be made:

- Most of the best and good enabling countries have a high CRM adoption rates but low growth rates, whereas the moderate enabling countries mainly have low CRM adoption rates but higher growth rates;
- In general, a phenomenon of convergence occurred between 2010 and 2012 as countries with the highest levels of CRM adoption in 2010 tend to have lower growth rates. The convergence pattern across EU28 MS is also supported by the decreasing value of the standard deviation of CRM solution usage rates between 2010 and 2012 (from 0.06 in 2010 to 0.05 in 2012);
- The Czech Republic has known considerable growth between 2010 and 2012 as its businesses CRM adoption rate for marketing purposes increased from 10% to 17% in between the two years.
Figure 26: Pattern of convergence in percentage of enterprises using Customer Relationship Management to analyse information about clients for marketing purposes exhibited by EU 28 MS over the period 2010-2012

Data limitations; Data not available for Greece in 2012

Indicator 5: Internet bandwidth

Internet bandwidth is measured as the sum of the capacity of all Internet exchanges offering international bandwidth. The data were rescaled for the sake of readability. The capacity is measured in kilobits per second (kb/s) per capita. This indicator is used as a proxy for the connection infrastructure quality.

Figure 27 below presents the Internet bandwidth accessible in 2012 inside the EU28 MS. The following observations can be made:

- All three best enabling countries perform above the EU28 average but the best performers are Luxembourg (good enabling environment) and Malta (second category of moderate enabling country). The other good enabling environments are distributed around the EU average and the countries from the other clusters perform mainly below the EU28 average and are pretty intermingled. Some exceptions can be noted: Romania and Portugal (in blue) as well as Malta (in green) are above the EU average;
- Malta and Luxembourg have Internet capacities largely above this average with bandwidth of respectively 639 kb/s/hab and 4091 kb/s/hab. The World Economic Forum Global Competitiveness Index indicates that among the whole world, Luxembourg and Malta occupy respectively the first and third rank in terms of Internet capacity per inhabitant (the second one being Hong Kong);
- On average, the Internet bandwidth available in the EU28 MS equals 110 kb/s/hab;
- The Luxembourg Ministry of Economy, Foreign Trade, Media and Communication Service launched in 2010 the national strategy for an "ultra-high" speed network: “The "ultra-high" broadband for all” with the objective to provide ultra-high speed network to all inhabitants and actors on the territory. This strategy relies largely on the optical fibre and builds on the existing high optical fibre penetration rate. The Postal and Telecommunications service (P&T) recently installed a state-of-the-art fibre optic network, offering ultra-high-speed Internet access to its customers;

11 World Economic Forum Executive Opinion Survey Global Competitiveness Index
Malta deployed its National Broadband Strategy end 2004 based on the objectives set within the eEurope 2005 action plan. It takes into consideration the particular characteristics of the country and lists drivers that will increase broadband take-up in Malta. The broadband model brings together a number of variables and stakeholders, which together set the framework for the broadband strategy. The model leads to a number of strategic objectives and action lines;

Slovakia, Hungary, Estonia and Croatia have the lowest Internet bandwidth of the EU28 MS. Their internet capacity are below 30 kb/s/hab.

Figure 27: 2012 Internet bandwidth


3.1.3. Pillar III: Taxation & financial environment

Pillar III measures the availability of financial resources as well as the fiscal environment for entrepreneurship. More in particular this pillar focuses on:

- The ease of accessing the various financing sources;
- The effective taxation level;
- The cost borne by digital entrepreneurs to comply with local regulations.

Indicator 1: Cost of tax compliance

Cost of tax compliance is based on the World Bank’s Doing Business data on the time taken to prepare, file and pay three major types of taxes and contributions: the corporate income tax, value added or sales tax and labour taxes (including payroll taxes and social contributions). In this regard, this indicator is used as a proxy for the cost that digital entrepreneurs face to comply with local regulations. The countries where the tax compliance costs are the lowest have the scores the closest to 10. In contrast, the countries with the highest costs tax compliance have a score close to 0.

Table 2 presents the cost of tax compliance in 2010 and its evolution since 2006. The following observations can be made:


15 The data was transformed into a zero-to-10 for the purpose of synthetizing this indicator with the others included in pillar III.
Digital Entrepreneurship Scoreboard 2015

- The best and good enabling countries perform better than the EU28 average and mainly have a null or positive growth rate. The only exception is Germany that is just below the EU average and has a negative growth rate. The moderate enabling countries perform lower than EU28 average, with the exceptions of Croatia and Lithuania;
- Estonia, Finland, Ireland and Luxembourg are the EU28 MS with the lowest costs of tax compliance;
- The Czech Republic and Bulgaria are the only two countries with scores below 5 meaning particularly high costs of tax compliance;
- In general, costs of tax compliance have fallen as the scores rose between 2006 and 2012. Indeed, out of the 27 countries for which data are available, 12 improved their ranking, 10 maintained the same score and 5 dropped in the ranking.

Table 2: 2006-2010 cost of tax compliance

<table>
<thead>
<tr>
<th>Country</th>
<th>2010 score</th>
<th>2006-2010 evolution</th>
<th>Country</th>
<th>2010 score</th>
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<td>Luxembourg</td>
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<td>Netherlands</td>
<td>8.6</td>
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<td>Poland</td>
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<td>Portugal</td>
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EU28 average 7.7 ↑

Source: The World Bank (http://www3.weforum.org)
Data limitations; No data available for Malta
Digital Entrepreneurship Scoreboard 2015

Indicator 2: Total tax rate

The total tax rate measures the amount of taxes and mandatory contributions payable by a business in the second year of operation, expressed as a share of commercial profits. The total amount of taxes is the sum of five different types of taxes and contributions payable after accounting for deductions and exemptions: profit or corporate income tax, social contributions and labour taxes paid by the employer, property taxes, turnover taxes, and other small taxes. This indicator is used to proxy the effective taxation level. For the purpose of the Scoreboard, “1-total tax rate” is standardised and aggregated with other indicator scores.

Figure 28 displays the 2012 total tax rate effective in the EU28 MS. The following observations can be made:

- The first category of moderate enabling countries (in blue) have a lower taxation rate than the EU28 average, except for Italy that has the highest total tax rate. The three other clusters are distributed around the EU average and are intermingled;
- On average, the total tax rate that European companies encounter is just below 50%;
- Luxembourg, Cyprus, Ireland, Denmark and Bulgaria are the EU28 MS that benefit from the lowest total tax rates with less than 30% of the profit payable by businesses;
- France, Estonia and Italy have the highest tax levels among the EU28 MS with above 60% of the corporate profits payable by the companies.

Figure 28: 2012 total tax rate

Source: The World Bank (http://www3.weforum.org)

Figure 29 displays the relation between the 2010 total tax rate and its growth rates between 2010 and 2012. The following statements can be made:

- The best and the first category of enabling countries (in blue) are situated in the left part of the graph (except Sweden), showing a lower tax rate. Most of the good enabling countries are located in the top part of the graph (except Germany and the UK), showing a high total tax rate and high growth. The moderate enabling countries are intermingled;
- In general, a phenomenon of divergence occurred between 2010 and 2012 as countries with the highest tax rates in 2010 tend to have higher growth rates. The divergence pattern across EU28 MS is also supported by the increasing value of the standard deviation between 2010 and 2012;

For most EU28 MS, the total tax rate growth rates are negative meaning that the tax rates that the companies faced fell over time;

Estonia and Spain have not been included in the graph because of the extreme values of their growth rates. Between 2010 and 2012, Estonia's total tax rate increased by 18% on an average annual basis as it jumped from 50% in 2010 to 67% in 2012. The reason for this temporary important increase appears to be the "Other taxes payable by businesses" that include the amounts paid for property taxes, turnover taxes, and other small taxes such as municipal fees and vehicle and fuel taxes. In 2013, the Estonian total tax rate was very close to its 2010 value. In contrast Spain's total tax rate fell by 16% as its dropped from 57% in 2010 to 39% in 2012. This drop during the crisis is due to small businesses failures and to a growing number of big corporations seeking profits abroad.17

**Figure 29: 2010 total tax rates exhibited by EU 28 MS in relation to annual growth rate over the period 2010-2012**

Source: The World Bank (http://www3.weforum.org)
Data limitation: No data for available for Malta in 2010

**Indicator 3: venture capital availability**

Venture capital availability measure, based on a survey the ease for entrepreneurs with innovative but risky projects to find venture capital. The respondents answered the survey by rating the venture capital availability between 1 (extremely difficult) and 7 (extremely easy).

Table 3 below presents the EU28 MS venture capital availability in 2012 and their growth rates between 2010 and 2012. The following observations can be made:

- The best and good enabling countries perform higher than the EU28 average, except Ireland. In contrast, moderate enabling countries perform lower than the EU28 average;
- Sweden, Finland and Luxembourg are the countries where venture capital funds are evaluated by local businesses as the most available. These countries have scores between 4 and 4.35. For comparison purpose, the whole survey highest performer is Hong Kong with a score of 4.6;
- The lowest performers from the EU28 MS are Hungary, Croatia, Ireland, Greece, Lithuania and Italy with venture capital availability scores between 2 and 2.25. For comparison, the country where it is evaluated the most difficult in the whole survey is Myanmar with a score of 1.5;

Most EU28 MS venture capital availability fell between 2010 and 2012. Five countries are exceptions to this trend: Greece maintained the same score while Belgium, Germany, Latvia and Sweden increased their score.

### Table 3: 2010-2012 venture capital availability

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</table>

EU28 average 2.87 ↘

**Indicator 4: ease of raising money through local equity markets**

Ease of raising money through local equity markets measures the ease for companies to raise funds by issuing shares on the stock market. This indicator is used as a proxy for the availability of funds from the local equity market. This indicator comes from a Eurostat survey where the respondents were asked to rate venture capital availability between 1 (extremely difficult) and 7 (extremely easy).

Table 4 below exhibits the EU28 MS ease of raising money through local equity markets in 2012 and their growth rates between 2010 and 2012. The following observations can be made:

- The best and good enabling countries perform higher than the EU28 average, with the exceptions of Austria, Cyprus and Ireland. The moderate enabling countries perform lower than the EU28 average, with the exception of Malta that performs higher. All countries where raising money through the local equity markets became easier between 2010 and 2012 belong to best and good enabling countries. Raising money through the local equity markets became more difficult in all moderate enabling countries;

- Malta, the UK, Sweden and France are the countries where local companies consider it the easiest to raise money by issuing shares. These countries scored between 4.5 and 5.

- Slovakia, Hungary, Slovenia, Latvia, Ireland and Croatia have the lowest scores among the EU28 MS with scores between 2.5 and 3. They are the economies considered by the local companies as the places where raising money through local equity markets is the most difficult.
Table 4: 2010-2012 ease of raising money through local equity markets

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<td>Italy</td>
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<td>Belgium</td>
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Indicator 5: Ease of access to loans

Ease of access to loans measures the ease for companies to obtain a bank loan with only a good business plan and no collateral. This indicator is used as a proxy for the availability of funds from the banking sector. The source of this indicator is a Eurostat survey where the respondents were asked to answer by rating the access to loans between 1 (extremely difficult) and 7 (extremely easy).

Table 5 displays the EU28 MS ease of access to loans in 2012 and their growth rates between 2011 and 2012. The following observations can be made:

- All best and good enabling countries perform better than the EU28 average with the exception of Ireland. Moderate enabling countries perform lower than or equal to the EU28 average with the exceptions of Bulgaria, Malta, Slovakia and the Czech Republic;
- Luxembourg, Finland and Sweden are the countries with the access to bank loans perceived as the best by local companies. They are the only countries with a score above 4. For comparison purpose, Qatar is the top performer from the whole survey with a score of 4.9;
- Greece and Ireland are the countries where accessing loans is thought the most difficult by local companies. These two countries have a score just below 2;
In most EU28 MS, accessing bank loans was considered more difficult in 2012 than in 2011. The exceptions are Austria, the Czech Republic and Slovakia that maintained the same score as well as Bulgaria, Germany, Latvia, Lithuania, Romania, Sweden and the UK, where accessing loans was considered easier in 2012.

Table 5: 2011-2012 ease of access to loans

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EU28 average 2.8 ↓

3.1.4. Pillar IV: Digital skills and e-leadership

Pillar IV compares e-leadership skills development through education and training. More specifically, it is designed to capture the following elements:

- The distribution of ICT specialist skills;
- Difficulties of companies in hiring ICT/IT specialists;
- Efforts of companies in training professionals in the domain of digital skills;
- Availability of individuals who have obtained IT skills through formalised education.

**Indicator 1: Share of total persons employed that have ICT specialist skills**

The share of total persons employed that have ICT specialist skills measures the ratio of ICT specialists among total employment. ICT specialists are defined as the persons that specify, design, develop, install, operate, support, maintain, manage, evaluate and research ICT and ICT systems. This indicator is used as a proxy for the distribution of ICT specialist skills.

Figure 30 below displays the share of persons employed that have ICT specialist skills per country in 2010. The following observations can be made:

- The best enabling countries have a higher share of ICT specialists than the EU28 average. The good enabling countries are spread around the EU28 average. Both categories of moderate enabling countries had a lower share of ICT specialists than the EU28 average, with the exception of the Czech Republic. The second category of moderate enabling countries (in green) tend to have higher score than the first one (in blue);
- In 2010, 3.2% of the persons employed in the European Union had ICT specialist skills;
- The Netherlands, Luxembourg, Denmark, Finland, the Czech Republic and Sweden performed noticeably above the EU28 MS average. The top performer is Sweden with a share of ICT specialists peaking up to 5.4%;
- Lithuania, Croatia, Greece, Romania and Bulgaria have the lowest shares of employees with ICT specialist skills.

**Figure 30: 2010 share of total persons employed that have ICT specialist skills**


**Indicator 2: Percentage of enterprises that provided training to ICT/IT specialists to develop/upgrade their ICT skills**

The percentage of enterprises that provided training to ICT/IT specialists to develop/upgrade their ICT skills measures the share of companies investing in training for their ICT specialists. This indicator is used as a proxy for the efforts of companies in training professionals in the domain of digital skills.
Digital Entrepreneurship Scoreboard 2015

Figure 31 shows the share of employees that have ICT specialist skills per country in 2012. The following observations can be made:

- The best, the good and the second category (in green) of moderate enabling countries have a higher share of companies that provided training to their ICT/IT specialists than the EU average, with the exceptions of France (good enabling country) as well as Estonia and Hungary (moderate enabling countries). The first category of moderate enabling countries (in blue) have a lower share of companies that provided training to their ICT/IT specialists than the EU average except for Greece, Hungary and Portugal;
- In 2012, around 9% of all EU28 companies provided ICT training to their ICT/IT specialists;
- Ireland, the Netherlands, Denmark, Belgium, the UK, Slovenia, Luxembourg and Finland are the top EU28 performers with 12% or more of their companies providing this kind of training. Finland’s ratio is the highest with 17% of the companies that trained ICT specialists;
- Romania, Italy and Bulgaria are the bottom performers with less than 5% of the local companies that trained ICT specialists. Romania is the lowest performer with a ratio of 1.6% of companies that provided IT/ICT skill training.

Figure 31: 2012 percentage of enterprises that provided training to ICT/IT specialists to develop/upgrade their ICT skills

[Graph showing the percentage of enterprises that provided training to ICT/IT specialists across EU countries.]

Source: Eurostat (http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/comprehensive_databases)

Indicator 3: Percentage of enterprises that had no hard-to-fill vacancies for jobs requiring ICT specialist skills

The percentage of enterprises that had no hard-to-fill vacancies for jobs requiring ICT specialist skills is used as a proxy for measuring difficulties of companies in hiring ICT/IT specialists.

Figure 32 presents the 2012 percentage of enterprises that had no hard-to-fill vacancies for jobs requiring ICT specialist skills. The following observations can be made:

- The best enabling countries had less hard-to-fill vacancies for jobs requiring ICT specialist than the EU28 average. The other categories are spread around the EU average and intermingled;
- In 2012, just below 5% of all EU28 companies did not encounter any difficulty to fill vacancies for jobs requiring ICT specialist skills;
- Greece, the UK and Finland are the countries where filling these vacancies was the easiest as more than 7% of the local companies did not face hard-to-fill vacancies for jobs requiring ICT specialist skills;
Companies from Italy, the Czech Republic and Romania faced the biggest difficulties (among EU28 MS) to hire ICT specialists as only less than 3% of them did not encounter any hard-to-fill vacancies for this kind of job.

Figure 32: 2012 percentage of enterprises that had no hard-to-fill vacancies for jobs requiring ICT specialist skills

Source: Eurostat
(http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/comprehensive_databases)

Data limitations: No data available for Germany in 2012
Indicator 4: Percentage of individuals who have obtained IT skills through formalised education

Percentage of individuals who have obtained IT skills through formalised education measures the proportion of individuals that learned IT skills through school, college, university, etc. This indicator is used as a proxy for capturing the availability level of individuals who have obtained IT skills through education.

Figure 33 represents the percentage of individuals who have obtained IT skills through formalised education in 2011. The following observations can be made:

- The best, good and second category (in green) of moderate enabling countries have a higher share of individuals who have obtained IT skills through formalised education than the EU28 average, with the exceptions of the Netherlands and Ireland that are just below the average. The first category of moderate enabling countries (in blue) have a lower performance than the EU average except for Poland, Lithuania and Latvia.
- On average, around 28% of people in EU28 MS learnt IT competences through formal education;
- Six countries clearly outperform the EU28 average as 35% or more of the individuals in Luxembourg, Estonia, Cyprus, the UK, Finland and Sweden learned IT skills through formal education;
- Three countries lag behind with 20% or less of the population that learned IT skills through formal education.

Figure 33: Percentage of individuals who have obtained IT skills through formalised education in 2011

3.1.5. Pillar V: Entrepreneurial mindset

Pillar V compares the EU28 MS entrepreneurial mindset. More specifically, it is designed to capture the following elements:

- The desirability of being an entrepreneur;
- The perception people have about entrepreneurs;
- The level to which individuals are ready to start their own business.

Indicator 1: Percentage of respondents that would prefer to be self-employed if they could choose between different kinds of jobs

The percentage of respondents that would prefer to be self-employed if they could choose between different kinds of jobs has been built based on a question asked to 42,000 respondents from different social and demographic groups in the context of the Eurobarometer survey “Entrepreneurship in the EU and beyond” led by the European Commission’s Directorate-General “Internal Market, Industry, Entrepreneurship and SMEs”. The interviewees were asked whether they would prefer to be employee, self-employed, none of the two or don’t know. This indicator is used as a proxy for measuring the desirability of being an entrepreneur.

Figure 34 indicates the share of respondents that would prefer to be self-employed in 2012 if they had the opportunity to choose. The following observations can be made:

- The first category of moderate enabling countries (in blue) show a high preference for self-employment whereas the respondents from almost all other countries have a lower preference for self-employment than the EU average. Spain has a lower score than the other cluster members and Cyprus a relatively high one;
- On average, 36% of the EU28 MS interviewees answered that they would prefer to be self-employed would they have the choice;
- More than one person out of two are willing to be self-employed in Lithuania and Croatia;
- Germany, Belgium, Slovakia, Denmark, Finland and Sweden have the lowest population willing to be self-employed with a ratio below 30%.
Figure 34: Percentage of respondents that would prefer to be self-employed if they could choose between different kinds of jobs in 2012

Source: Flash Eurobarometer No 354 “Entrepreneurship in the EU and beyond” (http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/eurobarometer/index_en.htm)

Indicator 2: Percentage of respondents that would set up a new business or take over an existing one if they had the means to start their own business, including sufficient funding

The percentage of respondents that would set up a new business or take over an existing one if they had the means to start their own business, including sufficient funding also comes from the Eurobarometer survey “Entrepreneurship in the EU and beyond” led by the European Commission’s Directorate-General “Internal Market, Industry, Entrepreneurship and SMEs”. The interviewees’ possibilities were whether they would prefer to set up a new business, take over an existing one, none of these or don’t know. Figure 35 indicates the 2012 percentages of respondents that would set up a new business or take over an existing one if they had the means to start one. The following observations can be made:

- The best enabling countries and the second category moderate enabling countries (in green) have a performance lower than EU28 average, except for Croatia and Slovakia. The other two categories tend to have a performance above the EU28 average. Italy is particularly low compared to the other countries in its cluster;
- The distribution of the countries’ scores is relatively small as the difference between the top and the bottom performers is less than 30%;
- Spain, Romania and Poland are the top performers, closely followed by France and Ireland;
- Estonia has the lowest population willing to set up a new business or take over an existing one with a score just below 60%.
Figure 35: 2012 percentage of respondents that would set up a new business or take over an existing one if they had the means to start their own business, including sufficient funding.

Source: Flash Eurobarometer No 354 “Entrepreneurship in the EU and beyond” (http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/eurobarometer/index_en.htm)

Indicator 3: Percentage of respondents that have a broadly favourable overall opinion about entrepreneurs

The percentage of respondents that have a broadly favourable overall opinion about entrepreneurs is also extracted from the Eurobarometer survey “Entrepreneurship in the EU and beyond” led by the European Commission’s Directorate-General “Internal Market, Industry, Entrepreneurship and SMEs”. The interviewees’ possible answers were “broadly favourable”, “broadly unfavourable”, “neutral” or “don’t know”.

Figure 36 displays the 2012 percentage of respondents that have a broadly favourable overall opinion about entrepreneurs. The following observations can be made:

- The best and good enabling countries have a more favourable opinion about entrepreneurs than the EU28 average (with the exceptions of the UK, Austria and Cyprus) whereas the two categories of moderate enabling countries have a worse opinion (with the exceptions of Estonia, Italy and Spain).
- On average in the EU28, one person out of two has a broadly favourable opinion of entrepreneurs;
- The countries where entrepreneurs are the best perceived are Denmark, Ireland and Finland with more than 65% of the population having a broadly favourable opinion about entrepreneurs;
- Entrepreneurs are relatively less well perceived in Cyprus, Croatia, the Czech Republic, Slovenia, Slovakia and Hungary with less than 40% of the population that has a good opinion about entrepreneurs. This is particularly true in Hungary where this ratio is around 25%.
Figure 36: 2012 percentage of respondents that have a broadly favourable overall opinion about entrepreneurs

Source: Flash Eurobarometer No 354 "Entrepreneurship in the EU and beyond" (http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/eurobarometer/index_en.htm)
3.2. Output dimensions

3.2.1. Dimension I: Digital transformation

The digital transformation dimension describes companies' reliance on novel digital technologies (Cloud, Mobility, Big Data and Social Media) to improve business operations, invent new business models, sharpen business intelligence, and engage with customers and stakeholders. It covers the following elements:

- Digital adaption rates by industry and company size. Combinations of most adopted technologies.
- Adoption of social media for business purposes by industry and company size. Reasons to adopt social media.
- Adoption of public cloud solutions by industry and company size. Adoption of enterprise applications as a service (CRM and ERP modules) versus other applications/solutions in the public cloud, by company size.
- Adoption of big data technologies by industry and company size.
- Adoption of mobile by industry and company size. Adoption of mobile applications for internal usage versus external usage by company size.

Furthermore, also included in this dimension is:

- The share of companies turnover from e-commerce

This indicator indicates to what extent companies can leverage and benefit from novel digital technologies and the internet.
Digital Entrepreneurship Scoreboard 2015

Indicator 1: Digital adaption rates

The indicator clusters the results of IDC's European vertical markets' survey to identify the percentage of companies which adopt one, two, three or four technologies among Cloud, Social Media, Big Data and Mobile in selected EU countries (France, Germany, Italy, Spain and the UK). 5 groups are identified, depending on the number of technologies adopted:

- None: "Non-digital" companies
- One Digital technology: "Digital beginners"
- Two Digital technologies: "Digital followers"
- Three Digital technologies: "Digital Mature"
- Four Digital technologies: "Fully Digital"

Figure 37 shows that:

- Companies in all 5 EU countries have just started the digitalisation journey, with fully digital companies representing a small share of the total market. The UK (2.6%) stands out; Italy and Spain (1.2% each) lag behind;
- The UK has also the largest share of digital mature companies (8.0%), followed by France (6.1%) and Germany (4.2%);
- Non-digital companies prevail in Italy (52.3%), due to limited adoption of novel digital technologies in SMEs;
- Germany and Spain show the strongest presence of Digital beginners (41.3% and 41.6% respectively); Spain and France of Digital followers (25.6% and 25.9% respectively).

Figure 37: Digital adaption rates, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises
Source: IDC, Based on IDC European Vertical Markets' Survey, 2012

Digital adaption rates vary strongly by company size, as shown in Figure 38. Data by company size exclude the government and healthcare sectors. Large companies (>250 employees) show higher IT sophistication and stronger adopted rates of novel digital technologies. Some 19% and 16% of large companies in the UK and Germany are fully digital against just 2% of SMEs (10-249 employees) in the two countries.

As SMEs dominate EU economies, low adoption of digital technologies in this segment is reflected in total digital adaption rates. This is particularly the case of Italy. The very small size of Italian companies and their laggard attitude towards innovation result in 52% of Italian SMEs not adopting any of the four digital technologies. This percentage falls to 28% among companies with more than 250 employees, but the large dominance of SMEs in the country means that 52.3% of Italian companies (irrespective of size) are non-digital.
Figure 38: Digital adaption rates by size of companies, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude the government and healthcare sectors.
Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012

Figure 39 shows that in general, most companies adopt stand-alone social media or cloud or mobile solutions. The percentage of digital beginners which adopt big data only technologies is very limited. Among Digital followers, the most common combinations of solutions include social media and are:

- Social media and cloud, especially in France and Spain.
- Social media and mobile, especially in Germany.

Social media, cloud and mobile is the most common combination of solutions in digital mature companies. The overall low adoption of big data in the EU means that combinations with big data are rather immature and usually more present in the UK, which shows the highest adoption of all four technologies (so fully digital companies ) especially among large enterprises.

Figure 39: Percentage of companies adopting digital technologies by status of digital adaption, total market, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises
Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012
Digital Entrepreneurship Scoreboard 2015

The total market picture mainly reflects the SME landscape (Figure 40) while there are some relevant differences when looking at large companies. In this segment, the stand-alone adoption of social media is rather limited. Large digital beginners usually rely on cloud or mobile, and the adoption of big data technologies only is more evident, especially in France, Germany and Spain. Cloud and mobile (followed by social and mobile) are the most common digital technologies adopted by digital followers. Social, cloud and mobile remains the most common combination of solutions for digital mature companies, but other combinations with big data are also evident.

Figure 40: Percentage of companies adopting digital technologies by status of digital adaption, SMEs, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude the government and healthcare sectors.
Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012

Figure 41: Percentage of companies adopting digital technologies by status of digital adaption, Large companies, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude the government and healthcare sectors.
Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012
Industry sectors have quite different patterns of adoption of digital technologies. Unsurprisingly, presence of non-digital companies (Figure 42) tends to be higher in those sectors where SMEs prevail, such as mining and construction.

**Figure 42: Percentage of Non-digital companies by industry sector, 2012**

The percentage of digital beginners is higher in healthcare, transport and storage, information and communications, and services (Figure 43).

**Figure 43: Percentage of Digital beginners by industry sector, 2012**

The percentage of digital followers is on average higher in wholesale and retail trade (Figure 44).

**Figure 44: Percentage of Digital followers by industry sector, 2012**

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises

Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012
Digital Entrepreneurship Scoreboard 2015

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises
Source: IDC, Based on IDC European Vertical Markets' Survey, 2012
Digital Entrepreneurship Scoreboard 2015

Digital mature companies (Figure 45) are mainly to be found in finance (and in public administration but just in the UK, which has the largest IT spending in government among all EU countries).

Figure 45: Percentage of Digital mature by industry sector, 2012

![Digital Mature Industry Distribution](image)

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises
Source: IDC, Based on IDC European Vertical Markets' Survey, 2012

Finance, information and communications, and services have the highest shares of fully digital companies (Figure 46). The UK public administration and mining sectors also stand out, compared to other countries. The very high share in UK mining is driven by the presence of few very large companies in the oil & gas industry, showing higher adoption rates of novel digital technologies than the rest of mining companies, in many cases small and laggards. Nearly 8% of UK public administration organisations are fully digital driven by higher adoption rates of big data and to a lower extent cloud.

Figure 46: Percentage of Fully Digital by industry sector, 2012

![Fully Digital Industry Distribution](image)

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises
Source: IDC, Based on IDC European Vertical Markets' Survey, 2012

Indicator 2: Social media adoption

As communication is crucial for competitiveness, social media tools are becoming a key element of transformation of businesses' operational dynamics, as relationships with customers, employees, suppliers, and partners are redefined.

Social media are defined as including wikis, social networks, microblogs, and blogs. Figure 47 presents adoption rates for business purposes by industry sector. Countries' adoption is quite homogenous, but there are some significant differences by industry. Adoption is high in the UK and Spanish public administrations, in information and communications, and wholesale and retail trade across countries, below average in utilities across countries and particularly low in healthcare in Italy.
Figure 47: Percentage of companies relying on social media for business purposes by industry sector, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises.
Source: IDC, Based on IDC European Vertical Markets' Survey, 2012

As shown in Figure 48, large companies have embraced social strategies more strongly than SMEs in all countries apart from Italy, where there is a slightly higher adoption rate among small and medium size companies. Germany (53.9%) and UK large companies (60%) stand out in the adoption of social media for business purposes.

Figure 48: Percentage of companies relying on social media for business purposes by company size, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude the government and healthcare sectors.
Source: IDC, Based on IDC European Vertical Markets' Survey, 2012

Social media is mainly used for marketing and customer facing purposes, such as increasing awareness about companies' products and services and/or managing relationship with customers (Figure 49). Gathering feedback and ideas for products and services is a key reason to adopt social in Spain (82.3%), while, in general, only UK companies are quite engaged with social commerce and able to generate revenue through direct sales (73.1%).
Figure 49: Reasons to adopt social media, total market 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude the government and healthcare sectors.

Source: IDC, Based on IDC European Vertical Markets' Survey, 2012

Considering company sizes, Figure 50 and Figure 501 confirm that increasing awareness about the organization and its products is a key driver of social adoption both in SMEs and large companies. However some relevant differences emerge:

- Small and mid-sized companies in Germany attach a stronger importance to internal communications and knowledge sharing. In Italy and Spain, it is large companies relying on social as a collaborative tool within the organization;
- In France, managing relationships with customers and prospects is relatively more important for SMEs compared to large companies;
- In France and Germany, managing relationships with clients and prospects is more important among large companies;
- Sustainability discussions on energy consumption are more important among large companies in all countries;
- Social commerce is driving more adoption of social media among large organizations in France, Germany, Italy and Spain. In the UK, the share of SMEs is slightly higher.

Figure 50: Reasons to adopt social media, SMEs 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude the government and healthcare sectors.

Source: IDC, Based on IDC European Vertical Markets' Survey, 2012
Figure 51: Reasons to adopt social media, Large companies 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude the government and healthcare sectors.
Source: IDC, Based on IDC European Vertical Markets' Survey, 2012

Indicator 3: Public cloud adoption

The indicator describes the adoption of at least one public cloud solution among CRM, ERP (and ERP modules), Business Intelligence, Content Management, Unified Communication, Security and Storage public cloud services, excluding public cloud services for office/collaborative, servers and basic storage (capacity) as a service (not covered in the IDC survey).

Figure 52 shows that the adoption of public cloud is quite even across countries, ranging from 31% in the UK to 26.7% in Germany. The only exception is Italy, where only 16.7% of companies have adopted a public cloud solution. Companies in finance, information and communications and wholesale and retail trade have a higher reliance on cloud compared to the average.

Figure 52: Percentage of companies adopting public cloud by industry sector, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises
Source: IDC, Based on IDC European Vertical Markets' Survey, 2012

On average adoption of public cloud solutions so far has been stronger in large companies, especially in the UK where more than 60% of companies with more than 250 employees already rely on the public cloud (Figure 53). Adoption in SMEs is more limited, and especially low in Italy (16.2%).

Security and storage as a service drive demand for cloud solutions, with CRM and ERP as a service showing more modest adoption rates, particularly low in SMEs.
Digital Entrepreneurship Scoreboard 2015

Figure 53: Percentage of companies adopting public cloud by company size and type of solution, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude the government and healthcare sectors.
* includes Business Intelligence, Content Mgmt, Unified Communication, Security and Storage public cloud services.
Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012

Indicator 4: Big data adoption

Big data technologies are still immature in Europe and, due to both complexity and cost, are mainly a large company play. This is reflected in adoption rates by industry sectors, shown in Figure 54. Industries with a higher presence of large companies, such as finance, information and communications and public administration show stronger adoption rates of big data. All other industries lag behind.

Driven by investments in mining (Oil & Gas upstream companies), finance and government, the UK stands out in terms of total adoption (14.3%). In the other countries, rates are below 10% and range from 4% of Spain to 9% of France.

Figure 54: Percentage of companies adopting big data technologies by industry sector, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises
Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012

The analysis by company size confirms higher adoption rates among large companies, especially in the UK (43.5%) and Germany (around 41.8%), with SMEs showing very limited reliance on big data (ranging from 3.6% in Spain to 15.1% in the UK).
**Digital Entrepreneurship Scoreboard 2015**

**Figure 55: Percentage of companies adopting big data technologies by industry sector, 2012**

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude the government and healthcare sectors.

Source: IDC, Based on IDC European Vertical Markets' Survey, 2012

**Indicator 5: Mobile adoption**

The indicator describes the adoption of mobile defined as defined as mobile applications (for internal - employees- or external –customers, citizens, patients- usage), excluding mobile office/collaborative (as the share of adoption of mobile office/collaborative is already very high, and doesn’t seem to describe a Digital enterprise).

The reliance on mobile is quite widespread in the UK, Germany and France, with 37.9%, 34.4% and 33.4% of companies already relying on mobile applications in these three countries. Despite strong adoption rates of mobile devices, Italy and Spain lag behind in the sophisticated usage of mobile.

**Figure 56: Percentage of companies adopting mobile solutions by industry sector, 2012**

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises

Source: IDC, Based on IDC European Vertical Markets' Survey, 2012

SMEs have the largest installed base of mobile devices. Nonetheless, they usually lack a mobile strategy and adoption of mobile applications is limited to basic functions such as e-mail and calendar. As shown in Figure 56, the adoption of more sophisticated applications is limited and usually driven by large companies.

Mobile can be deployed to mobile-enable employees and/or to offer new services to customers. Companies in Italy, Spain and Germany have focused more on mobile-enabling employees through the adoption of such solutions as mobile sales force automation, mobile field services, mobile procurement, etc. Companies in the UK, and to a lower extent in France, have focused
more on customer facing solutions such as m-banking, m-commerce, m-ticketing, m-gaming, etc.

**Figure 57: Percentage of companies adopting mobile applications by company size and type of application, 2012**

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude the government and healthcare sectors.

Source: IDC, Based on IDC European Vertical Markets' Survey, 2012

**Indicator 6: Share of enterprises' total turnover from e-commerce**

The share of enterprises' total turnover from e-commerce measures the value of sales by Internet and/or networks other than Internet among total sales value for all enterprises with 10 employees or more. This indicator is used as a proxy for the digital environment level of adoption.

Figure 58 below indicates the 2012 share of enterprises' total turnover from e-commerce. The following observations can be made:

- The best and good enabling countries perform above the EU28 average, with the exceptions of the Netherlands, Austria and Cyprus. The moderate enabling countries perform below the EU28 average, apart from Spain, Croatia, Hungary and the Czech Republic;
- On average in the EU28 MS, 13.6% of enterprises turnover comes from e-commerce;
- In 2012, four countries reached or exceeded 20% of sales coming from e-commerce. These countries are Sweden, Ireland, Luxembourg and the Czech Republic with respectively 20%, 21%, 23 and 24% of sales coming from e-commerce;
- The bottom part of the graph is composed of Bulgaria and Romania that have less than 5% of their sales coming from e-commerce. Cyprus’ total turnover from e-commerce equals 5%.
Figure 58: 2012 share of enterprises’ total turnover from e-commerce


Data limitations; No data available for Denmark and Greece in 2012.

Figure 59 displays the relation between the 2010 share of enterprises’ total turnover from e-commerce and its growth rates between 2010 and 2012. The following observations can be made:

- The 2010-2012 annual growth rates of EU28 MS share of enterprises’ total turnover from e-commerce are very concentrated in the bottom part of the graph because of the presence of outliers;
- Cyprus and Croatia exhibit annual growth rates of respectively 200% and 44%. Cyprus jumped from a share of enterprises’ total turnover from e-commerce of 1% in 2010 to 5% in 2012. Croatia progressed from a share of 9% in 2010 to 17% in 2012;
- Cyprus’ exceptional growth coincides with the third phase of the national e-commerce strategy aiming for the development of e-commerce in the region. Since 2001, the strategy knew 3 development phases:
  - Between 2001 and 2004, the Government unveiled initiatives to upgrade infrastructure, liberalise the telecommunications industry, and ensure high speed access to the Internet at affordable prices for Cypriot businesses and individuals. The Minister also planned that the authorities would be looking to create a coherent legal framework on issues such as data protection, electronic signatures, and intellectual property. These laws included the transposition of the EU’s regulatory framework into national law, although Cyprus was slow off the mark introducing the necessary secondary legislation for the Law on Electronic Communications.
  - During 2004 and 2008, Cyprus passed a number of laws related to e-commerce (e.g. the Electronic Commerce law, the Regulation of Electronic Communications and the Legal Framework for Electronic Signatures and for Relevant Matters) and amended existing ones (e.g. the 2002 Law on Radio communications).
  - Between 2008 and 2011, a Strategic plan for the promotion of ecommerce was prepared. The programme is entitled “Business Online” and its duration is from May 2008 until April 2011. A web was launched with information about electronic commerce, seminars for consumers and companies were held and subsidies were being provided to SMEs to create new or upgrade existing websites;
- Croatian’s high growth was supported by the “E-business Competitiveness Improvement Project” launched by Ministry of Entrepreneurship and Crafts. This EU funded project aims to enhance the competitiveness of Croatian small businesses by increasing their knowledge of and involvement in the field of e-business;
- These outliers have been isolated and removed in order to study the trend of the other countries.
Figure 59: Pattern of convergence in share of enterprises' total turnover from e-commerce exhibited by EU 28 MS over the period 2010-2012


Data limitations; No data available for Denmark and Greece in 2012, nor for Malta and Luxembourg in 2010.

Figure 60 displays the relation between the 2010 share of enterprises' total turnover from e-commerce and its growth rates between 2010 and 2012, without Cyprus and Croatia. The following observations can be made:

- The best and good enabling countries perform better than EU28 average. The best enabling countries mainly have positive growth rates while good enabling countries rather have negative growth rates. The moderate enabling countries perform lower than EU28 average but mainly have positive growth rates;
- Most of the good enabling countries have a negative growth rate (or equal to 0 except for France). The best and first category of moderate enabling countries have positive or null growth rates, except for the Netherlands (best enabling) and Lithuania (moderate enabling). The second category of moderate enabling countries have a positive growth rate;
- In general, a phenomenon of convergence occurred between 2010 and 2012 as countries with the highest level of e-commerce share in revenue in 2010 tend to have lower growth rates. The convergence pattern across EU28 MS is also supported by the slightly decreasing value of the standard deviation between 2010 and 2012;
- Bulgaria progressed by 25% between 2010 and 2012 as its businesses’ e-commerce performance increased from 2% to 3% in between the two years;
- Lithuania, the Netherlands, Belgium, Germany, and Ireland saw their share of revenues coming from e-commerce decline between 2010 and 2012. Belgium knew the largest drop with an annual growth rate below -10%.
Figure 60: Pattern of convergence in share of enterprises’ total turnover from e-commerce exhibited by EU 28 MS over the period 2010-2012

Data limitations; No data available for Denmark and Greece in 2012, nor for Malta and Luxembourg in 2010.
3.2.2. Dimension II: ICT Start-ups

Dimension II allows us to compare the development of ICT Start-ups in the EU28 MS.

More particularly it focuses on:

- The development of new enterprises in the ICT sector;
- The size of the ICT sector;

**Indicator 1: Information and communication technology birth rate**

The ICT birth rate (NACE Rev. 2) indicator is obtained through dividing the number of ICT enterprise births in 2010 by the number of ICT enterprises active in 2010. It is used to measure the creation of new enterprises in the ICT sector.

Figure 61 presents the 2010 ICT birth rate for the EU28 MS. The following observations can be made:

- The country clusters are very intermingled, no clear distinction can be made. Latvia knew the highest relative number of companies being created with a birth rate around 22% in 2010, 10% higher than the EU average (12.7%). France, Lithuania, Denmark and Poland follow with ICT firms birth rates above 15%;
- Estonia, the UK, the Netherlands, Slovenia and Portugal performed just above the EU average;
- The bottom performers are Austria, Italy and Belgium with a birth rate around 7%, a score approximately 5% below the EU average.

**Figure 61: 2010 information and Communication Technology Birth rate (NACE Rev. 2)**


Data limitation: data for Greece, Croatia and Malta is not available.

**Indicator 2: Employment share of information and communication technology enterprises births**

The employment share of information and communication technology enterprises (NACE Rev. 2) is calculated by dividing the number of persons employed among newly born ICT enterprises in 2010 by the number of persons employed among the stock of ICT enterprises active in 2010. This is used to proxy the employment creation dynamic of the ICT sector.

Figure 62 displays the 2010 employment share of ICT enterprise births. The following observations can be made:
The first category of moderate enabling countries (in blue) have a higher share of employment creation by new ICT firms than EU28 average, with the exceptions of Spain and Italy. The countries from the second category of moderate enabling environments (in green) are spread around the EU average. The two other clusters generally have a lower employment share of new ICT firms (with the exceptions of the Netherlands and France (good enabling environments));

- Poland and Latvia perform noticeably better than the EU28 average. They are the only countries were the employment share is double the EU28 average (2.5%);
- Finland and Cyprus have the lowest employment share, i.e. around 2% lower than the EU28 average.

**Figure 62: 2010 employment share of Information and Communication Technology enterprise (NACE Rev. 2)**


Data limitation: data for Greece, Croatia, the United Kingdom, Malta and Luxembourg is not available.
4. Conclusions

Many EU Member States lag behind in the setting-up of favourable conditions for digital entrepreneurship, and the overall uptake of digital technologies among businesses is quite limited, especially among small businesses from traditional sectors such as mining, construction, manufacturing, transport and storage and utilities.

This represents a big, untapped potential. Across all sectors, digital can drive productivity and innovation, by allowing European organisations to reach new markets and customers, automate and streamline business processes and create completely new business models, products and services. It is estimated that European SMEs – across different sectors – grow two to three times faster when they embrace digital technologies\(^ {18} \) and, more generally, it is recognized that the digital economy will bring new opportunities for growth and jobs.

Member States are called to take action, across all areas of policy (from investments to support knowledge creation, to measures to strengthen skills, access to finance, the entrepreneurship mindset), in order to progress in the creation of favorable environments in which digital entrepreneurs can start and thrive, and make it easier for European businesses to go digital.

Urgent action by all the Member States is a key condition for the potential of digital technologies to be unleashed and for Europe to maintain its leading position as a knowledge-based economy.

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# Table of Contents

5. Annexes .......................................................... 83

5.1. Country reports .................................................. 83
  5.1.1. Austria ...................................................... 84
  5.1.2. Belgium ...................................................... 86
  5.1.3. Bulgaria ...................................................... 88
  5.1.4. Croatia ....................................................... 90
  5.1.5. Cyprus ...................................................... 92
  5.1.6. Czech Republic ............................................ 94
  5.1.7. Denmark .................................................... 96
  5.1.8. Estonia ...................................................... 98
  5.1.9. Finland ...................................................... 100
  5.1.10. France ...................................................... 102
  5.1.11. Germany ................................................... 106
  5.1.12. Greece ..................................................... 110
  5.1.13. Hungary ................................................... 112
  5.1.14. Ireland .................................................... 114
  5.1.15. Italy ....................................................... 116
  5.1.16. Latvia ..................................................... 121
  5.1.17. Lithuania .................................................. 123
  5.1.18. Luxembourg .............................................. 125
  5.1.19. Malta ....................................................... 127
  5.1.20. Netherlands ............................................... 129
  5.1.21. Poland ..................................................... 131
  5.1.22. Portugal .................................................. 133
  5.1.23. Romania ................................................... 135
  5.1.24. Slovakia .................................................. 137
  5.1.25. Spain ....................................................... 139
  5.1.26. Sweden .................................................... 144
  5.1.27. Slovenia ................................................... 146
  5.1.28. United Kingdom .......................................... 148

5.2. Definitions used in this research ................................ 153
5. Annexes

5.1. Country reports

In this section for each country a more detailed profile is provided highlighting each country's relative strengths and weaknesses in digital entrepreneurship performance. Relative strengths and weaknesses are determined by comparing the composite indicator scores for each of the 5 enabling dimensions with the EU average. Details on the particularly high and low individual indicators scores are provided to deepen the understanding of the countries strengths and weaknesses. When available, the results in the two output dimensions are provided and explained as well.

For the five countries covered by the IDC 2012 European Vertical Markets' Survey (Germany, Spain, France, Italy and the United Kingdom), an overview of companies adoption of the four novel digital technologies (social media, mobility, cloud and big data) is provided. Insights on the digitalisation of the national companies per technology, level of digital adoption, sector and company size are described.
5.1.1. Austria

Austria exhibits a performance very close to the European average for all the framework conditions. Considering more specifically the individual indicators for each framework dimension, it can be remarked that:

- **The digital knowledge base and the ICT market** - Austrian enterprises in the high-tech sector have a high level of expenditure in R&D and a high relative number of high-tech patents. Nonetheless the share of ICT in the country total value added is 3.7%, the second lowest among EU28 MS. The capacity of attracting foreign direct investments remains low with 2218 million euro of inward FDI.

- **The digital business environment** – Austrian entrepreneurs can enjoy a good environment for doing business. In 2012, 28% of the firms used new technologies such as CRM to analyse information about clients for marketing purposes, the highest percentage among the EU28 MS.

- **Taxation & Financial Environment** – Austrian firms find it easier to raise capital through local equity markets and loans rather than through venture capital. The ease of raising money through local equity markets in Austria is however lower than the EU average when venture capital availability and access to loans are higher than the average.

- **Digital skills and e-leadership** – ICT skills are taught both through trainings organised within firms (11%) and formalised educational institutions (32%). However there is still need for more ICT specialists as witnessed by the 3.8 % of firms that had no hard-to-fill vacancies for ICT specialists profiles. This is 0.8% below the EU average (4.7%).

- **Entrepreneurial mindset** – 81% of respondents declare themselves in favour of setting up a new business or taking over an existing one if they had the means to do so, a score equal to the EU28 average. The two other indicators from this pillar are situated slightly below the EU average.

As regards ICT start-ups, Austria is below the EU28 average. The rate of new births (7.2%) in the economy is the lowest of the EU28 and Austria scores also low in the employment creation induced by new ICT firms (1.7%) as well.

The share of total turnover from e-commerce in Austria equals 13%, slightly below the EU average.
Digital Entrepreneurship Scoreboard 2015

Framework Conditions

ICT Start-ups dimension

Individual indicators

DIGITAL KNOWLEDGE BASE AND ICT MARKET
European High Technology Patents per million inhabitants
Number of IT enterprises in clusters
ICT sector (NACE Rev. 2) value added as a percentage of GDP
FDI in the reporting economy in the ICT sector
DIGITAL BUSINESS ENVIRONMENT
Ease of Doing Business
Investments of telecommunications sector in networks
% enterprises who have ERP software to share information
% enterprises using CRM to analyse client information for...
Internet bandwidth (kb/s/hab)
TAXATION & FINANCIAL ENVIRONMENT
Cost of Tax Compliance
1 - Total Tax rate
Ease of Raising Money Through Local Equity Markets
Ease of access to loans
DIGITAL SKILLS AND E-LEADERSHIP
% total persons employed that have ICT specialist skills
% enterprises providing training to ICT/IT specialists
% enterprises that had no hard-to-fill vacancies for ICT jobs
% individuals who obtained IT skills by educational institution
ENTREPRENEURIAL MINDSET
% respondents preferring to be self-employed
% respondents that would set up or take over a business
ENTREPRENEURIAL MINDSET
% respondents that have a favorable opinion about...
ICT START-UPS
Information and Communication Technology Birth rate
Employment share of new ICT enterprises
DIGITAL TRANSFORMATION
Share of enterprises' total turnover from e-commerce

Austria
EU28 average

0
0,1
0,2
0,3
0,4
0,5
0,6
0,7
0,8
0,9
1
Austria EU28 average
Dimension performance
ICT Start-ups dimension

0
0,1
0,2
0,3
0,4
0,5
0,6
0,7
0,8
0,9
1
Austria EU28 average
Dimension performance
ICT Start-ups dimension

0
20
40
60
80
100
120
140
160
180
Indicator/Pillar performance

0
20
40
60
80
100
120
140
160
180
Indicator/Pillar performance

0
20
40
60
80
100
120
140
160
180
Indicator/Pillar performance

0
20
40
60
80
100
120
140
160
180
Indicator/Pillar performance
5.1.2. Belgium

Belgium exhibits a performance above the EU average in the digital business environment, the taxation & financial environment and the digital skills and e-leadership. For the other two dimensions, Belgium scores very close to the EU28 average. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – Belgium applied for 16 high technology patents per million habitants in 2010. This intensity is almost 2 times above the EU average and contrasts with the low number of enterprises in the IT sector in clusters.
- The digital business environment – Entrepreneurs enjoy a good environment for doing business in Belgium as the country was ranked 33th worldwide in 2012. The same year, 33% of the entrepreneurs used ERP and 24% CRM. These scores are higher than the EU28 average.
- Taxation & financial environment – Belgium has a low cost of tax compliance with a score of 8.3, which is 0.7 point above the EU28 average. This is in contrast with the total tax rate on commercial profits of 57%, the fourth highest in the EU and 9% more than the EU28 average.
- Digital skills and e-leadership – In 2010, 32% of the people employed had ICT specialised skills, this is equal to the EU28 average. 13% of the firms provided training to ICT/IT specialist to develop their skills, this makes Belgium the 5 best performer of the EU.
- Entrepreneurial mindset – Only 28% of the respondents would prefer to be self-employed if they could choose between jobs, this is 8 % less than the EU28 average. Belgium has scores very similar to the EU28 average in the two other indicators of this dimension.

As regards ICT start-ups, Belgium scores below the EU28 average. Belgium has a low ICT birth rate (7.4%) and a low employment share of new ICT enterprises (1.79%).

The share of total turnover from e-commerce in Belgium equals 14%, slightly above the EU average.
5.1.3. Bulgaria

Bulgaria exhibits a performance very close to the EU28 average for all framework dimensions, except for digital skills and e-leadership where it performs below. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – Bulgaria had in 2011 an R&D expenditure from high-tech sectors of 117 million euro and an inward FDI of 3976 million euro in the ICT sector, this is lower than the EU28 average. The ICT sector in Bulgaria has an added value of 5.1% compared to its GDP. This is the fifth highest percentage in the EU and around 1% more than the EU28 average.

- The digital business environment – The telecommunication sector in Bulgaria invest 24% of revenues in networks, the highest share in the EU28. This is in contrast with the 13% share of the enterprises using Customer Relationship Management to analyse information about clients for marketing purposes, 5.5% less than the EU average.

- Taxation & financial environment – Bulgaria has a total tax rate on commercial profits of 28%, this is 20% below EU28 average. It also has an easier access to loans than the EU28 average, with a score of 3.3, 0.5 points more than the EU28 average. This is balanced by a very high cost of tax compliance.

- Digital skills and e-leadership – Only 4% of the companies provide training for their ICT specialists and only 20% of individuals obtained IT skills through educational institutions. 6.5% of the enterprises had no hard-to-fill vacancies for jobs requiring ICT skills, this is about 2% more than the EU28 average.

- Entrepreneurial mindset – 44% of the respondents would prefer to be self-employed if they could choose between jobs, this is 8% above EU28 average. As regards the indicator “a favourable opinion about entrepreneurs”, Bulgaria has a respondents percentage of 41%, 12% lower than the EU28 average.

As regard ICT start-ups, Bulgaria scores better than the EU28 average. The better score is due to the high rate of new ICT enterprises (4.7%).

The share of total turnover from e-commerce in Bulgaria equals 3%, the lowest score among all EU countries.
### Digital Entrepreneurship Scoreboard 2015

#### Framework Conditions

<table>
<thead>
<tr>
<th>Indicator/Pillar Performance</th>
<th>Dimension Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital knowledge base and ICT market</td>
<td>0.67</td>
</tr>
<tr>
<td>Entrepreneurial mindset</td>
<td>0.46</td>
</tr>
<tr>
<td>Digital business environment</td>
<td></td>
</tr>
<tr>
<td>Digital skills and e-leadership</td>
<td></td>
</tr>
<tr>
<td>Taxation and financial environment</td>
<td></td>
</tr>
</tbody>
</table>

#### Individual Indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Bulgaria</th>
<th>EU28 Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>European High Technology Patents per million inhabitants</td>
<td>N/A</td>
<td>67</td>
</tr>
<tr>
<td>R&amp;D expenditure from high-tech sectors</td>
<td>27</td>
<td>120</td>
</tr>
<tr>
<td>FDI in the reporting economy in the ICT sector</td>
<td>90</td>
<td>185</td>
</tr>
<tr>
<td>Investments of telecommunications sector in networks</td>
<td>81</td>
<td>71</td>
</tr>
<tr>
<td>% enterprises who have ERP software to share information</td>
<td>86</td>
<td>91</td>
</tr>
<tr>
<td>% enterprises using CRM to analyse client information</td>
<td>86</td>
<td>86</td>
</tr>
<tr>
<td>Internet bandwidth (kb/s/hab)</td>
<td>139</td>
<td>57</td>
</tr>
<tr>
<td>Venture Capital Availability</td>
<td>141</td>
<td>65</td>
</tr>
<tr>
<td>Ease of Raising Money Through Local Equity Markets</td>
<td>118</td>
<td>74</td>
</tr>
<tr>
<td>Ease of access to loans</td>
<td>91</td>
<td>72</td>
</tr>
<tr>
<td>Cost of Tax Compliance</td>
<td>96</td>
<td>83</td>
</tr>
<tr>
<td>1 - Total Tax rate</td>
<td>128</td>
<td>89</td>
</tr>
<tr>
<td>Ease of Doing Business</td>
<td>145</td>
<td>78</td>
</tr>
<tr>
<td>Venture Capital Availability</td>
<td>184</td>
<td>48</td>
</tr>
<tr>
<td>% enterprises with ICT specialist skills</td>
<td>22</td>
<td>48</td>
</tr>
<tr>
<td>% enterprises providing training to ICT/IT specialists</td>
<td>98</td>
<td>72</td>
</tr>
<tr>
<td>% enterprises that had no hard-to-fill vacancies for ICT jobs</td>
<td>96</td>
<td>72</td>
</tr>
<tr>
<td>% individuals who obtained IT skills by educational institution</td>
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<td>83</td>
</tr>
<tr>
<td>ENTREPRENEURIAL MINDSET</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% respondents preferring to be self-employed</td>
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<td>% respondents that would set up or take over a business</td>
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<td>% respondents that have a favorable opinion about entrepreneurs</td>
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<td></td>
</tr>
<tr>
<td>ICT START-UPS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information and Communication Technology Birth rate</td>
<td></td>
<td>72</td>
</tr>
<tr>
<td>Employment share of new ICT enterprises</td>
<td>72</td>
<td>96</td>
</tr>
<tr>
<td>DIGITAL TRANSFORMATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of enterprises’ total turnover from e-commerce</td>
<td>72</td>
<td>89</td>
</tr>
</tbody>
</table>

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December 2015
5.1.4. Croatia

Croatia exhibits a performance just above the EU28 average for entrepreneurial mindset. In the other four dimensions, Croatia has a lower score than the EU28 average. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – In 2010 Croatia had 0.2 high technology patents per million habitants, the second lowest performance of the EU28, and R&D expenditures from high tech sectors of 150 million euro in 2011. This amount only represents around 0.2% of the national GDP.
- The digital business environment – Croatia is ranked the 84th country in the global ease of doing business ranking and is the 27th EU country, just before Malta. The adoption rates of ERP and CRM solutions by enterprises are respectively 3% and 5% below the EU28 average.
- Taxation & financial environment – Croatia benefits from a relatively low total taxation rate of commercial profits (33%). This is counterbalanced by the Ease of raising money through local equity markets and venture capital availability that were graded relatively low compared to most of other EU countries.
- Digital skills and e-leadership – Around 1.9% of persons employed has ICT skills, the second lowest performance of the EU28. This is in contrast with the 10.6% of employees that provides training for their ICT specialists, 1.8% above EU average.
- Entrepreneurial mindset – 53% of the respondents would prefer to be self-employed if they could choose between jobs, the second highest score of the EU28. This is in contrast with the 36.6% of respondents that has a favourable opinion about entrepreneurs, the fifth lowest score.

As regard ICT start-ups, Croatia data for the selected indicators was not available. The scores that can be observed in the figures below were imputed via a linear regression based on national population and GDP for comparison purpose.

The share of total turnover from e-commerce in Croatia equals 17%, 3.5% above the EU average.
5.1.5. Cyprus

Cyprus exhibits a performance above the EU28 average in the taxation & financial environment and digital skills and e-leadership dimensions but a lower performance in the digital knowledge base and ICT market dimension. The performance of Cyprus in the two other dimensions is close to the EU average. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – Cyprus had business enterprise R&D expenditures in all NACE activities from high-tech sectors of 14 million € in 2011, the lowest amount among all EU countries. Cyprus also had an inward FDI of 296 million euro in the ICT sector in 2011, the third lowest amount in the EU28.

- The digital business environment – Cypriot entrepreneurs have an environment slightly less conductive to business than the EU28 average. 21% of the enterprises used ERP and 18% used CRM in 2012. These scores are similar to the EU28 average. Its internet bandwidth is however relatively low compared to most of the other EU countries.

- Taxation & financial environment – Cyprus has the second lowest tax rate on commercial profits of the EU28 with 23% and there is an easier access to loans than in most of the EU28 MS.

- Digital skills and e-leadership – 6% of the Cypriot enterprises had no hard-to-fill vacancies, the fourth highest rate among EU MS. For the indicator obtaining IT skills through education, Cyprus has a percentage of 36%, about 9% higher than the EU28 average.

- Entrepreneurial mindset – 44% of the respondents would prefer to be self-employed if they could choose, this is higher than the EU28 average. This is in contrast with the 39% of respondents who have a favourable opinion about entrepreneurs, 17% lower than EU28 average.

As regard ICT start-ups, Cyprus scores lower than the EU28 average. The employment share of new ICT enterprises is 0.56%, the second lowest of EU28 and the birth rate (11.1%) is 1.6% below EU28 average (12.7%).

The share of total turnover from e-commerce in Cyprus equals 5%, 8.5% less than the EU average and the third lowest EU score.
Digital Entrepreneurship Scoreboard 2015

Framework Conditions

ICT Start-ups dimension

Individual indicators

DIGITAL KNOWLEDGE BASE AND ITC MARKET
- European High Technology Patents per million inhabitants
- Number of IT enterprises in clusters
- R&D expenditure from high-tech sectors
- ICT sector (NACE Rev. 2) value added as a percentage of GDP
- FDI in the reporting economy in the ICT sector

DIGITAL BUSINESS ENVIRONMENT
- Ease of Doing Business
- Investments of telecommunications sector in networks
- % enterprises who have ERP software to share information
- % enterprises using CRM to analyse client information for...
- Internet bandwidth (kb/s/hab)

TAXATION & FINANCIAL ENVIRONMENT
- Cost of Tax Compliance
- 1 - Total Tax rate
- Venture Capital Availability
- Ease of Raising Money Through Local Equity Markets
- Ease of access to loans

DIGITAL SKILLS AND E-LEADERSHIP
- % total persons employed that have ICT specialist skills
- % enterprises providing training to ICT/IT specialists
- % enterprises that had no hard-to-fill vacancies for ICT jobs
- % individuals who obtained IT skills by educational institution
- ENTREPRENEURIAL MINDSET
- % respondents preferring to be self-employed
- % respondents that would set up or take over a business
- % respondents that have a favorable opinion about entrepreneurs

ICT START-UPS
- Information and Communication Technology Birth rate
- Employment share of new ICT enterprises
- DIGITAL TRANSFORMATION
- Share of enterprises’ total turnover from e-commerce

Cyprus - EU28 average

<table>
<thead>
<tr>
<th>Indicator/Pillar performance</th>
<th>Cyprus</th>
<th>EU28 average</th>
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</thead>
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<tr>
<td>Digital knowledge base and ICT market</td>
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<tr>
<td>Entrepreneurial mindset</td>
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<td>Digital skills and e-leadership</td>
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<td>Taxation &amp; financial environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital business environment</td>
<td></td>
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</tr>
</tbody>
</table>
Czech Republic exhibits a performance above the EU28 average for digital skill and e-leadership and a lower one in all other dimensions. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- **The digital knowledge base and the ICT market** – The ICT sector in the Czech Republic has an added value of 4.6% of the GDP, this is very close to the EU28 average. It has 0.6 high technology patents per million habitants, this is 9 times below the EU28 average.

- **The digital business environment** – The telecommunications sector invests 14.5% of revenues in the network, this is slightly above the EU28 average. In contrast, the environment was rated less conductive to business than the EU average (Czech ease of doing business was ranked 23rd/28 among EU countries).

- **Taxation & financial environment** – The indicator in the Czech Republic is around the EU28 average. The Czech Republic has a score of 3.5 for ease of raising money through local equity markets, slightly below the EU28 average, and a score of 2.9 for ease of access to loan, a little above the EU28 average.

- **Digital skills and e-leadership** – In 2010 4.6% of people employed had ICT specialist skills, the second highest percentage among the EU28. However there is need for more people with ICT specialist skills, as only about 3% of companies had no-hard-to fill vacancies, the second lowest score in the EU28.

- **Entrepreneurial mindset** – 33% of respondents would choose to be self-employed, 75% of respondents would set-up a new business and 36% of respondents have a favourable opinion about entrepreneurs. For each of these three indicators, the Czech Republic has a percentage below the EU28 average.

As regard ICT start-ups, The Czech Republic scores slightly lower than the EU28 average. It has an ICT birth rate of 10.9% when the EU28 average is about 12.7%. Regarding the employment share of new ICT start-ups, the Czech Republic is situated very close but below the EU28 average (2.37% compared to 2.55% for the EU28).

The share of e-commerce in the enterprises turnover is 24%, the highest rate in the EU28 and 11% higher than the EU28 average.
Digital Entrepreneurship Scoreboard 2015

5.1.7. Denmark

Denmark exhibits a performance largely above the EU28 average in all dimensions except in the entrepreneurial mindset. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – The score of Denmark in all indicators of this dimension are above the EU28 average in relative terms (but not in absolute terms, due to the small size of the country). Particularly remarkable, Denmark has 16.1 high technology patents per million habitants, the fifth highest number in the EU28 and an amount of around 2.2% of the GDP invested in R&D by the high-tech sectors, the third highest score in the EU after Finland and Sweden.

- The digital business environment – Entrepreneurs in Denmark can enjoy a good environment for doing business as score of Denmark in all indicators are above the EU28 average. Denmark is, with a global 5th place, the best ranked EU28 country on the ease of doing business ranking. Investments of the telecommunications sector in networks as percentage of revenues amounts to 20.7% in Denmark, the third highest score among EU countries. In 2012, adoption rates of new technologies such as CRM and ERP solutions are both 2% above the EU28 average.

- Taxation & financial environment – Again, for all indicators in this dimension, Denmark has better scores than the EU average. Denmark has the 4th lowest total taxation rate after Luxembourg, Cyprus and Ireland as only 27.7% of commercial profits are payable to the Danish responsible authorities. Denmark also has a lower cost of tax compliance and an easier taxation & financial environment than the EU28 average. Denmark has a score of 3.1 for ease of access to loan, and a score of 4.2 for ease of raise money through local equity markets, both are 0.3 points higher than the EU28 average.

- Digital skills and e-leadership – Again, for all indicators in this dimension, Denmark has better scores than the EU average. 4.4% of the persons employed in Denmark have ICT specialist skills, around 1.2% more than the EU28 average. 13% of the enterprises provided training for their ICT specialists, 4% more than the EU28 average. In addition, fewer companies face hard to fill vacancies for ICT jobs.

- Entrepreneurial mindset – 73% of the respondents have a favourable opinion of entrepreneurs in Denmark, this is the highest percentage and 20% higher than EU28 average. This is in contrast with the 26% of respondents that would prefer to be self-employed if they could choose jobs, this is the third lowest percentage and 10% less than the EU28 average.

As regard ICT start-ups dimension, Denmark has a higher score than the EU28 average. Denmark has an ICT birth rate of 18.4%, the fourth highest of the EU28 but has a lower employment rate of new ICT enterprises (2.0%) than the EU28 average (2.5%).

The share of e-commerce in the enterprises turnover was of 17% in 2010, a number relatively high compared to the EU average. More recent data is not available for this country.
5.1.8. Estonia

Estonia exhibits a performance similar to the EU28 average in the digital skills and e-leadership and digital knowledge base and ICT market dimensions. It performs slightly better in taxation & financial environment and worse in the entrepreneurial mindset and the digital business environment. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – The share of the ICT added value compared to the GDP is 4.9%, 0.6% more than the EU28 average. This result is in contrast with the Estonia low number of high technology patents per million inhabitants, around three times lower than the EU28 average.

- The digital business environment – In 2012, 10% of the Estonian enterprises used ERP solutions and 10.2% used CRM. These rates are respectively third and second lowest rates of EU28 countries. In contrast, Estonia is ranked 21st on the global ease of doing business ranking and 7th EU country.

- Taxation & financial environment – Comply to taxes is relatively easy and fast in Estonia as the country has the 4th lowest score. However, Estonia has a total tax rate on commercial profits of 67.3%, the second highest of the EU28 and around 19% higher than the EU28 average.

- Digital skills and e-leadership – 36% of individuals obtained ICT skill through education, this is about 8% more than the EU28 average. Only 6.1% of enterprises provided training, 2.7% less than the EU28 average.

- Entrepreneurial mindset – 59% of the respondents would set-up a new business, this is the lowest rate among the EU28 and 22% less than the average. This is in contrast with the 60.2% of respondents that had a favourable opinion about entrepreneurs, around 7% more than EU28 average.

As regard ICT start-ups, Estonia scores better than the EU28 average. The ICT birth rate (13.2%) and the new ICT firms employment share (2.7%) are slightly higher than the EU28 average.

The share of total turnover from e-commerce in Estonia equals 13%, slightly below the EU average.
Digital Entrepreneurship Scoreboard 2015

Framework Conditions

ICT Start-ups dimension

Individual indicators

- Digital knowledge base and ICT market
- Entrepreneurial mindset
- Digital skills and e-leadership
- Taxation & financial environment

Estonia vs EU28 average

Indicator/Pillar performance

0 0,1 0,2 0,3 0,4 0,5 0,6 0,7 0,8 0,9 1

Estonia EU28 average

0 20 40 60 80 100 120 140

Share of enterprises’ total turnover from e-commerce

December 2015
5.1.9. Finland

Finland exhibits a performance a lot better than the EU average in all enabling dimensions except the entrepreneurial mindset for which Finland is very close to the average. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – Among all EU28 countries, Finland has the highest R&D expenditures from high-tech sectors compared to national GDP. Finland has 21.9 high technology patents per million habitants, the second highest amount among the EU28 countries.

- The digital business environment – Finland has a good business environment, it is ranked 11th on the ease of doing business ranking, 3rd EU country. The adoption rates of ERP and CRM technologies in Finland are higher than the EU averages as well.

- Taxation & financial environment – Finland has a score of 4.4 for ease of access to loans, this makes it the second countries among the EU where it is the easiest to have access to loans after Sweden. Also for venture capital availability, Finland has the second highest score (4.1).

- Digital skills and e-leadership – Finland scores particularly high in this dimension, making it a country where IT skills are largely taught via trainings and education leading to no hard to fill vacancies for ICT jobs for local companies. More particularly, 7.2% of enterprises had no hard-to-fill ICT vacancies, the highest percentage of EU28. 4.5% of people employed have ICT specialist skills, the third highest rate of EU28.

- Entrepreneurial mindset – 22% of the respondents would prefer to be self-employed if they could choose between jobs. This is the second lowest score of EU28 and about 14% lower than EU28 average. This is in contrast with the 68.7% that has a favourable opinion about entrepreneurs, the third highest rate of the EU28.

As regard ICT start-ups, Finland has a score below the EU28 average. This is because of the low new ICT firms employment rate (0.4%), the lowest of the EU28.

The share of e-commerce in the enterprise turnover is 18%, 4.5% more than the EU28 average.
Digital Entrepreneurship Scoreboard 2015

Framework Conditions

ICT Start-ups dimension

Individual indicators

DIGITAL KNOWLEDGE BASE AND ICT MARKET
- European High Technology Patents per million inhabitants
- Number of IT enterprises in clusters
- R&D expenditure from high-tech sectors
- ICT sector (NACE Rev. 2) value added as a percentage of GDP
- FDI in the reporting economy in the ICT sector

DIGITAL BUSINESS ENVIRONMENT
- Ease of Doing Business
- Investments of telecommunications sector in networks
- % enterprises who have ERP software to share information
- % enterprises using CRM to analyse client information for...

TAXATION & FINANCIAL ENVIRONMENT
- Internet bandwidth (kb/s/hab)
- Cost of Tax Compliance
- 1 - Total Tax rate
- Venture Capital Availability
- Ease of Raising Money Through Local Equity Markets
- Ease of access to loans

DIGITAL SKILLS AND E-LEADERSHIP
- % total persons employed that have ICT specialist skills
- % enterprises providing training to ICT/IT specialists
- % enterprises that had no hard-to-fill vacancies for ICT jobs
- % individuals who obtained IT skills by educational institution

ENTREPRENEURIAL MINDSET
- % respondents preferring to be self-employed
- % respondents that would set up or take over a business
- % respondents that have a favorable opinion about entrepreneurs

ICT START-UPS
- Information and Communication Technology Birth rate
- Employment share of new ICT enterprises

DIGITAL TRANSFORMATION
- Share of enterprises’ total turnover from e-commerce
5.1.10. France

France exhibits a performance better than the EU28 average for entrepreneurial mindset and taxation & financial environment. For the three other dimensions, France has a score very close to the EU28 average. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – France registered 16.8 high tech patents per million inhabitants, 6.5 more than the EU average and the fourth highest EU performance. France also has an R&D expenditure of 27,403 million euro, the second highest in the EU. These expenditures remain high compared to the EU average when normalised by the national GDP. This is counterbalanced by a low number of IT enterprises in cluster (especially when considering the size/population of the country).

- The digital business environment – In 2012, 33% of the entrepreneurs used ERP, around 11% more than the EU28 average. France is scoring in the other indicators of this dimension close to the EU average.

- Taxation & financial environment – The total tax rate on commercial profits in France is 65.7%, the third highest rate of the EU28. This is counterbalanced by the fact that France has the highest score of raising money through equity markets (4.8) of all EU countries and a relatively low cost of tax compliance.

- Digital skills and e-leadership – 3.1% of peoples employed in France have ICT specialist skills, this rate is close to the EU28 average. 7.6% of the companies provided training, slightly lower than the EU28 average.

- Entrepreneurial mindset – 62% have a favourable opinion about entrepreneurs. This is the fourth EU highest score. 86.5% would set-up a new business or take over an existing one, the fifth EU highest score.

As regard ICT start-ups, France scores a lot higher than the EU28 average. It is mainly due to the company birth rate of 19.1% in the ICT sector, the second highest among EU28 countries.

The share of total turnover from e-commerce in France equals 14%, slightly above the EU average.
France is one of the five country covered by the IDC European Vertical Markets’ Survey. Below are described key findings on the digitalisation of the national companies per technology, level of digital adoption, sector and company size are described.

Despite being the largest share of total French companies, digital beginners are proportionally less in France compared to other countries, and particularly little in retail/wholesale trade and finance. Digital followers stand at nearly 26% of total companies, with higher shares in information and communications, finance and retail/wholesale trade. France shows a stronger
adoption of digital mature and fully digital companies (6.1% and 2.1% respectively). One third of finance institutions are digital mature and nearly 23% of large companies can benefit from the combined adoption of 3 digital technologies, in most of cases cloud, social and mobile.

More than 35% of French companies rely on social media tools for business purposes, up to 50% in information and communications and in the trade sectors. The majority of both SMEs and large companies see social media as a marketing tool to increase awareness about the organization and its products. Social commerce is emerging in SMEs (30.6% of companies with social media), and is already a reality among large companies (more than 60% of companies with social media).

Mobility is the second most adopted digital technology, with more than one third of companies in manufacturing, utilities, transport and storage, information and communications, finance, trade and services already relying on mobile applications. Up to 47.8% of French large companies have already adopted at least one public cloud solution; nearly 17% have already adopted either CRM or ERP modules as a service. Big data remains the least adopted technology, but the percentage of companies with Big data is nonetheless higher in France compared to other countries. 9.5% of French companies have Big data, ranging from 4.8% of healthcare to more than 35% in finance.

France digital adoption rates, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises.
Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012

France digital adoption rates by industry, sector and company size, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude government and healthcare.
Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012
France percentage of companies adopting novel digital technologies, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. 
Source: IDC, Based on IDC European Vertical Markets' Survey, 2012

Social: 35.2%  
Cloud: 29.4%  
Big Data Technologies: 9.5%  
Mobile solutions: 33.4%
5.1.11. Germany

Germany exhibits a better performance for the digital knowledge base and ICT market, the digital business environment and the digital skills and e-leadership dimensions. Its performance in taxation & financial environment equals the EU28 average. In the remaining dimension, entrepreneurial mindset, Germany has a lower score than the EU28 average. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – Germany has 20.5 high technology patents per million inhabitants, the third highest number in the EU28. German R&D expenditures from high-sectors almost amount to 50,000 million euro, 31% of the EU R&D expenditures from high-sectors.

- The digital business environment – Germany was ranked 20th in the global ease of doing business ranking and 6th EU country. German companies have higher adoption rates of ERP and CRM solutions than the EU28 average (around 10% more). In contrast, the telecommunication sector in Germany invests 10.5% of revenues in the network, the fifth lowest in the EU.

- Taxation & financial environment – Germany scored in all indicators of this dimension very close to the EU28 average. For example, Germany has a score of 3.0 for venture capital availability, this is about the EU28 average of 2.9. For ease of raising money through equity markets, Germany has a score of 4.0, also close to the EU28 average (3.9).

- Digital skills and e-leadership – In 2012, 11% of employees provides training for their ICT specialist skills, this is 3% more than the EU28 average. In 2011, 28% of individuals obtained ICT skill through education, this is very similar to the EU28 average.

- Entrepreneurial mindset – 28% of the respondents would prefer to be self-employed if they could choose between jobs, an equal percentage as Belgium and the fifth lowest percentage of the EU28. About 77% would set up a new business, also here Germany scores below the EU28 average.

As regard ICT start-ups, Germany scores below the EU28 average. This is because of the low percentage of ICT birth rate (11.6%) and the low share of new ICT firms employment (1.7%), compared to the EU28 averages of respectively 12.7% and 2.5%.

The share of e-commerce in the enterprises turnover is 17%, 3.4% more than the EU28 average.
Germany is one of the five countries covered by the IDC European Vertical Markets’ Survey. Below are described key findings on the digitalisation of the national companies per technology, level of digital adoption, sector and company size are described.

The majority of German companies are digital beginners: they have adopted just one novel digital technology, in many cases either social, or cloud or mobility. The trend is largely driven by SMEs in manufacturing and services, where up to more than 44% of companies rely on just one novel digital technology. One third of companies are still non digital, with mining and
construction having above average shares of companies that still need to start their digital journey. Social media and mobility characterise investments of digital followers, which represent 21.1% of companies overall, and up to 36.8% in wholesale and retail trade. Digital mature companies represent just 4.2% of total German companies, while fully digital play a marginal role (1.9% of total), reflecting the prevalence of SMEs in the country. In large companies, the share of fully digital companies increase to nearly 16% driven by banks, large utilities and services organisations.

Adoption of mobile solutions (34.4%) is on average higher than for the other four novel digital technologies. Deployments in information and communications, finance and utilities are well under way, with more than 45% of companies in these sectors already relying on mobile applications either to mobile enable employees or as a new channel to reach customers. 29.4% of German companies adopt social media for business purposes: retailers and Information and communications companies drive this trend, with nearly 40% of companies relying on social. The adoption of cloud is around 26%, with finance and ICT companies standing out and the government sector showing reluctance to embrace the new computing paradigm. Big data is still relatively immature; only 6.1% of total companies rely on Big data, but adoption is already quite strong among large companies.

**Germany digital adoption rates, 2012**

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises.
Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012

**Germany digital adoption rates by industry, sector and company size, 2012**

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude government and healthcare.
Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012
Germany percentage of companies adopting novel digital technologies, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises.
Source: IDC, Based on IDC European Vertical Markets' Survey, 2012
5.1.12. Greece

Greece exhibits a performance above the EU28 average in the entrepreneurial mindset dimension, an equal in the digital skills and e-leadership dimension and a below average in the three other dimensions. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – In 2010 Greece had 0.3 high technology patents per million inhabitants, the third lowest performance of the EU28.

- The digital business environment – Greece is ranked 78th most conductive country for business, 26th EU country just before Croatia and Malta. Greece has also one of the lowest internet capacity per inhabitant. However, the telecommunication sector invested 14.8% of their revenues in the network in 2011, 1.6% more than the EU28 average.

- Taxation & financial environment – Greece has a score of 1.7 for ease of access to loans. This makes it the most difficult country of the EU28 for the entrepreneurs to access loans. Greece is also the 4th countries where raising money through venture capitalists is the most difficult.

- Digital skills and e-leadership – 2.1% of the persons employed have ICT skills, the third lowest performance of the EU28 and 1.1% less than the EU28 average. This is in contrast with the 7% enterprises that had no hard-to-fill for jobs requiring ICT skills, the third highest rate of the EU28.

- Entrepreneurial mindset – 49% would choose to be self-employed if they could choose between jobs, that’s about 13% higher than EU28 average. 85.5% of the respondents would set up a new business or take over an existing one, that’s 4% more than the EU28 average.

As regard ICT start-ups, Greece data for the selected indicators was not available. The scores that can be observed in the figures below were imputed via a linear regression based on national population and GDP for comparison purpose.

The share of total turnover from e-commerce in Greece dropped from 4% in 2011 to 2% in 2013.
Digital Entrepreneurship Scoreboard 2015

Framework Conditions

![Framework Conditions Diagram]

ICT Start-ups condition

<table>
<thead>
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<th>Indicator/Pillar Performance</th>
<th>Greece</th>
<th>EU28 average</th>
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<td>Digital knowledge base and ICT market</td>
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</tr>
<tr>
<td>Digital skills and e-leadership</td>
<td>1</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Indicators:

- **Digital Knowledge Base and ICT Market**
  - European High Technology Patents per million inhabitants
  - Number of IT enterprises in clusters
  - R&D expenditure from high-tech sectors
  - ICT sector (NACE Rev. 2) value added as a percentage of GDP
  - FDI in the reporting economy in the ICT sector

- **Digital Business Environment**
  - Ease of Doing Business
  - Investments of telecommunications sector in networks
  - % enterprises that have ERP software to share information
  - % enterprises using CRM to analyse client information for
  - Internet bandwidth (kb/s/hab)

- **Taxation & Financial Environment**
  - Cost of Tax Compliance
  - 1 - Total Tax rate
  - Venture Capital Availability
  - Ease of Raising Money Through Local Equity Markets

- **Digital Skills and E-Leadership**
  - % total persons employed that have ICT specialist skills
  - % enterprises providing training to ICT/IT specialists
  - % enterprises that had no hard-to-fill vacancies for ICT jobs
  - % individuals who obtained IT skills by educational institution
  - ENTREPRENEURIAL MINDSET
  - % respondents preferring to be self-employed
  - % respondents that would set up or take over a business
  - % respondents that have a favorable opinion about entrepreneurs

- **ICT START-UPS**
  - Information and Communication Technology Birth rate
  - Employment share of new ICT enterprises

- **Digital Transformation**
  - Share of enterprises' total turnover from e-commerce

Greece vs EU28 average

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December 2015
5.1.13. Hungary

Hungary exhibits a performance very close to the EU28 average for the digital knowledge base and ICT market and digital skills and e-leadership dimensions. For the other three dimensions, Hungary has a lower score than the EU28 average. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – In 2010 Hungary had 2.1 high technology patents per million inhabitants, 4.4 times less than the EU28 average and the R&D expenditures from high tech sectors were relatively low as well. In contrast, the ICT value added compared to the GDP amounts to 5.7%, the third highest value of the EU28.

- The digital business environment – 7.4% of Hungarian enterprises used CRM solutions and 9% used ERP solutions, the lowest scores of the EU28. The internet capacity available per inhabitant is very low as well. In contrast, investments of the telecommunications sector in networks are slightly above the EU average.

- Taxation & financial environment – The total tax rate on commercial profits in Hungary is 50.3%, about 2% above the EU28 average. Hungary scores in all other indicators of this dimension are among the lowest of the EU.

- Digital skills and e-leadership – 2.6% of the peoples employed have ICT specialist skills, 0.5% less than the EU28 average and 31% obtained ICT skills through education, 3.1% above EU28 average. In contrast, a smaller percentage of Hungarian enterprises had hard to fill vacancies for ICT jobs than the EU28 average.

- Entrepreneurial mindset – 36.2% would prefer to be self-employed if they could choose. This level is similar to the EU28 average. This in contrast with the 25.4% who has a favourable opinion about entrepreneurs, the lowest score of the EU28 and 27% below the average.

As regard ICT start-ups, Hungary has a lower score than the EU28 average. The birth rate is 8.4%, the fourth lowest of the EU28. The employment share of new ICT enterprises is 2.4%, just below the EU28 average of 2.5%.

The share of e-commerce in the enterprises total turnover equals 19%, about 5.5% more than the EU28 average.
Digital Entrepreneurship Scoreboard 2015

Framework Conditions

Individual indicators

DIGITAL KNOWLEDGE BASE AND ICT MARKET
- European High Technology Patents per million inhabitants
- Number of IT enterprises in clusters
- R&D expenditure from high-tech sectors
- ICT sector (NACE Rev. 2) value added as a percentage of GDP
- FDI in the reporting economy in the ICT sector

DIGITAL BUSINESS ENVIRONMENT
- Ease of Doing Business
- Investments of telecommunications sector in networks
- % enterprises that have ERP software to share information
- % enterprises using CRM to analyse client information for...

TAXATION & FINANCIAL ENVIRONMENT
- Internet bandwidth (kb/s/hab)
- Ease of Raising Money Through Local Equity Markets
- Ease of access to loans

DIGITAL SKILLS AND E-LEADERSHIP
- % total persons employed that have ICT specialist skills
- % enterprises providing training to ICT/IT specialists
- % enterprises that had no hard-to-fill vacancies for ICT jobs
- % individuals who obtained IT skills by educational institution

ENTREPRENEURIAL MINDSET
- % respondents preferring to be self-employed
- % respondents that would set up or take over a business
- % respondents that have a favorable opinion about entrepreneurs

ICT START-UPS
- Information and Communication Technology Birth rate
- Employment share of new ICT enterprises

DIGITAL TRANSFORMATION
- Share of enterprises' total turnover from e-commerce

Indicator/Pillar performance

Hungary - EU28 average
5.1.14. Ireland

Ireland exhibits a performance above the EU28 average in the digital knowledge base and ICT market, the digital business environment and the entrepreneurial mindset. In the two other dimensions, taxation & financial environment and digital skills and e-leadership, Ireland has a score similar to that of the EU28 average. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – In 2011 Ireland had an inward FDI of 10,581 million euro in the ICT sector. Ireland has the highest inward FDI in the ICT sector compared to GDP. It was estimated that Ireland had 1319 IT enterprises in clusters in 2011. This number is decreasing since 2006 and is relatively for a country of this population when compared to other EU countries.

- The digital business environment – Ireland has a good business environment, it is ranked 15th in the global ease of doing business ranking and 5th EU country. This contrasts with the low rate (10.2%) of investment of the telecommunications sector in the network compared to the company revenues, about 3% below the EU28 average.

- Taxation & financial environment – Ireland has a low cost of tax compliance with a grade of 9.1, the second highest score after Luxemburg and a very low total taxation rate of 26.4%, the thirst lowest after Luxembourg and Cyprus. This in contrast with the difficult access to loans (score of 1.8, the second lowest of EU28), the low venture capital availability (third lowest score among EU countries) and the difficulty of raising money through local equity markets (5th lowest EU grade).

- Digital skills and e-leadership – 2.8% of employees has ICT specialist skills, 0.4% below EU28 average. 12.2% of enterprises provide training for their ICT specialist, 3.4% above EU28 average.

- Entrepreneurial mindset – 69.8% has a favourable opinion about entrepreneurs, the second highest percentage of the EU28. 86.9% of respondents would set-up or take over a business if they had the means, the fourth highest percentage among EU countries.

As regard ICT start-ups, Ireland score below the EU28 average. This is due to the low employment rate (0.7%) of the new ICT firms, the third lowest of EU28. The ICT firms birth rate (9.3) is relatively low as well when compared to the EU average (12.7%).

The share of e-commerce in enterprise total turnover is 21%, the third highest percentage of the EU28.
5.1.15. Italy

Italy exhibits a performance lower than the EU28 average for all five dimensions. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – In 2010 Italy recorded 3.3 patents per million inhabitants, a bit more than one third of the EU28 average.

- The digital business environment – In 2012, 21% of the Italian enterprises used new software like ERP, 0.9% below EU28 average, and 17.4% used CRM, 1.4% below EU28 average. The ease of doing business was ranked on the 73rd position in the global ranking and 26th EU country.

- Taxation & financial environment – The Italian total tax rate on commercial profits in 2012 was 68.3%, the highest of the EU28. The access to the venture capital and loans were graded among the worst among all EU countries.

- Digital skills and e-leadership – Italy performs poorly in this dimension. The need of ICT specialist is high witnessed by the 2.7% of those enterprises that had no hard-to-fill vacancies requiring ICT skills, the lowest percentage of the EU. Only 16% of Italians got IT skills through education, the lowest percentage among EU countries again. Merely 4% of Italian companies provided trainings to their ICT/IT specialists, the second lowest percentage in EU28.

- Entrepreneurial mindset – 42.4% of the respondents prefers to be self-employed, 6.3% above the EU28 average. In contrast, only 66% of respondents would set up or take over a business, 15% less than the EU average.

As regard ICT start-ups, Italy scores below the EU28 average. This is due to the low birth rate (7.34%) and the low employment share of the new ICT firms (1.9%).

The share of Italian companies revenue coming from e-commerce amounted to 6% in 2012, a share around half of the EU average.
Italy is one of the five countries covered by the IDC European Vertical Markets' Survey. Below are described key findings on the digitalisation of the national companies per technology, level of digital adoption, sector and company size are described.

Italy is the country with the highest share of non-digital companies (52.3%). The small size of Italian companies coupled with a cautious attitude towards innovation has limited the adoption of novel digital technologies in the country. Digital beginners (28.7%) mainly rely on social,
Digital Entrepreneurship Scoreboard 2015

which is the only digital technology already adopted by more than one third of Italian
companies. Digital followers represent just 14.4% of total Italian companies and are more
evident in information and communications, finance, trade and public administration. Italy has
a small share of digital mature and fully digital companies, mainly concentrated in finance and
information and communications (particularly in the telecommunications and IT sub-sectors).

The use of social is mainly focused on customer facing activities, including increasing
awareness about the organization and its products, and managing relationships with customers
and prospects. Adoption is stronger in information and communication and retail/wholesale
trade, somewhat limited in finance, which stands out for the deployment of other digital
technologies. Italian companies show a below average reliance on public cloud solutions;
security and data location concerns coupled with business issues translate in a 16.7% adoption
rate. Construction companies, which are many and small in the country, have been particularly
slow in understanding the benefits of public cloud: just 8.5% of them have deployed a solution
as a service. Finance organisations have been more active; some 33.5% have already some
public cloud solutions in place, generally, though, limited to the non-core activities of the
institution. Despite the very large installed base of mobile devices, only some 18% of Italian
companies rely on mobile applications (beyond e-mail), ranging from 7.2% in mining to some
29% in finance. Italian companies still use mobile devices for voice communications or for
basic calendar/e-mail functions. Only few have started deploying more sophisticated software
that can help them mobilising business processes (mobile sales force automation, Mobile
supply chain, mobile procurement, etc.). Big data is still immature in the country: some 4.7%
of Italian companies rely on Big data technologies to extract value from the increasing amount
of data they need to manage. Large companies (15%) have a stronger reliance on Big data,
but adoption is still limited to such industries as banking, information and communications,
utilities and retail.
Italy digital adoption rates, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Source: IDC, Based on IDC European Vertical Markets' Survey, 2012

Italy digital adoption rates by industry, sector and company size, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude government and healthcare. Source: IDC, Based on IDC European Vertical Markets' Survey, 2012
Digital Entrepreneurship Scoreboard 2015

Italy percentage of companies adopting novel digital technologies, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises.
Source: IDC, Based on IDC European Vertical Markets' Survey, 2012
5.1.16. Latvia

Latvia exhibits a performance very close to the EU28 average for digital skills and e-leadership and entrepreneurial mindset. For the other three dimensions, Latvia has a lower score than the EU28 average. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – The ICT sector value added in 2010 was 3.5%, 0.8% below EU28 average. The inward FDI in the ICT sector in 2011 was 312 million euro, the third lowest amount of the EU28 average.

- The digital business environment – In 2012, 10% of Latvian entrepreneurs used new software like ERP, less than half of the EU28 average (21.9%). This is partially counterbalanced by the good level of telecommunications sector investment in networks (15.8%) compared to the EU average (13%)

- Taxation & financial environment – In 2012, the total tax rate on commercial profits was 36.6%, 12% less than the EU28 average. It’s difficult in Latvia to raise money through local equity markets. Indeed, Latvia was graded 2.9, the fourth lowest of the EU28.

- Digital skills and e-leadership – 5.1% of enterprises had no hard-to-fill ICT job vacancies. That’s 0.5% above EU28 average. 2.7% of persons employed have ICT specialist skills, this is 0.5% less than the EU28 average.

- Entrepreneurial mindset – 80.9% would set-up a new business if they had the means, that’s about the EU28 average of 81.4%. That is in contrast with the 42.6% that has a favourable opinion about entrepreneurs, 10.5% below EU28 average.

As regard ICT start-ups, the score of Latvia is about 2.2 times higher than the EU28 average. It has an ICT birth rate of 22.5%, the highest of the EU28 and about 10% higher than the EU28 average. The employment share of new ICT enterprises amounts to 5.5%, more than double the EU28 average.

The share of e-commerce in the total enterprise turnover is 7%, 6.6% less than the EU28 average.
Digital Entrepreneurship Scoreboard 2015

Framework Conditions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Indicator/Indicator</th>
<th>Latvia</th>
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Individual indicators

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<td>R&amp;D expenditure from high-tech sectors</td>
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<td>121</td>
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<td>FDI in the reporting economy in the ICT sector</td>
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<td>Digital Business Environment</td>
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<td>123</td>
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<tr>
<td>ICT Start-ups</td>
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<td>215</td>
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<tr>
<td>Employment share of new ICT enterprises</td>
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<td>99</td>
</tr>
<tr>
<td>Information and Communication Technology Birth rate</td>
<td>61</td>
<td>177</td>
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<tr>
<td>Share of enterprises’ total turnover from e-commerce</td>
<td>51</td>
<td>109</td>
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<tr>
<td>Employment share of new ICT enterprises</td>
<td>84</td>
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<tr>
<td>Ease of Doing Business</td>
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<td>Cost of Tax Compliance</td>
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<td>Ease of access to loans</td>
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<td>Total Tax rate</td>
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<tr>
<td>Ease of Raising Money Through Local Equity Markets</td>
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<td>Venture Capital Availability</td>
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<td>122</td>
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</tr>
<tr>
<td>Total Tax rate</td>
<td>109</td>
<td>121</td>
</tr>
</tbody>
</table>
5.1.17. Lithuania

Hungary exhibits a performance above the EU28 average in the entrepreneurial mindset dimension and a very close to the average in the digital business environment. For the other three dimensions, Lithuania has a lower score than the EU28 average. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- **The digital knowledge base and the ICT market** – The Lithuanian ICT sector value added as a percentage of GDP is the lowest of all EU countries. Lithuania innovative effort is also relatively low with 0.6 patents per million inhabitants filled in 2010. This is around 15 times less than the EU28 average. The relative number of IT companies in clusters and the R&D expenditures from high tech sectors are very low as well.

- **The digital business environment** – In 2011, the telecommunications sector invested 15 of the revenues in the network, 1.8% higher than the EU28 average. In contrast, the companies use of ERP and CRM solutions are slightly below the EU28 average.

- **Taxation & financial environment** – Lithuanian cost of tax compliance and total tax rate are situated around the EU28 average. Financing seems more of an issue as venture capital, the ease of raising money through local equity markets and the access to loans are situated below the EU average. For example, Lithuania scored 2.3 in ease of access to loans, 0.5 points below EU28 average.

- **Digital skills and e-leadership** – 1.6% of employees have ICT specialist skills, this is half of the EU28 average. 5.8% of the employers provided training, this is 3% below EU28 average. In contrast, 58% of enterprises had no hard-to-fill vacancies for jobs requiring ICT specialist skills (12% more than the EU28 average) and 33% of individuals obtained IT skills through formalised educational institution, 6% more than the EU average.

- **Entrepreneurial mindset** – 56.1% would prefer to be self-employed if they could choose between jobs, the highest percentage of the EU28. This is in contrast with the 47.2% of respondents that have a favourable opinion about entrepreneurs, 6% below the EU28 average.

As regard ICT start-ups, Lithuania has a score of more than double the EU28 average. It has a high birth rate of 18.8%, 6.1% above average. Also for the employment share of the new ICT firms it performs better (4.2%) than the EU28 average (2.5%).

The share of e-commerce in the enterprise total turnover is 12%, 1.6% less than the EU28 average.
Digital Entrepreneurship Scoreboard 2015

Framework Conditions

ICT Start-ups dimension

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Lithuania</th>
<th>EU28 average</th>
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<tbody>
<tr>
<td>Digital knowledge base and ICT market</td>
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<td>Digital business environment</td>
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<td>Taxation &amp; financial environment</td>
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<td>0.67</td>
</tr>
</tbody>
</table>

Individual indicator

1. Digital knowledge base and ICT market
   - European High Technology Patents per million inhabitants
   - Number of IT enterprises in clusters
   - ICT sector (NACE Rev. 2) value added as a percentage of GDP

2. Digital business environment
   - FDI in the reporting economy in the ICT sector
   - Ease of Doing Business

3. Taxation & financial environment
   - Invests of telecommunications sector in networks
   - % enterprises who have ERP software to share information
   - % enterprises using CRM to analyze client information

4. Digital skills and e-leadership
   - Internet bandwidth (kb/s/hab)
   - Ease of access to loans
   - Venture Capital Availability

5. Entrepreneurial mindset
   - Individuals who obtained IT skills by educational institution
   - % enterprises that had no hard-to-fill vacancies for ICT jobs

6. Framework Conditions
   - % individuals who obtained IT skills by educational institution
   - ENTREPRENEURIAL MINDSET

7. ICT START-UPS
   - Information and Communication Technology Birth rate
   - Employment share of new ICT enterprises

8. Digital transformation
   - Share of enterprises’ total turnover from e-commerce
5.1.18. Luxembourg

Luxembourg exhibits a performance better than the EU28 average in all five dimensions. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – In 2011, Luxemburg counted 451 IT firms in clusters, a number relatively high compared to the size/population of the country.

- The digital business environment – The investments of telecommunications sector in networks as percentage of revenues amounted to 22.4%, the second highest level of EU28 as well. The internet bandwidth of Luxembourg amounts to 4091kb/s/hab, an internet capacity extremely high compared to all other EU countries.

- Taxation & financial environment – Luxembourg has the lowest cost of tax compliance and total taxation rate of the EU28. In addition, Luxembourg was graded third best among EU28 countries in terms of venture capital availability and ease of access to loans.

- Digital skills and e-leadership – Luxembourg had 4.3% of persons employed that have ICT specialist skills, 35% of companies provides training to their ICT specialist, 35% of individuals obtained IT skills through formalised education and 6.5% of companies did not face hard to fill vacancies for ICT jobs. All these percentages are significantly higher than the EU28 average.

- Entrepreneurial mindset – 35.5% would prefer to be self-employed if they could choose between jobs, that’s 0.5% less than EU28 average. 84.3% has a favourable opinion about entrepreneurs, that’s around 3% higher than the EU28 average.

As regard ICT start-ups, Luxembourg score lower than the EU28 average. It is due to an ICT birth rate of 10.4%, 2.3% below EU28 average.

The share of e-commerce in the enterprise total turnover is 23%, the second highest percentage of the EU28.
Digital Entrepreneurship Scoreboard 2015

Framework Conditions

ICT Start-ups dimension

Individual indicators

DIGITAL KNOWLEDGE BASE AND ICT MARKET
- European High Technology Patents per million inhabitants
- Number of IT enterprises in clusters
- R&D expenditure from high-tech sectors
- ICT sector (NACE Rev. 2) value added as a percentage of GDP
- FDI in the reporting economy in the ICT sector

DIGITAL BUSINESS ENVIRONMENT
- Ease of Doing Business
- Investments of telecommunications sector in networks
- % enterprises who have ERP software to share information
- % enterprises using CRM to analyse client information for...
- Internet bandwidth (kb/s/hab)

TAXATION & FINANCIAL ENVIRONMENT
- Venture Capital Availability
- Ease of Raising Money Through Local Equity Markets
- Ease of access to loans
- Cost of Tax Compliance

DIGITAL SKILLS AND E-LEADERSHIP
- % total persons employed that have ICT specialist skills
- % enterprises providing training to ICT/IT specialists
- % enterprises that had no hard-to-fill vacancies for ICT jobs
- % individuals who obtained IT skills by educational institution

ENTREPRENEURIAL MINDSET
- % respondents preferring to be self-employed
- % respondents that would set up or take over a business
- % respondents that have a favorable opinion about entrepreneurs

ICT START-UPS
- Information and Communication Technology Birth rate
- Employment share of new ICT enterprises
- Digital Transformation
- Share of enterprises’ total turnover from e-commerce

Luxembourg EU28 average

0.36
0.46
5.1.19. Malta

Malta exhibits a performance very close to the EU28 average for digital business environment and digital skills and e-leadership. It performs better than the EU28 average for access to finance and worse for digital knowledge base and ICT market and entrepreneurial mindset. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – Business enterprise R&D expenditure in from high-tech sectors in Malta were of 32 million euro in 2011, the second bottom performer among EU countries after Cyprus. Malta information and communication sector an FDI stock position from the rest of the world of -45 million euros, the lowest EU figure and the only negative one. This happens when the loans from the direct investment enterprise to the parent exceed the loans – or even the original capital – given by the parent to the direct investment enterprise. It could be the case where conduits or treasury companies are involved.\(^{19}\)

- The digital business environment – In 2011, the telecommunication sector invested 18.6% of revenues in the network, the fourth highest percentage of the EU28. 19.5% of Maltese enterprises used new software like CRM in 2012, a level close to the EU28 average. However, in the global ease of doing business ranking, Malta was ranked 102\(^d\) and last EU28 country.

- Taxation & financial environment – Malta has a score of 4.5 for raising money through local equity markets, which is the fourth highest score of EU28. Also for access to loans it has the fourth highest score, 3.9. This makes Malta a country where it’s raise money through loans or local equity markets than most of the other EU28 countries.

- Digital skills and e-leadership – 8.9% of the local companies provided training to ICT specialists, which is equal to the EU28 average. 5.1% of the enterprises had no hard-to-fill ICT vacancies, this is just above EU28 average.

- Entrepreneurial mindset – 34.3% of respondents would prefer to be self-employed, that’s 1.8% below EU28 average. 43.9% has a favourable opinion about entrepreneurs, more than 9% below EU28 average.

As regard ICT start-ups, Malta data for the selected indicators was not available. The scores that can be observed in the figures below were imputed via a linear regression based on national population and GDP for comparison purpose.

The share of total turnover from e-commerce in Malta equals 13%, slightly below the EU average.

\(^{19}\) Eurostat, http://www.oecd.org/daf/inv/investmentstatisticsandanalysis/fdistatisticsanddata-frequentlyaskedquestions.htm#Q2
### Framework Conditions

#### ICT Start-ups dimension

<table>
<thead>
<tr>
<th>Indicator/Pillar performance</th>
<th>Malta</th>
<th>EU28 average</th>
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</table>

#### Individual indicators

**DIGITAL KNOWLEDGE BASE AND ICT MARKET**
- European High Technology Patents per million inhabitants
- Number of IT enterprises in clusters
- R&D expenditure from high-tech sectors
- ICT sector (NACE Rev. 2) value added as a percentage of GDP
- FDI in the reporting economy in the ICT sector

**TAXATION & FINANCIAL ENVIRONMENT**
- Ease of Doing Business
- Venture Capital Availability
- Ease of Raising Money Through Local Equity Markets

**DIGITAL SKILLS AND E-LEADERSHIP**
- Ease of access to loans
- Investments of telecommunications sector in networks
- % enterprises that have ERP software to share information
- % enterprises using CRM to analyse client information for...

**ENTREPRENEURIAL MINDSET**
- % respondents that have a favorable opinion about entrepreneurs
- % respondents that would set up or take over a business
- % respondents that prefer to be self-employed

**DIGITAL TRANSFORMATION**
- Information and Communication Technology Birth rate
- Employment share of new ICT enterprises
- Share of enterprises' total turnover from e-commerce
5.1.20. Netherlands

The Netherlands exhibits a performance above the EU28 average in the four first dimensions. For entrepreneurial mindset, the Netherlands has a score similar to the EU28 average. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – The Netherlands receive an inward FDI in the ICT sector of 22,847 million euro in 2011. The second highest amount of the EU28. In 2010 the Netherlands had 15.3 high technology patents per million habitants, about 6 more than the EU28 average. The Netherlands has 20,750 IT companies in clusters, the fourth highest number among EU countries.

- The digital business environment – In 2011 the telecommunications sector invested 16.2% of revenues in the network, the fifth highest percentage of EU28. The internet bandwidth available in the Netherlands is equal to 172kb/s/hab., the 8th highest among EU28 countries.

- Taxation & financial environment – In 2012 the Netherlands had a total tax rate on commercial profits of 40.1%, 8.5% lower than EU28 average. It has a score of 3.7 for ease of access to loans, 0.9 point higher than EU28 average.

- Digital skills and e-leadership – 4.1% of employees has ICT specialist skills, about 1% more than EU28 average. 12.3% of employers provide training, this is also better than EU28 average (3.5% above it).

- Entrepreneurial mindset – 30.9% would prefer to be self-employed if they could choose between jobs, about 5% below EU28 average. This is in contrast with the 84.4% of respondents that would set-up a new business if they had the means, 4% above the EU28 average.

As regard ICT start-ups, the Netherlands have a score slightly higher than the EU28 average.

For the indicators, employment rate of new ICT firms (2.8%) and ICT birth rate (13.5%) are slightly better than the EU28 average.

The share of total turnover from e-commerce in the Netherlands equals 13%, slightly below the EU average.
5.1.21. Poland

Poland exhibits a performance slightly above the EU28 average for entrepreneurial mindset. For the other four dimensions, Poland has a lower score than the EU28 average. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – Poland counts more than 25,500 IT companies in clusters, the highest number among EU countries. In contrast, Poland counts registered 1 European high tech patent per million inhabitants in 2010. This innovative performance is 9 times below the EU29 average. Poland high-tech sectors R&D expenditure amounted to 855 million euro, a relatively low amount compared to the other EU28 countries when compared to national GDP.

- The digital business environment – In 2012, 13% of enterprises used new software like ERP, 7.9% below EU28 average and 12.9% used CRM, third lowest among EU28.

- Taxation & financial environment – Poland has a score of 2.5 for ease of access to loans when the EU28 average is of 2.8. Also for venture capital availability Poland performs below the EU28 average (2.9) with a score of 2.4. The time required in Poland per year for a business to prepare, file, and pay taxes is the third longest among EU countries.

- Digital skills and e-leadership – 2.7% of peoples employed has ICT skills, 0.5% below EU28 average. 29% has obtained ICT skills though education, 1.3% above EU28 average. The share of enterprises that provided trainings to their IT/ICT specialists is only of 5.5%, 3.5% below the EU average.

- Entrepreneurial mindset – 40.4% of respondents have a favourable opinion about entrepreneurs, 13% less than the EU average. That is in contrast with the 87.4% of respondents that would set up a business if they had the means, the third highest percentage among EU28.

As regard ICT start-ups, Poland performs a lot better than the EU28 average. It has an ICT birth rate of 17.9%, 5.2% higher than the EU28 average. The new ICT firms employment rate of Poland (5.7%) is the highest of the EU28.

The share of total turnover from e-commerce in Poland equals 10%, 3.5% less than the EU average.
Digital Entrepreneurship Scoreboard 2015

Framework Conditions

![Diagram showing the performance of Poland and EU28 average across different dimensions](image)

**Individual indicators**

- **Digital Knowledge Base and ICT Market**
  - European High Technology Patents per million inhabitants
  - Number of IT enterprises in clusters
  - R&D expenditure from high-tech sectors
  - ICT sector (NACE Rev. 2) value added as a percentage of GDP
  - FDI in the reporting economy in the ICT sector

- **Digital Business Environment**
  - Ease of Doing Business
  - Investments of telecommunication sector in networks
  - % enterprises who have ERP software to share information
  - % enterprises using CRM to analyse client information
  - Internet bandwidth (kb/s/hab)

- **Taxation & Financial Environment**
  - Ease of Raising Money Through Local Equity Markets
  - Venture Capital Availability
  - 1 - Total Tax rate
  - Ease of access to loans

- **Digital Skills and E-Leadership**
  - % total persons employed that have ICT specialist skills
  - % enterprises providing training to ICT/IT specialists
  - % enterprises that had no hard-to-fill vacancies for ICT jobs
  - % individuals who obtained IT skills by educational institution
  - % respondents who obtained IT skills by educational institution

- **Entrepreneurial Mindset**
  - % individuals who obtained IT skills by educational institution
  - % enterprises that had no hard-to-fill vacancies for ICT jobs
  - % individuals who obtained IT skills by educational institution

- **ICT Start-Ups**
  - % respondents that would set up or take over a business
  - % respondents that prefer to be self-employed
  - % respondents who would set up or take over a business
  - % respondents that have a favorable opinion about entrepreneurs

- **ICT Transformation**
  - Information and Communication Technology Birth rate
  - Employment share of new ICT enterprises
  - Share of enterprises’ total turnover from e-commerce

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December 2015
5.1.22. Portugal

Portugal exhibits a better performance than the EU28 average for digital business environment and entrepreneurial mindset. It is below the EU28 average in the three other dimensions. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – In 2010 Portugal had 0.48 high technology patents per million habitants, the fifth lowest amount of the EU28. The ICT added value compared to the GDP is 3.6%, 0.7% below the EU28 average. Portugal’s inward FDI in the ICT sector position was equal to 1160 million euro in 2011. This amount is around 13 times less than the EU28 average.

- The digital business environment – 31% of Portuguese firms used ERP solutions, 9% above the EU28 average (22%). Portugal has an internet bandwidth of 194 kb/s/hab., the fourth highest among EU28 countries.

- Taxation & financial environment – Portugal has a score of 6.9 for the cost of tax compliance, this is below EU28 average. The total tax rate on commercial profits is of 42.6%, 6% lower than EU28 average. The ease of access to loans was graded 2.3 in Portugal, a score below the EU28 average.

- Digital skills and e-leadership – 2.6% of people employed have ICT specialist skills, this is around 0.6% less than the EU28 average. 25% of persons obtained ICT skills through education, lower than the EU28 average (27.7%).

- Entrepreneurial mindset – 46.9% of respondents would prefer to be self-employed if they could choose, the fifth highest percentage and 11% above the EU28 average. This is in contrast with the 45.8% of respondents that have a favourable opinion about entrepreneurs, 6.3% below EU28 average.

As regard ICT start-ups, Portugal performs better than the EU28 average. This is reflected in the two indicators: the Portuguese ICT birth rate equals 15.1% and new ICT firms employment share 3.3% when EU averages equal 12.7% and 2.5%.

The share of total turnover from e-commerce in Portugal equals 12%, slightly below the EU average.
Digital Entrepreneurship Scoreboard 2015

Framework Conditions

ICT Start-ups dimension

Individual indicators

DIGITAL KNOWLEDGE BASE AND ICT MARKET
European High Technology Patents per million inhabitants
Number of IT enterprises in clusters
R&D expenditure from high-tech sectors
ICT sector (NACE Rev. 2) value added as a percentage of GDP
FDI in the reporting economy in the ICT sector

DIGITAL BUSINESS ENVIRONMENT
Ease of Doing Business
Investments of telecommunications sector in networks
% enterprises who have ERP software to share information
% enterprises using CRM to analyse client information for...
Internet bandwidth (kb/s/hab)

TAXATION & FINANCIAL ENVIRONMENT
Cost of Tax Compliance
1 - Total Tax rate
Venture Capital Availability
Ease of Raising Money Through Local Equity Markets
Ease of access to loans

DIGITAL SKILLS AND E-LEADERSHIP
% total persons employed that have ICT specialist skills
% enterprises providing training to ICT/IT specialists
% enterprises that had no hard-to-fill vacancies for ICT jobs
% individuals who obtained IT skills by educational institution

ENTREPRENEURIAL MINDSET
% respondents preferring to be self-employed
% respondents that would set up or take over a business
% respondents that have a favorable opinion about entrepreneurs

ICT START-UPS
Information and Communication Technology Birth rate
Employment share of new ICT enterprises

DIGITAL TRANSFORMATION
Share of enterprises' total turnover from e-commerce
5.1.23. Romania

Hungary exhibits a performance largely above the EU28 average for entrepreneurial mindset and a close to the average for digital business environment and access to finance. For the other two dimensions, Hungary performs lower. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – In 2010, Romania had 0.1 high technology patents per million habitants, the lowest innovative performance of the EU28. High-tech sectors R&D expenditure was equal to 237 million euro in 2011, which represents around 0.07% of the national GDP. This percentage is the second lowest after Cyprus.

- The digital business environment – Romania performed better than the EU28 average (13.1%) in the national investment of the telecommunication sector in networks compared to revenues (16.1%). Romania was ranked 72\textsuperscript{nd} on the global ease of doing business ranking and 25\textsuperscript{th} EU country. The adoption rates of ERP and CRM are also slightly below the EU averages.

- Taxation & financial environment – Romania has a score of 3.2 in raising money through local equity markets which makes it more difficult in Romania than the EU28 average (3.9). Also for access to venture capital availability Romania (2.4) performance less than the EU28 average (2.9).

- Digital skills and e-leadership – In 2010, 2.3% of persons employed had ICT specialist skills, the fourth lowest percentage of EU28. 1.5% of employers provided training to their ICT specialist, the lowest rate of EU28 and 7.4% lower.

- Entrepreneurial mindset – 47.8% of respondents would prefer to be self-employed if they could choose between jobs, 11.7% above the EU28 average. 88.7% would set-up a new business if they had the means, the second highest percentage of EU28.

As regard ICT start-ups, Romania performs lower than EU28 average. It has a low ICT birth rate (6.1%) but the new ICT firms employment share (2.7%) is slightly higher than EU28 average (2.5%).

The share of e-commerce in the total enterprise turnover is 4%, the second lowest of the EU28.
Digital Entrepreneurship Scoreboard 2015

Framework Conditions

![Diagram showing framework conditions indices for Romania and EU28 average](image)

Individual indicators:

- **Digital knowledge base and ICT market**
  - European High Technology Patents per million inhabitants
  - R&D expenditure from high-tech sectors
  - ICT sector (NACE Rev. 2) value added as a percentage of GDP
  - FDI in the reporting economy in the ICT sector

- **Digital business environment**
  - ICT Start-ups condition
  - % respondents that have a favorable opinion about entrepreneurs
  - % respondents that would set up or take over a business
  - % individuals who obtained IT skills by educational institution
  - % enterprises that had no hard-to-fill vacancies for ICT jobs
  - % enterprises providing training to ICT/IT specialists
  - % total persons employed that have ICT specialist skills
  - % enterprises using CRM to analyse client information for...
  - %  enterprises who have ERP software to share information
  - Investments of telecommunications sector in networks

- **Taxation & financial environment**
  - Ease of Doing Business
  - Ease of access to loans
  - Ease of Raising Money Through Local Equity Markets
  - Venture Capital Availability
  - Cost of Tax Compliance
  - 1 - Total Tax rate
  - FDI in the reporting economy

- **Digital skills and e-leadership**
  -_number of IT enterprises in clusters
  - Internet bandwidth (kb/s/hab)

- **Entrepreneurial mindset**
  - Number of new ICT enterprises
  - % respondents prefering to be self-employed
  - % respondents that would set up or take over a business

- **ICT Sector (NACE Rev. 2) value added as a percentage of GDP**

- **R&D expenditure from high-tech sectors**

- **Number of IT enterprises in clusters**

- **FDI in the reporting economy**

- **Venture Capital Availability**

- **Cost of Tax Compliance**

- **Ease of Raising Money Through Local Equity Markets**

- **Ease of access to loans**

- **Ease of Doing Business**

- **ICT Start-ups condition**

- **Digital entrepreneurship conditions**

- **Romania**

- **EU28 average**

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December 2015  Page 136 of 157
5.1.24. Slovakia

Slovakia exhibits a performance better than the EU28 average for digital skills and e-leadership. Its performance is almost equal for digital business environment and below the average for the digital knowledge base and ICT market, the access to finance and the entrepreneurial mindset. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- **The digital knowledge base and the ICT market** – The ICT added value share compared to the GDP is 4.8%, 0.5% higher than the EU28 average. In contrast, Slovakia has 175 IT companies in clusters, the lowest amount of the EU28 and 0.42 high tech patents per million inhabitants, the fourth lowest innovative productivity among EU28 countries.

- **The digital business environment** – In 2012, 20% of the Slovakian enterprises used new software like ERP, 1.9% below EU28 average. 19.6% used new software like CRM, 0.8% above EU28 average.

- **Taxation & financial environment** – Slovakia has a score of 2.5 for raising money through local equity markets, the lowest score of EU28. This is in contrast with the score (3.0) it has for access to loan, 0.2 points higher than the EU28 average. Slovakia has an internet bandwidth of 11.4 kb/s/hab, the lowest capacity among the EU28 countries. Nevertheless, Slovakian companies have 12% of their revenues coming from e-commerce, a percentage just below the EU28 average of 13.6%.

- **Digital skills and e-leadership** – 39% of individuals have obtained ICT skills through education, the third highest rate of EU28. However, 3.9% of the Slovakian companies only do not face hard to fill vacancies for ICT jobs.

- **Entrepreneurial mindset** – 84% of respondents would set up a new business if they had the means, about 3.5% more than the EU28 average. This is in contrast with the 32.6% of respondents that have a favourable opinion about entrepreneurs, the second lowest rate of the EU28.

As regard ICT start-ups, Slovakia data for the selected indicators was not available. The scores that can be observed in the figures below were imputed via a linear regression based on national population and GDP for comparison purpose.

The share of total turnover from e-commerce in Slovakia equals 12%, slightly below the EU average.
5.1.25. Spain

Compared to the EU28 average, Spain exhibits a better performance for entrepreneurial mindset and a lower performance for digital skills and digital knowledge base and ICT market. It has a performance equal to the EU28 average for the digital business environment and a close one to the taxation & financial environment. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – In 2010, Spain had 2.8 high technology patents per million inhabitants, this is 3.3 times less than the EU28 average. Spanish levels of R&D expenditures from high-tech sectors and ICT sector value added compared to GDP are almost two times lower than the EU28 average. In contrast, Spain has the highest amount of inward FDI in the ICT sector (26,550 million euro) among the EU28. When normalised by the national GDP, Spain still gets the 3d place.

- The digital business environment – The telecommunication sector in Spain invests 11.5% of revenues in the network, 1.6% less than the EU28 average. About 21% of the enterprises use CRM, which is lower than the EU28 average (19%).

- Taxation & financial environment – Spain has a score of 2.1 for the access to loans, the fourth lowest grade in the EU28, which makes it more difficult to access to loans than in most other EU28 countries. Regarding raising money through local equity market, Spain got a score of 3.2 lower than the average EU grade.

- Digital skills and e-leadership – Around 3% of the peoples employed in Spain has ICT specialist skills, this is similar to the EU28 average. In contrast, the share of individuals obtaining IT skills through educational institutions amounts to 21%, 7% less than on average in the EU28.

- Entrepreneurial mindset – 89% of the respondents would set-up a new business or take over an existing one, the highest score among the EU28 countries. Also, more people in Spain have a favourable opinion about entrepreneurs than the EU28 average (62% compared to 53%).

As regard ICT start-ups, Spain scores below the EU28 average. This is because of the low rate of new ICT firms employment (1.8%) and the low ICT birth rate (11.8%) compared to the EU28 averages of respectively 12.7% and 2.5%.

The share of total turnover from e-commerce in Spain equals 14%, slightly above the EU average.
Spain is one of the five countries covered by the IDC European Vertical Markets' Survey. Below are described key findings on the digitalisation of the national companies per technology, level of digital adoption, sector and company size are described.

Digital beginners prevail in Spain, where up to 48.5% of companies in manufacturing and some 49% in transport and storage have adopted just one digital technology. Social media and cloud, and social media and mobility drive investments of digital followers, which account for some 25.6% of total Spanish companies, and are particularly evident in finance, information
Digital Entrepreneurship Scoreboard 2015

and communications and retail/wholesale trade. Spanish retailers have been particularly active in the adoption of social media tools to engage with customers: the adoption of cloud (to standardise across subsidiaries and reduce costs) is also higher than country average in this sector. Digital mature (3%) and fully digital (1.2%) companies represent a small share of the total market, and are mainly present in the finance sector (17.7% and 3.7%) and generally among large companies (11.7% and 6.8%).

Social media is the most adopted digital technology in the country, with many companies trying to gather ideas/feedback for their products and services (82.3%) and/or managing relationships with prospects and customers (70.8%) through social media tools. The usage of social software and of internal wikis is still limited, with just 50% of companies having adopted social media to collaborate within the organisation. This is particularly true in SMEs, while some 73% of large Spanish companies use it also as a collaborative tool to acquire and share knowledge within the company.

The adoption of public cloud follows in the ranking, driven by large companies. Basic solutions such as security and storage as a service drive cloud demand, while CRM and ERP modules as a service have been so far more appealing just to 13.5% of large Spanish companies. Similarly to other countries, costs and complexity of Big data have limited adoption to the high-end of the market, where some 24% of companies already rely on it. Mobility has found more acceptance also in SMEs, with some 28% of small and medium size Spanish companies using mobile applications especially to mobile enable their employees.
Digital Entrepreneurship Scoreboard 2015

Spain digital adoption rates, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises.
Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012

Spain digital adoption rates by industry, sector and company size, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude government and healthcare.
Source: IDC, Based on IDC European Vertical Markets' Survey, 2012
Spain percentage of companies adopting novel digital technologies, 2012

- Social: 36%
- Cloud: 29%
- Big Data Technologies: 4%
- Mobile solutions: 27%

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises.
Source: IDC, Based on IDC European Vertical Markets' Survey, 2012
5.1.26. Sweden

Sweden exhibits a performance better than the EU28 average in the digital knowledge base and ICT market, the digital business environment, the access to finance, the digital skills and e-leadership dimensions. It performs below the EU28 average in the entrepreneurial mindset. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – In 2010, Sweden had 26.5 high technology patents per million habitants, the highest of the EU28 and 2.8 times more than EU28 average. The ICT added value share compared to the GDP is 6.4%, the highest of EU28 as well.

- The digital business environment – In 2011, the telecommunications sector invested 11.1% of its revenues in networks, 2% lower than EU28 average. Sweden has high new technology adoption rates as witnessed by the 38% of enterprises that used ERP solutions, the highest rate among EU28 countries. The internet bandwidth available in Sweden equals 280 kb/s/hab, the third highest EU score.

- Taxation & financial environment – Sweden has the highest score of EU28 for venture capital availability (4.3) and ease of access to loans (4.6).

- Digital skills and e-leadership – Sweden has the highest rate of persons who obtained ICT skills through education (40%), 12.3% above than EU28 average, as well as of persons employed that have ICT specialist skills (5.4%), 2.2% above the EU28 average.

- Entrepreneurial mindset – 21.2% of respondents would prefer to be self-employed if they could choose, the lowest percentage of the EU28. However, 53.20% have a favourable opinion about entrepreneurs, which is about the EU28 average.

As regard ICT start-ups, Sweden has a lower score than the EU28 average. Both the ICT birth rate (8.9%) and the new ICT firms employment share (2.3%) are below the EU28 average of respectively 12.7% and 2.5%.

The share of total turnover from e-commerce in Sweden equals 20%, largely above the EU average and 4th best performance among the EU28MS.
Digital Entrepreneurship Scoreboard 2015

Framework Conditions

Individual indicators

- Digital knowledge base and ICT market
- Entrepreneurial mindset
- Digital skills and e-leadership
- Taxation & financial environment
- ICT Start-ups condition

- Share of enterprises’ total turnover from e-commerce
- Employment share of new ICT enterprises
- Information and Communication Technology Birth rate
- Venture Capital Availability
- Ease of access to loans
- FDI in the reporting economy in the ICT sector
- Number of IT enterprises in clusters
- R&D expenditure from high-tech sectors
- ICT sector (NACE Rev. 2) value added as a percentage of GDP
- European High Technology Patents per million inhabitants
- % respondents that would set up or take over a business
- % total persons employed that have ICT specialist skills
- % enterprises providing training to ICT/IT specialists
- % respondents that had no hard-to-fill vacancies for ICT jobs
- % individuals who obtained IT skills by educational institution
- % respondents preferring to be self-employed
- % entrepreneurs who have ERP software to share information
- % enterprises using CRM to analyse client information for...
- Internet bandwidth (kb/s/hab)
- % respondents that have a favorable opinion about entrepreneurs
- % of total tax rate
- Perceived Ease of Doing Business
- % respondents who would set up or take over a business
- % respondents that would set up or take over a business
- % respondents that had a favorable opinion about entrepreneurs
- % respondents that would set up or take over a business

Sweden
EU28 average
5.1.27. Slovenia

Hungary exhibits a performance above the EU28 average in the digital skills and e-leadership dimension, a very close to the EU28 average for the digital knowledge base and ICT market, the digital business environment and the access to finance. It performs largely below in the entrepreneurial mindset dimension. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – The ICT added value share compared to the GDP is 4.8%, slightly higher than the EU28 average. Slovenia had 1944 IT companies in clusters in 2011, a relatively low number.
- The digital business environment – In 2011, the telecommunications sector invested 9.8% of revenues in the network, the lowest rate of EU28. In contrast, its ERP adoption rate amounts to 28%, 6% above the EU average.
- Taxation & financial environment – Slovenia has a score of 2.8 for ease of raising money through local equity markets, the third lowest score. The total tax rate on commercial profits is 34.7%, the 7th lowest among EU28 countries.
- Digital skills and e-leadership – 31% of individuals have obtained ICT skills through education, 3.3% above EU28 average. 3% of persons employed have ICT skills, 0.2% beneath the EU28 average. 14% of the companies provided trainings to their ICT specialists, this is the 3rd highest score among EU28 countries and the 4% above the average.
- Entrepreneurial mindset – Slovenia has the third lowest score of EU28 for the indicators: respondents that would set-up a new business (70.1%) and respondents that have a favourable opinion about entrepreneurs (35.7%).

As regard ICT start-ups, Slovenia has a higher score than the EU28 average. The ICT birth rate is 15.7%, 3% higher than the EU28 average. The employment share of new ICT enterprises is 3.6, the fifth highest score of EU28.

The share of total turnover from e-commerce in Slovenia equals 13%, slightly below the EU average.
5.1.28. United Kingdom

The United Kingdom exhibits a performance very close to the EU28 average for the digital business environment and the entrepreneurial mindset. For the other three dimensions, the UK performs better than the EU28 average. Considering more specifically the individual indicators for each framework dimension it can be remarked that:

- The digital knowledge base and the ICT market – The ICT added value share compared to the GDP is 5.8%, the second highest of the EU28. The number of high technology patents per million inhabitants is 7.4, slightly below the EU28 average.
- The digital business environment – The United Kingdom is ranked 7th on the ease of doing business ranking and second EU country. In contrast, only 9% of enterprises used ERP solutions, the lowest among EU28 together with Hungary.
- Taxation & financial environment – It has a score of 4.6 for ease of raising money through local equity markets, the third highest among EU28 and 3.51 for the venture capital availability, the 6th highest score among EU28.
- Digital skills and e-leadership – 7.2% of UK enterprises had no hard-to-fill ICT vacancies, 3.6% above EU28 average and the second highest among the EU28 countries. 38% of individuals have obtained ICT skills through education, 10.3% more than the EU28 average.
- Entrepreneurial mindset – 31.5% would prefer to be self-employed if they could choose between jobs, 3.6% below EU28 average. 86% of the respondents would set up a new business or take over an existing one if they had the means. This is 5% more than the EU28 average.

As regard ICT start-ups, the United Kingdom has a score equal to the EU28 average. It has an ICT birth rate of 13.4%, 0.7% more than the EU28 average.

The share of total turnover from e-commerce in Belgium equals 19%, 5.5% above the EU average.
UK is one of the five countries covered by the IDC European Vertical Markets' Survey. Below are described key findings on the digitalisation of the national companies per technology, level of digital adoption, sector, and company size are described.

Higher ICT sophistication has brought a higher number of UK companies to start experimenting with novel digital technologies. Digital beginners still represent the highest share of the total market, with strong adoption rates especially in healthcare, but also in information and communications (led by SMEs in publishing), manufacturing, and transport and storage. Digital
followers account for some 23.7% of companies, up to more than 40% in trade. Social media and mobility is the most adopted combination of solutions among digital followers in the country. The UK shows a relatively higher share of digital mature (8%) and fully digital (2.6%) companies. Digital mature companies in many cases rely on a combination of digital technologies that also includes Big data, showing on average a more advanced usage of digital technologies. Sophistication in the finance, information and communications, retail and mining (oil&gas upstream) sectors drives a relatively high share of fully digital companies among large companies (nearly 19%). The public administration also shows a higher than average adoption of new digital solutions.

Mobility (37.9%) is the most adopted technology area, followed by social (34.4%) and public cloud (31%). Reliance on mobile applications is particularly strong among large companies (up to 74% relying already on some sort of mobile application beyond e-mail). Finance, information and communications and utilities lead adoption. Social media is quite used as a new channel to reach customers in retail (48.7%), and as a way to interact with citizens in public administration (66.5%).

More than 60% of UK large companies (excluding healthcare and the public administration sectors) have adopted public cloud solutions; adoption goes beyond basic solutions and up to nearly 18% of companies have already CRM or ERP modules in the public cloud.

The UK is the most mature country for Big data deployment, with adoption higher than 20% across several sectors, including mining (oil&gas upstream), utilities, services, information and communications and public administration, and around 50% in finance, thanks to investments in banking and capital markets.
United Kingdom digital adoption rates, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012

United Kingdom digital adoption rates by industry, sector and company size, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises. Data by size exclude government and healthcare. Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012
United Kingdom percentage of companies adopting novel digital technologies, 2012

Note: Data refer to companies with 10+ employees and are weighted by number of enterprises.
Source: IDC, Based on IDC European Vertical Markets’ Survey, 2012
5.2. Definitions used in this research

The survey conducted for this research is based on the following definitions for:

- Cloud Computing
- Big Data
- Mobility
- Social Media

Respondents were selected based on their role in the IT organization, so have a good understanding of the meaning of each of the digital technologies used. When survey respondents asked specifically what is meant by any of the above digital technologies the following definitions were read out to them by the interviewer.

Cloud computing

- **Public cloud** services are available on public networks and open to a largely unrestricted universe of potential users. Public clouds are designed for a market, not a single enterprise. Public cloud has all or most of the following characteristics:
  - **Shared, standard service.** Built for a market (public), not a single customer
  - **Solution packaged.** A "turnkey" offering; integrates required resources
  - **Self-service.** Administration and provisioning; may require some "onboarding" support
  - **Elastic scaling.** Dynamic and fine grained
  - **Usage-based pricing.** Supported by service metering
  - **Accessible via the Internet.** Ubiquitous (authorized) network access
  - **Standard UI technologies.** Browsers, RIA clients, and underlying technologies
  - **Published service interface/API.** Web services and other common Internet APIs
  - **Private cloud** services are designed for restricted access by a single enterprise (or extended enterprise) but otherwise share most if not all of the key characteristics of public cloud services. A private cloud can be held on site within the enterprise (Private cloud, run in your company's own set of hosts) or held within the service providers' premises hosted as a dedicated private cloud (Private cloud, delivered by a cloud service provider on a dedicated set of hosts).
Big Data

Big Data is a term describing the continuous increase in data, and the technologies needed to collect, store, manage, and analyse it. It is a complex and multidimensional phenomenon, impacting people, processes and technology. From a technology point of view, Big Data encompasses hardware and software that integrate, organize, manage, analyse, and present data which is characterized by "four Vs": IDC describes Big Data technologies as a new generation of technologies and architectures, designed to economically extract value from very large volumes of a wide variety of data, by enabling high-velocity capture, discovery, and/or analysis.

- Volume: massive volume of data
- Variety: breadth of data sources and formats
- Velocity: speed at which information arrives, is analysed and delivered
- Value: referring to both the cost of technology and the value derived from its use
- The Big Data technology stack includes:
  - Infrastructure, such as storage systems, servers, and datacentre networking infrastructure
  - Data organization and management software
  - Analytics and discovery software
  - Decision support and automation software
  - Services including business consulting, business process outsourcing, IT outsourcing, IT project-based services, and IT support and training related to Big Data implementations.

Mobility

A mobile device management (MDM) solution includes many of the standard features included in PC management solutions but also includes additional functionality that addresses the unique needs of mobile devices such as smartphones and media tablets and, increasingly, other areas (i.e., M2M modules or printers). Some of the key features of a mobile device management solution are:

- Device provisioning and managing configuration settings
- Inventory/asset management
- Software distribution (applications, operating systems [OSs], firmware updates)
- Remote wipe/lock, remote control for systems diagnostics
- Policy/compliance management (encryption management, device posture, etc.)
- Authentication and certificate management
- Real-time device monitoring, location information, GPS breadcrumbing
- Reporting and analytics on devices
Digital Entrepreneurship Scoreboard 2015

Mobile application management (MAM) refers to a solution by which specific mobile applications can be managed, secured, and distributed by IT organizations and typically allow for enhanced policies to be applied to individual applications. Mobile application management solutions can either supplement MDM functionality or stand alone and typically include some combination of the following features:

- Management of the application life cycle:
  - Granular application distribution capabilities by group or policy (often through a mobile enterprise application store)
  - Application performance management and monitoring
  - Application version management and end of life
  - Detailed application analytics

- Granular security management and corporate policy control of applications and content:
  - Enforce or restrict user authentication and encryption per application
  - Apply micro-VPNs to individual apps
  - Enable or disallow data storage, offline access, document sharing, and copy/paste
  - Offer ability to wipe applications/data remotely

Social Media

No formal definitions were offered to respondents for Social Media, but the definition used in this research is:

- **Enterprise social media** describes companies' reliance on social media tools for business purpose. These tools may include social networks (e.g. Facebook, LinkedIn, etc.), microblogging (e.g. Twitter), blogs, internal wikis and/or other enterprise collaborative social software.

- **Social media** enables new ways to communicate, interact and work with partners, customers/potential customers and other individuals outside the organization, as well as facilitate collaboration and knowledge sharing within the organization.