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## **Intellectual Output 1: Deliverable 1.1. - Definition of skills demand**

**Project title: Open Up Entrepreneurship**

**Activity 1 (IO1): Skill profile  
identification.**

**IME GSEVEE  
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### **Ethical Statement for Deliverable IO1 – Activity 1**

We testify on behalf of all co-authors that our article submitted for the current Deliverable is compliant with the rules of the relevant managing authority and EU guiding rules:

Title: Skill Profile Identification Report

All authors:

- 1) this material has not been published in whole or in part elsewhere;
- 2) all the material used follows the appropriate referencing rules and conventions;
- 3) the manuscript is not currently being considered for publication in academic journals or projects' deliverables;
- 4) all authors have been personally and actively involved in substantive work leading to the Deliverable, and will hold themselves jointly and individually responsible for its content.

Date: 30/03/2016

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## 1. Introduction

The present Report (Intellectual Output 1: Deliverable 1.1. - Definition of skills demand) constitutes the first Deliverable of the Activity 1 (IO1): Skill profile identification, in the framework of the project ‘Open Up Entrepreneurship’ (OpEn).

The project ‘Open Up Entrepreneurship’ objectives promote the identification of needs into two broad firms’ categories and target groups which are perspective young entrepreneurs but also existing micro/small-sized firms. In that respect, common business needs will be identified and will be tackled through the formulation of a joint and integrated course of action.

More specifically, the project will address the education needs of talented youth during their progression from undergraduate students to young entrepreneurs, establishing their own business in a real business environment.

Simultaneously, enterprise associations and confederations, as well as university's experts on innovation and entrepreneurship will express the needs of their members-firms and users (by analyzing existing studies or by conducting interviews or running focus groups where needed), while academic partners will translate them to specific learning objectives and module outline.

In this respect, the following Report includes a literature review on digital and e-business skills in the field of SME's with respect to start-ups, established firms as well as the countries of reference (Italy, Spain, United Kingdom, Greece). In this part, it is taking place an identification of skills demands by analyzing secondary data collection/desk research (published information, international studies etc) from existing secondary sources and evaluating existing case studies on training and skill demands.

Furthermore, a primary data collection has taken place with a focus to assess competence and skill needs through structured interviews with major players on the field and/or focus groups with relevant stakeholders in each participating country. This phase validated the skills demands identified within the secondary data collection, formulating a relevant skills profile which includes possible educational and training paths leading to skills and competences required (module outline/module units). The whole approach will be based on a qualitative method (e.g. literature review, interviews, focus groups) aims to illustrate and define major skills demands and needs by collecting information and observing human behaviour along with their causes.

Specifically, University of Bari, Manchester Metropolitan University and CEEI Burgos implemented specific number of interviews within the Activity 1, while IME GSEVEE and University of Patras collected relevant information provided by the interviews and implemented two (2) Focus Groups (Athens and Patra) with respective emphasis into project's two broad firms' categories/target groups which are perspective young entrepreneurs but also existing micro/small-sized firms.

This input will be exploited for the purposes of designing an appropriate concept training package (module development) which takes into account the scope of the project but also the idiosyncrasies of SME's companies as regards to innovation and e-business. In this framework, there will be an assessment of final results derived from WP 1 & WP2 and a conversion of skills' needs to Module Units based on qualitative methods (e.g. secondary literature identification; primary research cross-validation).

The final output will be a concept training package including a brief description of the training content, prerequisites and outcomes, a syllabus and a course outline. More specifically, the module development includes: Learning Objectives for each target group, Course Syllabus, Course Outline and Assessment methods.

### **1.1. The e-skills concept**

The last few decades, there has been significant growth in ICT employment as a result of ICT dissemination throughout the economy. This includes employment directly in the ICT sector but also indirectly in terms of ICT-specialists in non-ICT sectors (e.g. health) and also among ICT-intensive users in all sectors which rely on ICT skills to perform their work (OECD, 2012). As ICTs and the Internet become more pervasive, Information and Communication Technologies (ICT) are increasingly viewed as a vital infrastructure for all sectors of the economy.

Moreover, Information and Communication Technologies (ICTs), and particularly the Internet, are driving innovation, skills, labour productivity and growth (OECD, 2011a, 2011b). New applications are also key enablers for developing new skills, novel business models and innovative activities within the society and all sectors of the economy (e.g. green growth) (OECD, 2012).

Nowadays, the importance of e-skills for economic development is widely acknowledged. It is a common knowledge that shortages and mismatches in e-skills, and the resulting digital divide negatively affect growth, competitiveness, innovation, employment and social cohesion in Europe. Furthermore, the acceleration of change in the economy towards the digital revolution, such as the use of platforms for businesses, use of robots, 3D printing or the shared economy, has revealed an increasing and urgent need for digital skills (European Commission, 2014).

It is a fact that very soon not only ICT experts are required to have digital competences, but more and more jobs are using digital competences to various extent. Emerging key enabling technologies but also specialised technology sets, such as web 2.0 technologies have already an identified business impact (Andriole, 2010). Moreover, in the near future all jobs including traditional jobs will require digital knowledge in relation with the development of the Internet of Things and as a result all employees will need some digital skills.

Digital skills are also connected to changes in modes of production and new forms of manufacturing. Flexible production in smart factories that integrate different work stages and processes through digitisation and networks of interacting systems and tools: this is the vision of Industry 4.0 (VDI; ASME, 2015), or the fourth industrial revolution. In addition to a strong core of technical and generic skills and competences, skilled workers will need digital and problem-solving competences and knowledge management abilities but furthermore social and communication skills, team work and autonomy will also be more important. As a result, learning may need to be structured differently with virtual learning environments (that can reduce the costs of expensive training), new partnerships, different learning venues and hybrid qualification routes in collaboration with higher education (VDI; ASME, 2015). In this respect, to help people innovate, initial and continuing vocational education and training (VET) is becoming more creative and innovative and there is strong evidence that VET is changing across Europe taking into account new skills sets (e.g. innovation, digital skills) and new learning methods such as virtual learning/e-learning (CEDEFOP, 2015).

Thus, the European Commission denotes that as new technologies develop rapidly, the skills required to use them become increasingly sophisticated and need to be constantly updated. Individuals with creativity, innovation and higher-level conceptual skills are increasingly in demand<sup>1</sup>. In September 2007, the European Commission adopted a Communication on "e-Skills for the 21st Century" based on the definition and the recommendations formulated by the European e-Skills Forum. The Digital Agenda for Europe adopted in 2010 further confirmed the importance of enhancing European e-skills. In this direction, the EU Commission launched the Grand Coalition for Digital Jobs in 2013 (European Commission, 2014). The strategy was welcomed by member states in the Competitiveness Council Conclusions of November 2007. Stakeholders also welcomed a long-term e-skills agenda while industry established the e-Skills Industry Leadership Board to contribute to the implementation of the strategy.

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<sup>1</sup> [http://ec.europa.eu/growth/sectors/digital-economy/e-skills/index\\_en.htm](http://ec.europa.eu/growth/sectors/digital-economy/e-skills/index_en.htm)

It is widely accepted that e-skills are fundamental to the innovation strategies of the future. One of the most fundamental resources for innovation strategies are e-skills in business processes for SME's as well as the reconfiguration of value chains in ICT software and services. As a result, Europe's competitive edge could be determined by factors other than the quality and volume of R&D. Digital policies must dare to initiate forward-looking systemic reforms in education and lifelong learning systems so that the workforce to acquire skills and mind-sets that will enable human capital to take the lead in new and more open forms of market and user driven innovation. This could be critical to a competitive and creative Europe of the future (European Commission, 2004).

Nonetheless, one of the critical resources for successfully designing and implementing a digital transformation strategy are tech-savvy organizational leaders and employees. According to Hoberg et al (2015) and a relevant survey digital transformation has found its way into companies' business agendas with 80% of respondents regard digital transformation as being important for their company's overall business strategy. On the other side, many companies are just starting to prepare for digital transformation while gaps in cross-functional knowledge may become a major obstacle for digital transformation with 88% of respondents state that extensive business related knowledge on the IT side is crucial for developing a digital transformation strategy.

In turn, 57% state that business executives need extensive technology skills to be able to develop a successful digital transformation strategy for their company. Despite these numbers, most companies seem to be lacking the relevant cross-functional knowledge necessary for doing so. Similarly, 58% of respondents claim that their IT executives actually possess the business-related knowledge necessary to enable the successful digital transformation of their company and only 27% said that their business executives possess the technology skills necessary for digital transformation. In this respect, a substantial lack in digital talent was identified across all skill domains with respondents note substantial gaps in digital skills. Nevertheless, the survey illustrated that targeted skill development is not always the case and mostly could be characterized as a rarity. Despite an apparent lack of digitally-skilled personnel, targeted skill development is rare. Only 10% of the respondents claim that their HR division has implemented a recruitment/training program to close the skill gap (Hoberg et al, 2015).

The digital economy itself is growing in Europe and the majority of enterprises utilise digital technology in various different forms and at least in a small percentage of their activities. The application of an IT service innovation affect firm performance in



multiple ways (Ordanini & Rubera, 2010) while many of the digital applications are transforming both emerging sectors and more traditional ones (Loebbecke & Palmer, 2006; Rigby, 2011).

It is also a fact that the Internet is providing consumers with exciting opportunities to purchase an expanding range of products from a large number of suppliers, usually at lower prices. The e-commerce marketplace has evolved dramatically in recent years and consumer trust in such a complex and interactive environment has become crucial. As a result, enhancing the benefits of e-commerce for consumers will require maintaining an environment in which consumers have trust (OECD, 2016).

With the Internet of Things joining people and businesses in the connected world, the value of digital knowledge and digital skills expands greatly driving enterprise architecture leaders must apply new approaches to capitalize on the new economics of connections (Burton, Smith, Scheibenreif & Barnes, 2016). In this prism, new tools encourages new business opportunities since information technologies has profoundly reduced the need to own physical infrastructure and assets. As Van Alstyne et al illustrate, IT makes building and scaling up platforms vastly simpler and cheaper. At the same time, it allows nearly frictionless participation that strengthens network effects, and enhances the ability to capture, analyze, and exchange huge amounts of data that increase the platform's value to all (Van Alstyne, Parker & Choudary, 2016).

Additionally, the digital revolution has an impact on education and training methods. For instance, on-line learning and MOOCs are becoming more and more part of teaching programmes in all sectors. European SME's must recognise that even the highest level of education is not a one-time event and learning can and must occur in all kinds of contexts and throughout life to enable human capital to create products and services that are not easily replicated.

It seems that the future digital and innovation strategies for SME's should give emphasis to skills and learning-intensive measures to stimulate SME's digitization. Hence, digital business is the creation of new business designs by blurring the digital and physical worlds leading to an unprecedented convergence of people, business, and things that disrupts existing business models<sup>2</sup>.

A related study found that national IT policies tend to focus on developing basic IT user skills. The development of IT practitioner skills is often considered to be part of continuing vocational training policy. They found that nine countries had policies aimed at developing e-business skills. Twenty-six countries had policies designed for

<sup>2</sup> <http://www.gartner.com/technology/research/digital-business/>



e-skills for users, while eleven countries (Denmark, France, Germany, Hungary, Ireland, Malta, Spain, Portugal, Romania, United Kingdom and Turkey) had policies specifically aimed at the development of e-skills of practitioners. The study identified a total of forty-five initiatives that were specifically targeted at the development of IT practitioner skills<sup>3</sup>.

At the same time, European e-Competence Framework has been developed and a European e-skills career portal was implemented together with several high-level multi-stakeholder partnerships. These include actions related to supply and demand (including the development of foresight scenarios) to better anticipate change but also the further development of European e-Competence Framework. In this prism, the promotion of relevant financial and fiscal incentives is included. In this vein, the pan-European e-Skills for Jobs was a major awareness raising campaign to promote e-skills, share experiences, foster cooperation and mobilise stakeholders.

It is widely accepted that the term “e-skills” encompasses a wide range of capabilities (knowledge, skills and competences) and issues with an e-skills dimension span over a number of economic and social dimensions. The ways individuals interact with ICT vary considerably, depending on the work organisation and context of a particular employer, or home environment.

In view of this complexity, it is necessary to establish a number of underlying concepts that need to be distinguished for policy analysis, development and response purposes, while recognizing that specific national, regional, sectoral and organizational perspectives may vary. European Commission (2004) identifies certain e-skills which covers mainly three general categories:

- ICT practitioner skills: The capabilities required for researching, developing and designing, managing, the producing, consulting, marketing and selling, the integrating, installing and administrating, the maintaining, supporting and service of ICT systems;
- ICT user skills: the capabilities required for effective application of ICT systems and devices by the individual. ICT users apply systems as tools in support of their own work, which is, in most cases, not ICT. User skills cover the utilisation of common generic software tools and the use of specialised tools supporting business functions within industries other than the ICT industry;

<sup>3</sup> <http://eskills4jobs.ec.europa.eu/manifesto>

- e-Business skills: the capabilities needed to exploit opportunities provided by ICT, notably the Internet, to ensure more efficient and effective performance of different types of organisations, to explore possibilities for new ways of conducting business and organisational processes, and to establish new businesses.

While there are certain overlaps between these categories, it should be emphasized that e-business skills are more strategic in nature and related in particular to innovation management, rather than technology-management, skills - which are part of ICT practitioner skills (European Commission, 2004).

Furthermore, the current and recent past technological and social developments in information systems, production, e-commerce, customer intelligence and demands, together with the radical changes in the competitive environment, have led to some rapid and major changes in the way work is carried out within the organizations and business firms.

According to CEDEFOP (2005), all employees face the challenge of evolving jobs, within and between companies, the conditions under which they are employed (i.e. from employees at a company to independent workers in some cases), and the content of the work that is carried out. As a result, usually these characteristics of work lead to changes in job duties and the qualifications required to make the employee more attractive in terms of recruitment and retention to the company. This dynamic business environment and need for workforce upskilling is common to the automotive, graphic arts and media and banking and finance sectors (Petersen, et al., 2005).

In this prism, recently European Commission adopted the concept of “e-Leadership skills”. e-Leaders are people capable of driving successful innovation and capitalising on advances in information and communication technologies (European Commission, 2015). More specifically, e-Leaders are both business and digitally savvy, and exhibit a capability to lead strategically. They might be ICT leaders who are also business-savvy or business leaders who are digitally-savvy. E-leadership involves leading and managing e-skilled professionals as well as other professionals.

e-Leadership skills include the competences which enable an individual to initiate and guide ICT-related innovation at all levels of enterprise, from the start-up to the largest of corporations, from private to public (European Commission, 2015). As follows, three domains of skills are defined: Digital skills, business skills and strategic leadership skills which can be further specified by enumerating skills that exemplify

e-leadership in these areas, while e-Leadership skills needs are rather diverse across industries, enterprise sizes and life-cycle stages.

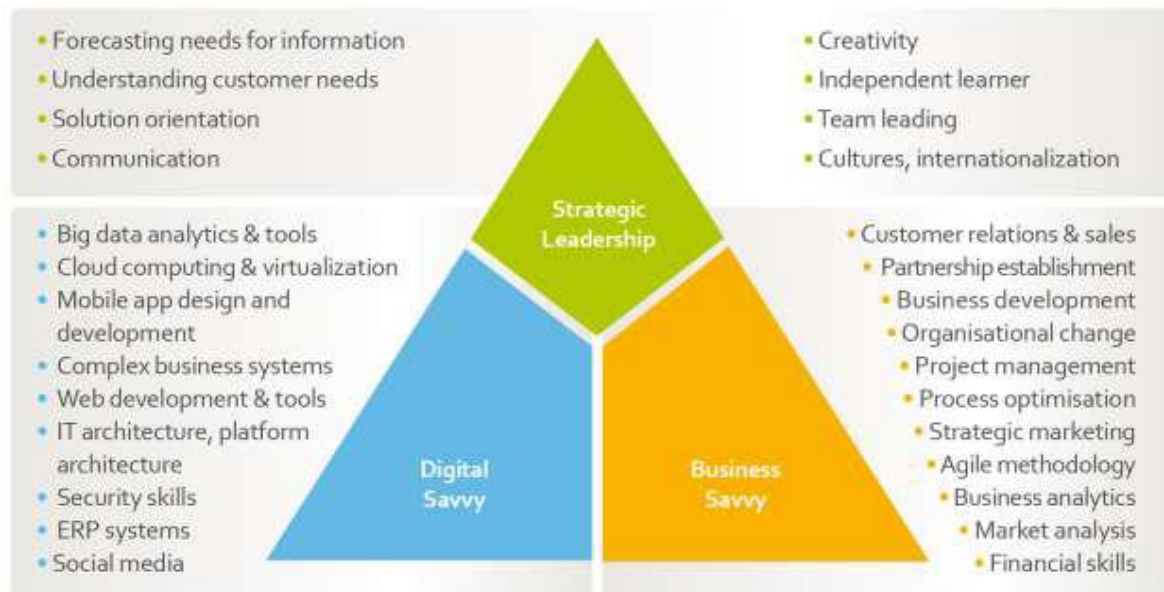
Additionally, e-Leaders are people capable of driving successful innovation and capitalising on advances in information and communication technologies. Sufficient supply of e-leadership skills to the economy is believed to foster economic growth and create jobs through its key role in identifying and exploiting innovation opportunities.

Based on the e-leadership classification, the three domains of skills Digital skills, business skills and strategic leadership skills can be further specified by enumerating skills that exemplify e-leadership in these areas. e-Leadership skills needs are rather diverse across industries, enterprise sizes and life-cycle stages. Also due to the dynamics of technological developments in ICT (and, although perhaps to a lesser degree, in entrepreneurship and management science) will evolve over time. E-leadership skills are combinations of a sufficient number and level of skills from all three domains.

The vast majority of e-leadership skills and competences in the three domains are covered, in differing degrees of specificity, by the European e-Competence Framework, e-CF. Competences that are arguably not covered well by the e-CF include industry specific knowledge, skills and competences (such as the knowledge about the automotive sector that an e-leader in that sector needs. Also, product specific knowledge, skills and competences (which may also be company specific) are not covered by the e-CF. As the e-CF is a generic tool, including these competences would clearly stretch it beyond its purpose (European Commission, 2015).

According to European Commission, the requirements of e-leadership education appear very diverse, yet some patterns emerge from the analysis. Fast growing SMEs and entrepreneurs have many competence needs that could be translated into training and education offers in the three skill areas that constitute e-leadership: IT savvy, business acumen and strategic leadership skills.

In terms of offerings, e-Leadership demonstrations include new ways and formats of teaching, from very short to full programme, MOOCs and video lessons, an agile curriculum and a co-creation approach, defining the learning outcomes in close cooperation with the learners and their employers. e-Leadership demonstrations are oriented along the described e-Leadership journey and lessons learnt are ready for dissemination and adoption elsewhere.



Source: European Commission, 2015.

E-leadership skills in start-ups and fast growing SMEs are fostered in a variety of ways. Higher Education and commercial training providers offer a variety of courses and programmes, online or offline. There are also non-commercial or semi-commercial providers who offer courses and learning material. Consulting and coaching might be best suited to be tailored to the specific needs of the enterprise and are offered also by commercial enterprises as well as in the framework of multi-stakeholder partnerships (European Commission, 2015).

E-leadership skills and competences are also associated the benefits of adopting a 'digital workplace'. The digital workplace can best be considered the natural evolution of the workplace since it encompasses all the technologies people use to get work done in today's workplace – both the ones in operation and the ones yet to be implemented. As a result, it ranges from your HR applications and core business applications to e-mail, instant messaging and enterprise social media tools and virtual meeting tools (Deloitte, 2012).

According to Deloitte, the digital workplace framework includes four layers covering the following components:

- **Use:** collaborate, communicate, connect: The digital workplace should foster the employees' ability to do their job by collaborating, communicating and connecting with others.
- **Technology:** Technology enables the digital workplace, so each organization already has a digital workplace toolbox with different tools.

- Control - governance, risk and compliance: The effective use of technology in the digital workplace is underpinned by appropriate controls. This means that the digital workplace should include appropriate governance structures and management processes.
- Business drivers - measurable business value: As with any core initiative, it is essential for business needs to drive the digital workplace.



Source: Deloitte, 2012.

Furthermore, in most organizations, the digital workplace toolbox can be broadly defined in eight categories to support the ways in which you communicate, collaborate, connect and deliver day-to-day services. Too often, organizations implement these tools in silos without the benefit of a holistic digital workplace strategy (Deloitte, 2012).





Source: Deloitte, 2012.

The deployment of an integrated ‘digital workplace’ must address existing challenges and provide business value in several levels:

- Increase revenue: provide applications that help employees identify cross-sell and up-sell opportunities;
- Reduce operational costs: introduce more effective ways to meet virtually, cutting travel and telecommunication costs and eliminating wasted time;
- Accelerate time-to-market: supply tools to help, research, develop, test and deliver new products and services more quickly, such as remote scanners that let you fulfill orders remotely;
- Enhance innovation: foster two-way communication to drive discussions and build communities of interest and practice to drive the innovation agenda;
- Improve the customer experience: enable employees to find the information they need more quickly and serve their customers more efficiently;
- Increase agility and flexibility: provide the tools that mimic organization and business changes and reflect employee behaviours;
- Heighten staff satisfaction: implement easy-to-use tools that can be used the same way both inside and outside the firewall;
- Raise productivity and efficiency: provide tools and technologies that help employees execute business processes and functions as currently designed;
- Strengthen talent recruitment and retention: develop a brand of exceptional work environments;

- Improve employee experience: provide the right tools at the right time for their employees to their jobs.

Overall, a digital workplace provides an integrated and systematic way to explore and exploit the crucial skill sets for the enterprises' growth. Nonetheless, new digital and e-business skills are further more crucial in many other perspectives beyond the workplace organization. For instance, the last years the development of multi-sided platforms have redefined the boundaries among enterprises and their clients bringing together related groups of customers and partners and facilitating interactions between them (Hagiu & Wright, 2015). At the same time, new applications and technology companies provide novel solutions and services (e.g. small business financing and marketing tools) to small businesses and individuals (e.g. Square). As long as ICTs, Internet and digital tools become more pervasive, digital and e-business skills will be increasingly crucial for the development, deployment and further diffusion of productive technologies, especially at the level of micro and small-sized enterprises, encouraging innovation and knowledge flows across organizational boundaries towards improved but also entirely new propositions (Chesbrough, Vanhaverbeke & West, 2014).



## 2. Technological revolution and the Digital Economy and Society Index (DESI)

In the years to come, the mobile internet will develop applications across business and the public sector, enabling more efficient delivery of services and opportunities to increase workforce productivity. With cloud technology, applications can be delivered with minimal or no local software or processing power, enabling the rapid spread of internet-based service models. Moreover, the full potential of technological advances will require having in place the systems and capabilities to make sense of the unprecedented flood of data these innovations will generate.

In the upcoming economic environment, the significance of digital tools and skills is further integrated to the emerging importance of business model innovation. As Pisano (2015) illustrates, in the past couple of decades, there have seen a plethora of companies (Netflix, Amazon, LinkedIn, Uber) master the art of business model innovation. As a result, as thinking about innovation opportunities, companies have a choice about how much of their efforts to focus on technological innovation and how much to invest in business model innovation (Pisano, 2015). The business model innovation constitutes a crucial new source of innovation and revenue (Zott, Amit & Massa, 2011).

More specifically, new sources of revenue and of value creation will transform manufacturing business models over time (The Government Office for Science, 2013). They will draw on new sources of knowledge and closer, long term relationships with customers. Future sources of revenue for manufacturers will include:

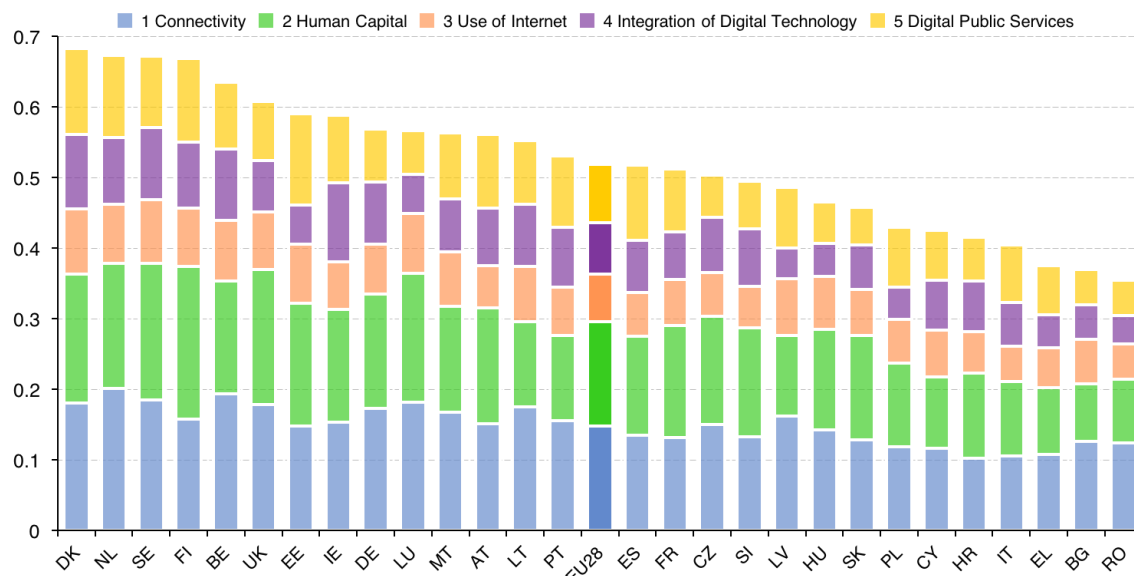
- Increasingly extensive packaging of services with products;
- New sources of information on how products are used, drawing on embedded sensors and open data;
- Becoming a 'factoryless goods producer', capturing value by selling technological knowledge and leaving production to others;
- Becoming a 'remanufacturer' with end of life products remanufactured and returned to original specifications or better;
- Targeting 'collaborative consumption', where no one customer owns a product outright;
- Creating value from new forms of (competitive) strategic alliance within and across sectors; and
- Exploiting new technologies more rapidly through greater operational capability coupled to entrepreneurial insight (The Government Office for Science, 2013).

In this respect, the use of remote sensors, communications, and processing power in industrial equipment and everyday objects will unleash an enormous amount of data and the opportunity to see patterns and design systems on a scale never before possible while advanced robots with enhanced senses, dexterity, and intelligence can be more practical than human labour in manufacturing, as well as in a growing number of service jobs, such as cleaning and maintenance. Moreover, it is now possible to create cars, trucks, aircraft, and boats that are completely or partly autonomous, which could revolutionize transportation, if regulations allow, as early as 2020 (World Economic Forum, 2016).

With peer-to-peer platforms, companies and individuals can do things that previously required large-scale organizations and in some cases, the talent and resources that companies can connect to, through activities such as crowdsourcing, may become more important than the in-house resources they own. At the same time information technology is further integrated in marketing strategies through multiple innovative ways enhancing e-Marketing capability (Trainor, Rapp, Beitelspacher & Schillewaert, 2011).

Advances in artificial intelligence, machine learning, and natural user interfaces (e.g. voice recognition) are making it possible to automate knowledge-worker tasks that have long been regarded as impossible or impractical for machines to perform. In this prism, a range of technological advances in manufacturing technology promises a new wave of productivity. For example, 3D printing (building objects layer-by-layer from a digital master design file) allows on-demand production, which has far-ranging implications for global supply chains and production networks (World Economic Forum, 2016).

European Union has already foreseen these changes and recognizes the crucial importance of digital skills for the years to come. In this respect, EU Commission has published several directions towards digital transformation denoting that as new technologies develop rapidly, the skills required to use them become increasingly sophisticated. In this respect, The Digital Economy and Society Index (DESI) has been developed.



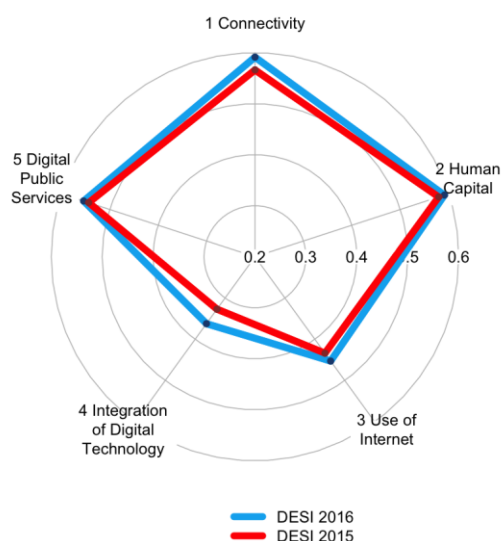
Source: DESI, 2016.

The Digital Economy and Society Index (DESI) is a composite index that summarises relevant indicators on Europe's digital performance and tracks the evolution of EU member states in digital competitiveness. The Digital Skills Indicator was piloted in the 2014 Digital Agenda Scoreboard on the basis of data collected in 2012. It represents work carried out by DG CONNECT F4 in relation to action 62 of the Digital Agenda to propose "EU-wide indicators of digital competence". The indicator takes as its conceptual framework the digital competence framework developed by the IPTS under the European Commission funded DIGCOMP project.

The framework identified 5 digital competence areas (information, communication, problem-solving, content creation and safety) the first four of which are represented in the indicator. The fifth area of safety is currently not represented due to a lack of availability of appropriate indicators. Data used in the indicator have been collected through the Eurostat European Union Survey on ICT Use in Households and by Individuals.

The DESI 2016 summarises data collected mostly during calendar year 2015, which are at the basis of the main DESI ranking of EU member states depicted below. Each score in the DESI is between 0 and 1, with higher values representing better performance<sup>4</sup>.

<sup>4</sup> <https://ec.europa.eu/digital-single-market/en/desi>



Source: DESI, 2016.

According to DESI, overall, Europe is progressing as the EU as a whole attained a score of 0.52 in 2016, up from 0.50 last year. Improvement in the overall DESI score was mostly driven by the Connectivity and Integration of Digital Technology dimensions, the two fastest growing dimensions in the index. Moreover, developments in Digital Public Services and Human Capital have all but stagnated this year.

However, European progress has slowed down. Over the past year, the EU progressed a mere 0.02, from 0.5 to 0.52, whereas from 2014 to 2015 the EU had progressed 0.04, from 0.46 to 0.5. This slowing down has happened in 4 out of the 5 main DESI dimensions, with Integration of Digital Technology being the only dimension that has accelerated its growth: it grew 0.035 over the last year, more than the 0.023 it had grown from 2014 to 2015.

Currently, member states are at different stages of development, and developing at different paces. Countries were grouped in clusters according to their score in DESI 2016 and to the growth they have registered between 2015 and 2016.

- *Running ahead countries* are those that score above the EU average and whose score grew faster than that of the EU over the last year. These are countries that perform well and that have been developing at a pace that allows them to further distance themselves from the EU average. Countries in this cluster: Austria, Germany, Estonia, Malta, the Netherlands and Portugal.

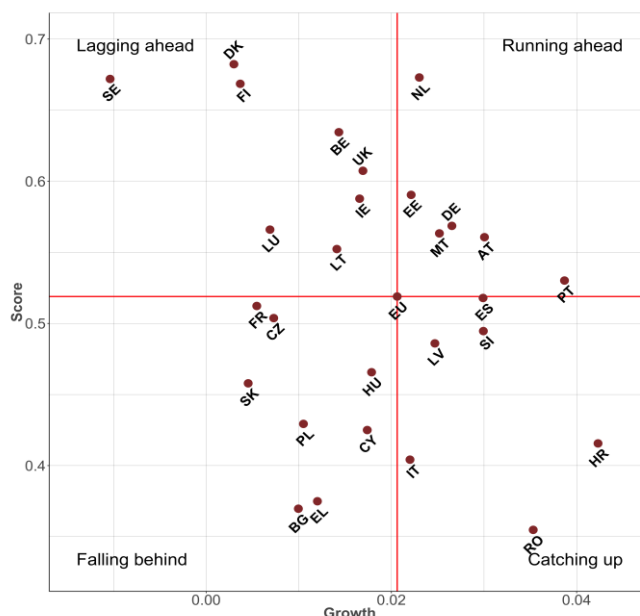
- *Lagging ahead countries* are those that score above the EU average but whose score grew slower than that of the EU over the last year. These countries perform well, but their development is now very slow and, as such, they are lagging in comparison to the progress of the EU as a whole. Countries in this cluster: Belgium, Denmark, Finland, Ireland, Lithuania, Luxemburg, Sweden and the United Kingdom.
- *Catching up countries* are those that score below the EU average but whose score grew faster than that of the EU over the last year. These countries are developing faster than the EU as a whole and are thus catching up with the EU average. Countries in this cluster: Spain, Croatia, Italy, Latvia, Romania and Slovenia.
- *Falling behind countries* are those that score below the EU average and whose development over the last year was slower than that of the EU as a whole. These countries are already less developed than the EU average, and by showing anemic growth they are distancing themselves further from the rest of the EU. Countries in this cluster: Bulgaria, Cyprus, Czech Republic, Greece, France, Hungary, Poland and Slovakia.

Over the course of last year, all EU countries have improved their score except for Sweden, who has stagnated at around 0.67. However, some countries have improved more than others<sup>5</sup>:

- The top performing countries were Denmark (0.68), the Netherlands (0.673), Sweden (0.672) and Finland (0.669).
- On the other side of the scale, the bottom performing countries were Romania (0.35), Bulgaria (0.37), Greece (0.375) and Italy (0.4).
- The countries that have improved the most from 2015 to 2016 were Croatia (from 0.37 to 0.42), Portugal (from 0.49 to 0.53), and Romania (from 0.32 to 0.35).
- The gap between the best and worst performing countries is closing. This year, the difference between Denmark (0.68) and Romania (0.35) was 0.33, slightly smaller than in 2015, when it was 0.36. This is due to improvements registered by the bottom performing countries in tandem with the nearly inexistent growth by the top performers.
- While 27 countries displayed positive net growth from 2015 to 2016, 24 of them have actually seen the pace of their growth slow down when compared to the previous year. The exceptions were Croatia (which grew 0.043 over the last year, more than the 0.017 that it had grown the year before), Portugal

<sup>5</sup> <https://ec.europa.eu/digital-single-market/en/desi>

(growth of 0.039 last year versus 0.034 the year before) and Latvia (growth of 0.025 from 2015 to 2016, versus 0.23 from 2014 to 2015).



Source: DESI, 2016.

According to Commission, European SMEs continue to miss out on the opportunities of online sales. Only 14.5% of them sell online, which represents an increase of only 3.5 percentage points over five years is growing at a glacial pace, reaching 14% in 2013, compared to a DAE baseline of 12%<sup>6</sup>. Interestingly, the best performing countries include the Czech Republic and Croatia. Even the best performing countries are far from the EU-wide target of 33% by 2015 and on current trends will not reach it. Large companies, on the other hand, are much more active, with 35% of them selling online. This represents a gain of 6 percentage points over the last five years. As a result, the gap between SMEs and large companies has increased since the Digital Agenda was launched.

It should be mentioned that businesses benefit from cross-border e-commerce by exploiting economies of scale which reduce costs, increase efficiency and promote competitiveness, improving total factor productivity. In many cases, without these economies of scale an on-line business may not be viable at all. This could be especially important for SMEs that remain confined to a small home market with high production costs. However, only 7% of European SMEs sell online to other Member states, while 20% of large enterprises do so.

<sup>6</sup> <https://ec.europa.eu/digital-single-market/en/integration-digital-technology>



The Human Capital dimension of the DESI has two sub-dimensions covering 'basic skills and usage' and 'advanced skills and development'. The basic skills and usage sub-dimension includes indicators on internet use by individuals and digital skills - individuals with at least basic skills in the Digital Skills Indicator. The second sub-dimension includes indicators on ICT specialist employment and graduates in STEM (Science, Technology Engineering and Mathematics). LU, FI, SE and DK score highest for basic skills and usage, while FI, SE, the UK and IE score best for advanced skills and development. BU, RO and EL score consistently at the bottom of the rankings for both sub-dimensions<sup>7</sup>.

The number of internet users in the population continues to increase, with 75% of the EU population reporting that they used the internet at least weekly in 2014. For most people, use of the internet is a daily activity, with 65% of EU citizens reporting using it daily in 2014. Use by disadvantaged people also continues to rise; with 60% reporting using the internet at least weekly in 2014. As such, the Digital Agenda targets on internet use have been met before their target date of 2015. If past trends persist, it can be expected that by 2024, 90% of the EU population will be regular internet users.

According to the composite index of digital skills<sup>8</sup>, based on the IPTS digital competence framework<sup>9</sup>, 22% of the EU population has no digital skills (2014) i.e. are not using the internet. This figure ranges from 5% in Luxembourg to 45% in Bulgaria and 46% in Romania. In eight countries (PT, PL, HR, CY, IT, EL, BG and RO) 30% or more of the population have no digital skills. In Italy, with its large population, this equates to almost 18 million people without digital skills<sup>10</sup>.

As a result, considering that to function effectively in the digital society an individual needs more than low level skills (e.g. only being able to send emails), 40% of the EU population can be considered as insufficiently digitally skilled (having either low digital skills or not using the internet). Seventeen Member States have rates higher than this. In Romania (80%) most of the population does not have the digital skills they need to function effectively in the digital world.

According to Commission, rates of digital skills amongst the labour force are on average higher than for the average population in the EU. Only 13% of the EU labour

<sup>7</sup> <https://ec.europa.eu/digital-single-market/en/desi>

<sup>8</sup> [http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc\\_id=9979](http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=9979)

<sup>9</sup> Ferrari, A. (2013), DIGCOMP: A Framework for Developing and Understanding Digital Competence in Europe, JRC Scientific and Policy Reports.

<sup>10</sup> <https://ec.europa.eu/digital-single-market/en/desi>



force has no digital skills. However, in some countries rates are still relatively high. In eight countries (HR, PL, PT, IT, CY, EL, BG and RO) rates are at or above 20% of the labour force. In Romania and Bulgaria more than a third of the labour force has no digital skills. If we also add to this the percentage of the labour force who have only a low level of skill, we get a figure of around a third of the EU labour force (32%) that can be considered to be insufficiently digitally skilled. In eighteen Member States (SK, SI, LT, ES, LV, CZ, HU, PT, IE, IT, EL, PL, CY, HR, BG and RO) the percentage is higher. In Bulgaria (61%) and Romania (77%) it is most of the labour force.

Over the period 2004-2013 employment of ICT specialists (Broad definition) in the EU-28 grew significantly by 2.4 million; from around 4 million in 2004 to 6.4 million in 2013. This resulted in an increase in the share of ICT employment in total employment from 1.9% to 3% over this period. On average, ICT employment growth was more than 4% p.a. over this (allowing for the break in the series in 2010-2011). By contrast, the average growth rate of total employment has been 0.4% p.a. over this period and overall employment has been continuously falling since the onset of the crisis in 2008.

Despite the strong positive evolution in the employment of ICT professionals in the EU over the past decade, the employment potential of ICT is underexploited. Evidence shows that there is a growing gap emerging between the demand and supply of ICT specialists in Europe. This gap has been projected could reach 825 000 by 2020 if not addressed. It is the purpose of the Commission's Grand Coalition for Digital Jobs initiative to address this issue of lacking ICT professional skills.

Currently the largest ICT professional skills gap is to be found in Germany. However, latest forecasts suggest that over the period up to 2020 the ICT professionals skills gaps will be severely aggravated in the UK and Italy in particular; largely due to the insufficient production of ICT graduates to keep up with strongly increasing demand for ICT professionals in these countries.

A distinct dimension of concern for SME's and skills is e-commerce. Online shopping has made continuous progress, up more than 14 percentage points to 50% of citizens advancing in a close parallel with Internet use. Convenience, variety and prices are the main drivers for the adoption of e-Commerce by citizens. On the other hand, data protection and payment security (30% of respondents were concerned that personal data may be misused and 25% that payment card details may be stolen) are the most important concerns of online shoppers. While 44% of citizens shop online nationally, only 15% cross a border to another Member State when doing so (9% do both, while 6% buy only from abroad, mostly in smaller Member States with a less developed

offer). Cross-border online shopping is advancing regularly, adding six and a half percentage points in four years to reach nearly 15% in 2014. Smaller member states do not only have higher levels of cross-border shopping, but display also higher growth.

For companies who are not selling online, the delivery system is overwhelmingly the most important concern, either via direct shipping costs or via the cost of guarantees and returns, although uncertainty about the applicable law follows a close third. Based to the Digital Agenda Scoreboard 2015, SMEs are more concerned about most of the barriers than large firms, and micro enterprises more than SMEs. Selling online requires an up-front investment (in terms of money but also in terms of time, e.g. to research legislation) which larger companies can afford more easily. Businesses benefit from cross-border e-commerce by exploiting economies of scale which reduce costs, increase efficiency and promote competitiveness, improving total factor productivity<sup>11</sup>. In many cases, without these economies of scale an on-line business may not be viable at all. This could be especially important for SMEs that remain confined to a small home market with high production costs. However, only 7% of European SMEs sell online to other Member states Member states, while 20% of large enterprises do so<sup>12</sup>.

Online suppliers of goods and services who wish to serve a pan-European market may potentially need to know about, and comply with, 28 differing sets of national regulations. Finding out which regulation applies in which case may be difficult. 37% of EU online exporters to other Member States have problems identifying which rules to follow. That figures rises to 63% for companies trying to start exporting online . This situation creates significant information and compliance costs for many online traders, especially for SMEs, in particular when the value of the transaction remains low.

<sup>11</sup> <https://ec.europa.eu/digital-single-market/en/digital-scoreboard>

<sup>12</sup> <https://ec.europa.eu/digital-single-market/en/download-scoreboard-reports>

### 3. Skills demands by country

In this section, an e-business skills demand identification will be presented based on secondary sources review and primary sources research (interviews and focus groups). Prior to the analysis of skills demand, several remarks should be emphasized. For instance, according to CEDEFOP, a number of key issues identified in several reports for ICT skills (Petersen, et al., 2005):

- (a) the lack of a clear common definition of ICT skills and skill levels relevant for ICT employment and of ‘qualification’ (learning outputs) definitions and qualification levels relevant for ICT education;
- (b) little or no common approaches to skill and training standards, unitisation or modularisation of vocational training and of its assessment and certification across the European Union;
- (c) no possibilities to get qualifications or modules of training assessed independent of when, where or how they have been achieved (credit transfer).

In this respect, more work should be promoted on several issues related to:

- (a) ICT skill needs and comparison of existing European skills framework and models;
- (b) generic ICT skills profiles at all different skill levels within a new ‘GAHFA’ European ICT skills framework;
- (c) based on the ICT skills framework definition and description of ICT qualification (training) profiles and levels within a new European ICT qualifications framework;
- (d) guidelines for ICT training solutions and curriculum development.

In the following sub-chapter, the current situation on digital and e-business skills in the participating countries will be presented, with respect to a secondary and primary data collection.

#### 3.1. Italy

The Digital Economy and Society Index (DESI) is a composite index that summarises relevant indicators on Europe’s digital performance and tracks the evolution of EU member states in digital competitiveness. In terms of DESI, Italy has an overall score<sup>3</sup> of 0.4 and ranks 25th out of the 28 EU Member States. In the past year, Italy has made little progress in most of the indicators. One of the exceptions is an

increased role of eCommerce in SMEs turnover (8.2% of the total) although the Italian economy could benefit from a more diffused use of eBusiness solutions.

NGA coverage has increased from 36% of households in 2014 to 44% in 2015, but adoption of fast broadband connections is only 5.4% of the total (which is capped at 53% of households). The main cause for low adoption of fixed broadband is the lack of basic digital skills. Indeed, 37% of the population doesn't regularly use the Internet. Italy scores close to the EU average in Digital Public Services, driven by increased availability. Italy is part of the catching up<sup>4</sup> cluster of countries because, although it still performs worse than the EU as a whole, it has developed fast over the last year and got closer to the EU average. Italy still performs below the cluster average<sup>13</sup>.

Challenges indicated in last year's report (2015) remain: fixed broadband subscriptions remain low, at only 53% of households (confirming as the lowest percentage in the EU). On the contrary Italian citizens seem to prefer mobile broadband connections, with 75 subscriptions per each 100 individuals (10th highest value in the EU). The other major challenge for Connectivity in Italy is the low availability of Next Generation Access networks, which has improved since last year (from 36% to 44%) but not more than in other EU countries (keeping its 27th place).

With a Human Capital score of 0.42, Italy ranks 24th among EU countries. The country has improved its score and ranking in comparison to the previous year (0.38), but Human Capital endowment is still an issue for Italy. Based on DESI, Italy cannot hope to fully grasp the benefits of the digital economy as long as one third of its population refrains from using the Internet regularly<sup>14</sup>. On the positive side, the share of regular Internet users has grown by 4 percentage points. But a substantial percentage (at least 31%) of those regular Internet users still lacks basic digital skills, constituting a further drag to the well-functioning of the Italian digital economy. The major cause of this lack of digital skills is to be found in the low level of education (the two are highly correlated) of the Italian population (only 42% of the population has an education level above lower secondary - ISCED 2 - the fourth lowest value in the EU28), and in the important share of aged population. The education performance also explains the low level of STEM graduates among the population in their 20's, a statistic which has barely improved in the last year. Also the share of the ICT specialists in the economy is quite below the EU average and it has remained stable in the last year. Given the low share of STEM graduates and the slow integration of digital technology, the percentage of ICT specialists is unlikely to increase in the near future for reasons of both demand and supply.

<sup>13</sup> <https://ec.europa.eu/digital-single-market/en/scoreboard/italy>

<sup>14</sup> <https://ec.europa.eu/digital-single-market/en/scoreboard/italy>

According to DESI, integration of Digital Technology by businesses is the dimension where Italy ranks second best of all DESI 2016 dimensions: with a score of 0.31 (substantially unchanged from last year), Italy ranks 20th among EU countries. Italy's enterprises are not making much progress in the take up of eBusiness solutions but the eCommerce sales channel is gaining importance. Moreover, it looks like Italian SMEs have been slowly realising that the eCommerce sales channel can be an important instrument for expanding their markets and fighting the consequences of the economic crisis. The more marked progress has been made by the share of turnover coming from eCommerce: it rose from 4.9% in 2014 to 8.2% this year (and consequently the rank went from 22nd to 14th). The increase in the percentage of SMEs selling online (6.5%) and cross-border online (5.2%), however, has been less spectacular. The adoption of eBusiness solutions hasn't witnessed the same progress, with the proportion of enterprises using Electronic Information Sharing (36%) substantially stable (indeed, slightly decreasing) and the use of social media only barely improving (from 12% to 14%). Instead, EU competitors were not standing still and this has resulted in a loss of positions in the EU ranking.

### 3.2. Spain

Spain has a low percentage of entrepreneurs (5.1%), and this number is on a downward trend due to the crisis. However, half of new entrepreneurs are young people between the ages of 18 and 34. Most people prefer wage-earning jobs to self-employment. In addition, this preference is increasingly prevalent, having gone from 34% of the population in 2001 to 52% in 2009. Young people place more value on stability and a fixed income than on independence and the freedom to create one's own timetable. Spanish companies are of a reduced size. More than half of them (53%) do not have a single employee. 42% employee between one and nine workers. In 2009 Spain had 3.4 million companies, and of these 1.8 million represent self-employed individuals and only 185,000 have 10 or more employees. The crisis has not caused this change in the percentages. Currently, in 2010, 19% more companies are closing than are being created. This percentage increases to 29% if one excludes companies with no employees (Alemany et al., 2011).

In terms of DESI, Spain has an overall score<sup>3</sup> of 0.52 and ranks 15 th out of the 28 EU Member States. During last year, Spain has improved or maintained its performance in all areas measured by DESI. In particular, Spain ranks 4 th when it comes to highest growth performance countries. Spain is increasing its performance in connectivity, as fast broadband networks are being deployed (77% of households have access to fast broadband) although with gaps among regions. In general, Spain is weak on the demand side, with low levels of digital skills (only 54% of Spaniards have basic digital skills) and Internet use, but strong in the use of digital technologies (RFID use and SMEs using Cloud) and in digital public services (this is the area



where Spain performs best, thanks to an improved offer of these services). Spain is part of the catching up<sup>4</sup> cluster of countries because, although it still performs slightly below than the EU as a whole, it has developed fast over the last year and got closer to the EU average<sup>15</sup>.

According to DESI, with a Human Capital score of 0.56, Spain maintains last year's position, among the lower half of EU countries, although it performs better than in the previous year (0.49)<sup>16</sup>. In order to fully develop its digital society, Spain needs to engage more of its citizens to use the Internet and to acquire digital skills. While there is some progress from year to year, so far this progress has been slow to catch up with the more advanced Member States. The best performance sub-indicator within this category is for technical graduates, which has proved to show a good step forward from previous years.

Insufficient levels of digital skills also limit the exploitation of economic benefits of investments in ICT by companies and public authorities. Although Spain is not faring too badly compared to other EU countries, in absolute levels the problem remains large, since only 54% of individuals between 16 and 74 years old have basic digital skills. The problem has been recognised and measures have been proposed in the Digital Agenda for Spain, which expected positive outcome in the forthcoming future.

In Integration of Digital Technology by businesses, Spain scores 0.37, better than in all other previous dimensions and with a score above the EU average (0.36). Spanish businesses are not getting out the most of the new digital technologies. The share of SMEs using eInvoice this shows a good performance, partly because from 2015, electronic invoicing was obligatory for all suppliers dealing with the central public administration for invoices higher than 5000 €, thus limiting scope for fraud. The law on administrative procedure, revised in October, promotes e-government by making it compulsory for firms to deal with the public administration services electronically.

On the other hand, the use of social media and cloud are growing positively but slowly, which is unusual for an economy with a very strong focus on tourism and accommodation services, and also still contrasts with the enthusiastic adoption of social networks by Spanish residents. Spanish SMEs exploit the potential of cross-border sales only to a small extent, but this is fairly typical for large member states.

<sup>15</sup> <https://ec.europa.eu/digital-single-market/en/scoreboard/spain>

<sup>16</sup> <https://ec.europa.eu/digital-single-market/en/scoreboard/spain>

### 3.3. United Kingdom

The United Kingdom has an overall score<sup>3</sup> of 0.61 and ranks 6<sup>th</sup> in the EU. In the past year, it has progressed in Use of the Internet, with increases in reading online news (71%, +6 pp.), use of Video calls (43%, +10 pp.), and social networking (71% +6 pp.). The United Kingdom has also made progress in increasing the proportion of STEM graduates (23 per 1000, up 3 over last year). This is an important development as the UK has high and increasing demand for ICT professionals. Until more recently, graduate numbers had fallen for a number of years and they still remain significantly below those of a decade ago. When integrating digital technologies, UK Businesses could make more effort to exploit the possibilities offered by electronic information sharing and RFID. Additional efforts are required to bridge the gap in the availability of superfast broadband between urban and rural areas and there is a need for concrete measures and a roadmap to achieve the UK's ultrafast broadband goal. The United Kingdom performs better than the EU average but it has improved at a slower rate than the EU as a whole, which places it in the lagging ahead<sup>4</sup> cluster of countries<sup>17</sup>.

According to the Department for Business Innovation and Skills (2015b), almost all SMEs use the internet for business purposes, but intensity varies with increasing size. The most common use of the internet is emailing customers; the use of e-commerce is increasing, but is much less prevalent: only 20 per cent of turnover derived from this source in 2013, and only 22 per cent of businesses made e-commerce sales.

Similarly, a quarter of SMEs report that they do not possess basic digital skills; there is a positive link between digital skill levels and turnover growth. In this respect, there is an attitudinal barrier amongst a minority of SMEs towards developing an online presence, a lack of awareness about the benefits and opportunities available, and a lack of understanding about online security threats (Department for Business Innovation and Skills, 2015b). Moreover, embedding digital learning throughout the education system is a long-term solution, but there is also a clear need to enhance digital capabilities in the shorter term. Key to increasing capacities to take advantage of digital opportunities are providing digital courses and awareness-raising initiatives through existing local private and third sector networks, and improving cyber security.

Overall, 98 per cent of SMEs use the internet for business purposes. Eighty-five per cent do so at home, 82 per cent at work, and 67 per cent via smart phones. Ninety-one per cent of SMEs have broadband. Thirty-nine per cent have superfast broadband, a proportion which rises to 56 per cent of medium-sized businesses (with 50-249

<sup>17</sup> <https://ec.europa.eu/digital-single-market/en/scoreboard/united-kingdom>



employees). SMEs use the internet for a variety of purposes. Three quarters or more use it for finding out general information relating to the business, customer emails, online banking, paying bills, ordering supplies and paying taxes online.

The digital economy is of paramount importance to the UK economy. Between 2003 and 2012 internet retail volumes grew by more than 6 times from £4.8 billion to £31.1 billion. Yet only a third of small businesses sell online.<sup>1</sup> An intrinsic element of the government's vision for a competitive UK information economy is for all UK businesses and organisations, particularly SMEs, to confidently use technology, trade online and increase revenues in domestic and international markets.

There are particular benefits for SMEs to being online; they grow faster, export more and create more jobs<sup>2</sup>. The UK has the most advanced online market in Europe, and there are opportunities for SMEs to increase their online presence and sales in both domestic and international markets. Rates of international online trading are particularly low, with fewer than one in ten UK SMEs selling to customers overseas.

Many SMEs are not currently making the most of the opportunities open to them by the internet with recent studies showing that fewer than a third of UK SMEs transact online. The reasons cited by SMEs for not trading online include technical issues, such as reorganising business processes and systems, skills issues, including a lack of specialist knowledge or capability, and trust issues including concerns about security and a lack of trust in available advice. It is evident that the term 'digital capabilities' is multi-dimensional and encompasses a wide range of activity which may benefit SMEs: effective online trading, use of social media and communications technology more generally, utilisation of a range of technologies connected with superfast broadband, seeking advice and support - both general and specifically relating to digital - from online sources, engaging with e-government, and higher level coding skills (among many others). It is difficult to measure the 'digital capabilities' of SMEs, given the varied nature of the options open to different SMEs.

According to the Department for Business Innovation and Skills (2015b), the Information Economy Strategy (2013) outlined the action that was to be taken to address this need. Government, in partnership with industry, would launch a programme to get more SMEs transacting online. The programme would target both those SMEs who are already online in a simple way but are looking to start transacting online, and those SMEs who are already transacting online but are hoping to scale up. It was hoped the programme would reach 1.6 million businesses over the five years to 2018.

The main strategic document relating to digital skills of small businesses is the Government's Information Economy Strategy<sup>3</sup>. This recognises both the scope of the prospects for business, and the scale of the challenges; equipping non-ICT businesses and the workforce as whole with the skills to make the most of the opportunities open to them, regardless of their line of trade. The strategy also recognises the value of increasing digital literacy more generally, relevant here mostly in terms of increasing the potential size of the online market for goods and services, and in enabling workers to be 'digital-ready' for the demands which are increasingly likely to be placed on them by businesses, and which will be necessary to complete in a global marketplace.

Moreover, there is also a broader argument<sup>5</sup> that 'universal digitisation' – i.e. moving as many transactions of all kinds online as possible - would be highly beneficial to SMEs as well as the broader population. However, these arguments are beyond the scope of this report to examine; as such, the main message is that digitisation by itself is insufficient, as SMEs need appropriate training and upskilling, along with relevant advice and other support, in order to make the most of the opportunities that greater digitisation will bring (Department for Business Innovation and Skills, 2015b).

Almost all SMEs use the internet for business purposes, but intensity varies with increasing size. According to the 2014 SBS, virtually all SMEs use the internet for business purposes: 98 per cent of SME employers, and 94 per cent of businesses with no employees; those that did not have access stated that they did not need it. Usage of the internet generally became more intensive as number of employees increased; this is most noticeable in the promotional use of a website: 53 per cent of businesses with no employees had a website which they used from promotional purposes, compared with 66 per cent of micros, 79 per cent of small businesses, and 87 per cent of mediums (all differences were significant).

Furthermore, the most common use of the internet is emailing customers, but e-commerce was much less prevalent. The most common use of the internet was to email customers (79 per cent of businesses with no employees, 85 per cent of employers), followed by paying taxes online (79 per cent) and other online transactions (78 per cent). Amongst the options presented, use of e-commerce was the least used (26 per cent with no employees, 33 per cent of employers, with only medium businesses reporting significantly higher usage, at 45 per cent). Barriers remain to increasing the use of e-commerce. Use of the internet to seek advice was also less common, with 43 per cent with no employees, and 61 per cent of employers (and 82 per cent of medium businesses) seeking advice on regulation, with the proportions seeking general business advice being 47 per cent among SMEs with no employees, and 59 per cent of employers.

### 3.4. Greece

Greece has an overall score<sup>3</sup> of 0.37 and ranks 26th out of the 28 EU Member States. Relative to last year, Greece has progressed in terms of Connectivity; but despite 99% of Greek households being covered by fixed broadband, 34% do not yet subscribe to it. Greece lags behind on the demand side, with low levels of digital skills (only 63% are regular Internet users, while 30% have never used the Internet) and trust (most Greeks still do not shop online nor do they make online transactions). These seem to be holding back the development of its digital economy. Online public services are a key challenge for Greece, as it is among the last in the EU; it is positive to note, however, that 37% of Internet users have exchanged filled forms with the public administration online. Greece's score was lower than the EU average and over the last year, the score grew at a slower pace than the EU. As such, Greece is part of the falling behind<sup>4</sup> cluster of countries<sup>18</sup>.

More specifically, with a Human Capital score of 0.38, Greece ranks 26th among EU countries, showing only mild improvement compared to the previous year (0.33). In order to fully develop its digital economy and society, Greece needs to engage its citizens to use the Internet. Greece has one of the lowest levels of regular Internet users in the EU (63%), and 30% of the Greek population has never used the Internet (the EU average is 16.4%). This means that about one-third of the population cannot partake on the possibilities offered by the Internet, nor can they contribute to the digital economy.

Greece needs to address its severe digital skills gap, as insufficient levels of digital skills limit the exploitation of benefits for investments in digital technologies as well as gains for citizens for engaging in a wide range of on-line activities. Digital skills are nowadays needed in every corner of the workforce, and the fact that only 44% of Greeks possess at least basic levels of digital skills can be an important barrier to the country's economic development. Finally, Greece has the lowest share of ICT specialist in the workforce among all EU countries (1.3% in 2014). Greece also performs worse than the EU average in terms of STEM (science, technology and mathematics) graduates, with 1.6% of Greeks aged 20-29 years old holding a STEM degree in 2013. As a result there is a digital skills deficit, which impedes the potential of the digital economy for growth and jobs<sup>19</sup>.

Greece has its second best ranking of all the DESI 2015 dimensions in Integration of Digital Technology by businesses. It ranks 24th among the EU countries with a score

<sup>18</sup> <https://ec.europa.eu/digital-single-market/en/scoreboard/greece>

<sup>19</sup> <https://ec.europa.eu/digital-single-market/en/scoreboard/greece>

of 0.23. Still, progress seems to have stagnated over the past year and Greece's businesses need to better exploit the possibilities offered by on-line commerce and cloud-based applications.

The adoption of digital technologies is an important driver of labour productivity growth and needs to be strengthened. The percentage of businesses using technologies such as electronic information sharing (ERP – 37%) and social media (18%) is nearly equal to the EU average (36% and 18%, respectively). However, not many Greek businesses use RFID (2.6% in 2014), eInvoices (4.1%), or cloud services (6.5%). Greek businesses need to improve their digitization in order to attain further efficiency and productivity gains<sup>20</sup>. Greek businesses need also to take advantage of the possibilities offered by on-line commerce. Very few SMEs in Greece sell online (6.1%) and even less sell online to other EU member states (3.4%). In both cases the figures have fallen compared to the previous year.

Based on the National Bank of Greece data and specifically the digital economy indicator, Greece is lagging behind from the EU average. The largest divergence is detected at the level of enterprises where the digital technologies adoption and electronic transactions are extremely low (Μυλωνάς & Τζάκου-Λαμπροπούλου, 2016). In terms of digital footprint, a large share (one out of three) of the Greek SME's is not users of digital tools (e.g. information systems, e-commerce). For instance, the 4% of Greek SME's retain an integrated information system while the 25% (almost 1/3 of those operating a digital tool) retain only a website or social media profile. Similarly, a very small share of the Greek SME's is using electronic transactions for the collaboration with their suppliers (in contrast to the EU average of 23%).

At the same time, the share of e-sales is approximately 2% in contrast to the EU average of 15%. More particularly, the 92% of the medium-sized companies (with sales from €0,5mil.to €10mil.) are using digital tools while the same indicator is 61% for micro companies (sales less than €0,1mil.) and the 28% retain only a website or social media profile. Overall, the divergence of the digital capacity of Greek SME's in comparison to EU ones is remarkable and expanding, especially as regards to the adoption of electronic transactions channels and the use of new technologies for the development of new products or services (Μυλωνάς & Τζάκου-Λαμπροπούλου, 2016).

<sup>20</sup> <https://ec.europa.eu/digital-single-market/en/scoreboard/greece>

#### 4. Methodological statement

This deliverable describes and summarizes data collected from a multi-level survey with the aim to identify current “e-skills needs” into two broad firms’ categories and target groups which are perspective young entrepreneurs but also existing micro/small-sized firms.

The present part of the Deliverable provides a clear and logical justification for why the methods used were necessary, how they will provide the information that will accomplish the goals laid out in the problem statement, and how they are similar to techniques used by others in relevant surveys.

As it has been already mentioned, the project objectives promote the identification of needs into two broad firms’ categories and target groups which are perspective young entrepreneurs but also existing micro/small-sized firms. In this respect, common business needs will be identified and will be tackled through the formulation of a joint and integrated course of action.

More specifically, the project will address the education needs of talented youth during their progression from undergraduate students to young entrepreneurs, establishing their own business in a real business environment. At the same time, enterprise associations and confederations, as well as university's experts on innovation and entrepreneurship will express the needs of their members-firms and users (by analyzing existing studies or by conducting interviews or running focus groups where needed), while academic partners will translate them to specific learning objectives and module outline.

The research design includes specific steps aiming to address the project’s objectives. The major goal is to set up a comparison between two different inputs and to shed some light on the theoretical questions laid out in our problem statement through a multi-layer research design base on the literature review, focus groups and interviews.

First, the present Report was based on a literature review on digital and e-business skills in the field of SME’s with respect to start-ups, established firms as well as the countries of reference (Italy, Spain, United Kingdom, Greece). In this part, it is taking place an identification of skills demands by analyzing secondary data collection/desk research (published information, international studies etc) from existing secondary sources and evaluating existing case studies on training and skill demands.

Second, a primary data collection has taken place with a focus to assess competence and skill needs through structured interviews with major players on the field and/or focus groups with relevant stakeholders in each participating country. This phase validated the skills demands identified within the secondary data collection,



formulating a relevant skills profile which includes possible educational and training paths leading to skills and competences required (module outline/module units).

More particularly, University of Bari, Manchester Metropolitan University and CEEI Burgos implemented specific number of interviews within the Activity 1, while IME GSEVEE and University of Patras collected relevant information provided by the interviews and implemented two (2) Focus Groups (Athens and Patra) with respective emphasis into project's two broad firms' categories/target groups which are perspective young entrepreneurs but also existing micro/small-sized firms.

In-depth triangulation and comparative interpretation of data will be used to convert input from Activity 1 to concrete module units. In the following Table, the detail number of interviewees and Focus Groups' participants (per partner) is illustrated.

**Table 1. Number of interviews/participants**

Partner	Number of interviews	Number of FG's participants	Questionnaires
<b>IME GSEVEE</b>	-	8	7
<b>University of Patras</b>	-	12	10
<b>University of Bari</b>	8	-	-
<b>CEEI Burgos</b>	9	-	-
<b>Manchester Metropolitan University</b>	9	-	-

This input will be exploited for the purposes of designing an appropriate concept training package (module development) which takes into account the scope of the project but also the specificities of SME's companies as regards to innovation and e-business. In the following pages, a synopsis of the results derived from interviews and Focus Groups will be illustrated.



#### 4.1. Focus Groups

##### *Focus Group (Patra, Greece)*

In Patra, the focus group session was held on the 2nd of March 2016 at a venue in the University of Patras and lasted approximately two and a half hours (2.5h). The discussion was facilitated by one experienced moderator (who is also part of the research team). Four researchers taking fieldnotes as observers were also present in the session. No formal guide with questions was used. Instead, to stimulate the discussion, three PowerPoint slides containing selected keywords were used.

In order to triangulate the findings in the focus group, a follow-up online questionnaire (in Greek) was distributed among participants. Due to the limited number of participants, data from this may only be used in order to check the validity of the claims discussed in the focus group (i.e. to reassure that the interpretation we made to our findings is appropriate). The questionnaire was followed the structure of Interviews Form and Skills' List formulated by IME GSEVEE. To date (23.3.2016), the questionnaire has been completed by 10 (ten) of the participants.

Some of the benefits mentioned in the discussion regarding e-business are: accommodating the communication in order to promote ones' company (e.g. via social media), reaching out international markets (e.g. via e-shops), and conducting research (both for educational/technical information as well as consumer insight). Perhaps one of the most important aspects of digital tools is the possibility: a) to use them for free (at least those that do not have any royalties and/or are provided for free), and b) to cut down costs by doing-it-yourself (e.g. carrying out consumer research rather than paying a market research company to do it for you). With respect to training for digital tools, participants revealed that companies/providers are sometimes lacking a user-friendly approach (e.g. for google adworks), and highlighted that a perspective training course should adopt a step-by-step approach in order to be of any help. This will be discussed in greater detail later on in the next section.

Some of the most important points raised were dealing with the need for interdisciplinarity (many hats to be worn by one or more people), the advantages of teaming-up and developing synergies (either formally or informally), the varying degrees in the need for digital skills (and the various types), as well as the importance of training as a means to aid innovativeness and to overcome obstacles.

The focus group identified five broad categories falling under what has been termed as business management skills. The first category refers to Financial skills. A second

category refers to Human Resource management and includes skills on team formation, co-operation and team development over time. The third category refers to Product Development. The fourth category refers to planning, and includes the commonly known business plan as well as one other common tool called the canvas business model. Finally, the last category refers to Marketing while one last subcategory of Marketing refers to the skills related to the art of sales which, according to one participant, could involve some inherent talent. The focus group discussion suggested that skills related with ICT mostly evolve around digital tools for promotion purposes, research/analysis, administration and internal business organization, as well as finding information or recording and sharing the knowledge within the firm.

Through the discussion with participants, it was possible to identify several skills which can fall under the Personal Development category. Some of these skills are related to promotion and sales, networking, negotiation and leadership. The ability to manage stressful situations, to be flexible and to have confidence in order to overcome the obstacles imposed by fear, also came up as important. Additionally, since team-working was stressed as providing valuable synergies and perhaps a good model to adopt, skills connected with the creation of the “right” teams, (e.g. searching for team-mates), working within a team, as well as techniques for the sustainable development of a team could also be relevant here.

Overall, three aspects which appear necessary to be considered throughout the development process are: Firstly, the importance of digital economy for young entrepreneurs. Secondly, the need to provide an environment which supports development of confidence and a “can do” attitude. Thirdly, the need to embrace a “hands-on” active learning approach.

#### *Focus Group (Athens, Greece)*

In Athens, the focus group session was held on the 9<sup>th</sup> of March 2016 at a venue in the Small Enterprises’ Institute (IME GSEVEE) and lasted approximately three hours (3h). The discussion was also facilitated by two experienced moderators, members of the team of IME GSEVEE. During the focus group, the Interviews’ Form and the Skills’ List were used with the aim to facilitate the discussion and stimulate interactions amongst the participants. A PowerPoint presentation was used also at the very beginning of the focus group in order to provide a complete picture of the whole project and the aim of the focus group.

In order to triangulate the findings in the focus group, a follow-up online questionnaire (in English) was distributed among participants. The questionnaire was

followed the structure of Interviews Form and Skills' List formulated by IME GSEVEE. To date (30.3.2016), the questionnaire has been completed by 7 (seven) more respondents.

The focus group identified the importance in several categories of the Skills' List while the discussion delved into the questions of the Interviews' Form in detail. A crucial parameter emerged from the discussion was the Business Development dimension at the level of Marketing and Management. Specific topics and sub-categories such as Marketing Research, Consumer Behaviour, E-commerce strategy, Sales and Marketing as well as Finance were considered also as prerequisites for business growth. Less importance has been identified on topics related to Information Technology and specifically sub-categories, such as ICT infrastructure, Big Data Analytics and ICT systems and application development. As significant topics in the field of Information Technology, the following were mentioned, depending on the size and the specialization of each company: Web development and tools, Security and legal issues and Future trends.

Overall, the focus group discussion raised the significance of management and personal development skills as preconditions for the further 'digitization' of SME's. Furthermore, several of the participants marked the importance of training and their willingness to receive training on e-business skills. As a major reason to receive training on e-business skills, the need for sales and competitiveness improvement was mentioned. Similarly, both e-learning but also 'hands on' approaches (e.g. seminars, workshops) were considered as optimal methods to receive training on e-business skills.

Moreover, some more aspects emerged from the discussion included the outcomes expected by a potential training on e-business skills. The major expected outcomes were sales increase, cost reduction and turnover improvement, while several barriers towards the development of 'digital business' were mentioned which problems in electronic payments systems and social trust on e-commerce issues.

## **4.2. Interviews' synopsis**

### **✓ Italy**

In Bari, interviews took place in February 2016 as part of the Activity O1 "Skill Profile Identification", project "Open Up Entrepreneurship". The semi-structured interviews aimed to provide results derived from startup practitioners and researchers located in Bari.

As first step, some local startup employees and entrepreneurs having ICT expertise were contacted to answer the questions. Eight interviews were conducted with an average age of 30 years old. Most of them are employed as developers (7 responders over 8) in their own startups, which vary in size between 2 and 4 members. The remaining subject is a researcher. Only 2 responders were not interested in receiving training on e-business skills, mainly for a lack of interest. The remainders were strongly interested, mainly because they consider e-business skills crucial to be a successful entrepreneur.

The majority of the interviewed people are interested in receiving e-business training, mainly for gaining new knowledge about skills they consider crucial for their business activities. Education is the principal cause of Business skills knowledge gap.

In the question ‘Reasons to receive training’, the most frequent answer were Capital raising, Business Analysis and Project and research management. Similarly, as ‘Potentially preferred methods for receiving training’ the most frequent answer was ‘workshop’ and then ‘Seminar + E-learning’.

In terms of skills significance, several significant skills were identified, such as Collaborative skills (team leader, communication, and partnership establishment), Creativity-idea generation, strategy, innovation and planning, Big data analytics & tools and ICT content and knowledge management. All this information provides useful material for the design and development of the educational material.

#### ✓ Spain

The interviews’ form information has been collected during March 2016. CEEI Burgos has gathered answers from 9 entrepreneurs belonging to 5 different startups and SMEs from Burgos (Spain). All the participants agreed that they would be willing to receive some training on e-business skills. Participants gave several reasons to justify their need of training on e-business skills. Some of the most remarkable reasons are the following:

- Entrepreneurs are good in their own professional skill but they may lack of business and management skills.
- To improve marketing actions effectiveness.
- To acquire new knowledge and skills.
- To apply e-business skills to the company management.

In the Question “*Which e-business skills do you consider as crucial for your entrepreneurial venture to grow?*”, participants answered here a variety of options. However, some agreed on the same skills. The answers indicates that there is a special need of training in ‘Sales and digital marketing’ followed by Collaborative skills,

Mobile app design and development, Agile methodology and Cloud computing. It is important to keep in mind that more than half of the participants in the questionnaire belong to the sector Programming and web development. Participants think Personal Development skills are the most significant ones, over information technology and business development. They consider the skills gap is not so high as in the previous fields though and they think this gap is due completely to educational factors.

All the participants would expect to acquire both theoretical knowledge as well as practical skills and competences during the e-business skills training. Some of them also have some other expectations such as: short-term actual implementations, adaptability to the job characteristics, to increase costumers and sales, learn how to make contacts with other companies (networking) and learn how to deal with general business problems.

Most of the participants (5 out of 9) consider that the best way to receive the training is through workshops. Only one participant thought that e-learning would be the best way and none of them thought about the seminars. Three of them answered “Other” and explained that the best option would be to have blended learning that includes e-learning, seminars and individual coaching.

#### ✓ United Kingdom

In UK, the results refer to data collected from final year students on Business programmes at Manchester Metropolitan University Business School. Students participating on final year elective units on; a) Entrepreneurial Practice and b) ICE (Ideas, Creativity and Entrepreneurship), were selected as a sample for this study. These students are either running their own business at the same time as they are studying or they are at the final stages of developing a business plan and aim to launch their business after graduation. Because of these reasons they were considered to be a suitable sample for this study.

Up until the 21st of March there were 9 responses coming from that population. The average age of the sample was 23 years of age, with the oldest student being 29 and the youngest 20. Out of the 9 students 3 run their own business, whilst only one reported the sector of their business: “crafts”. It should be noted that not all respondents answered all questions. Six (6) respondents said they will be willing to receive training on e-business skills and three (3) said that they wouldn’t be interested. The main reasons for wishing to receive training are: Improve e-commerce skills/gain more knowledge on e-commerce (most important); General interest on e-business; Establish and run an online business; Gain competitive advantage as the future is going digital. Moreover, skills considered as most important for Venture’s Growth regards ‘Marketing & digital marketing’.

When asked about the results they are expecting to gain from training on e-business skills, the respondents suggested a combination of outcomes, which can be broken down as in the table below.

***Q 2.2. What expected results (output or outcome) do you expect from e-business skill training?***

Categories of Outcomes	Responses
Theoretical Knowledge	2 (it's a new digital age so theoretical knowledge is required)
Practical Skills & Competences	6 (web design; setting up an online business; improve performance)
Other	1 (consumer behaviour)
<b>Total</b>	<b>9</b>

Similarly, the responses in the Question Q 3.Q “Which do you consider optimal method to receive training on e-business skills and why?” are illustrated in the table below.

Method for Training	Responses
Seminar	2 (because it is interactive and you receive an instant response)
Workshop	4 (because it could be adapted to recipients' requirements; because it provides hands on experience and you are able to practice what you learn)
E-learning	2 (maybe it is unsuitable for individuals not familiar with the internet)
Other	None
<b>Total</b>	<b>8</b>



The majority of respondents suggested they would be willing to receive training on e-business as they wish to improve their e-commerce skills or to establish an online business. Marketing and online communications (e.g. blogging) were considered amongst the most important e-business skills that could help the growth of their business. Amongst the business related skills, “development of new products and services” and “identification of viable market niches..” are the most highly rated skills in terms of importance.

Within this category, the highest skills gaps seem to be around the areas of “business ethics” and “consumer behaviour”. In terms of business management skills, “digital product management”, “raising finance”, “agile methodology” and “international business/trade” are amongst the most highly rated skills in terms of significance. In terms of skill shortages for the same category of skills, “raising finance”, “advanced sector/industry knowledge..” and “process optimization” seemed to be the main areas where the areas where the highest skill shortages currently exist.

In terms of IT skills, “electronic payments”, “e-shops”, “privacy”, “trust”, “content management systems” and “ICT systems application” were rated as the most highly significant skills areas, while there doesn’t seem to be a clear prioritisation within this category of skills based on the level of existing skills shortages. Finally, “user empathy skills” and skills for “creativity..” were rated most highly in terms of importance amongst the personal/interpersonal skills. Skill shortages were mainly on the areas of “collaboration”, “user empathy” and “adaptability”. It is worth noting that most respondents didn’t provide an answer for the main factors behind the skill shortages. One reason that explains this is uncertainty about what the underlying factors might be.

## 5. Conclusions: 9 Findings - 5 Module Units

The whole methodological approach has been based on a qualitative method (e.g. literature review, interviews, focus groups) aims to illustrate and define major skills demands and needs by collecting information and observing human behaviour along with their causes or needs. The empowerment of digital skills is considered as part of what we usually call “entrepreneurial education”. The main goal of most entrepreneurial education is to develop some level of entrepreneurial competencies. Entrepreneurial competencies are defined here as knowledge, skills and attitudes that affect the willingness and ability to perform the entrepreneurial job of new value creation (Lackeus, 2015).

A major part of the present approach is to proceed an in-depth triangulation and comparative interpretation of data to convert input from Activity 1 to concrete module units. In this respect, several comparative and interactive collaboration took place amongst the partners in order to illustrate, compare and categorise the input collected and the skills’ identified from the various and heterogeneous participants’ groups.

The major findings derived from the synthesis of secondary and primary research include the following 9 findings (as headlines):

**Finding 1.** Personal development skills importance. The majority of the respondents underlined the importance of personal development skills, in terms of traversal dimension to enhance ‘e-business’.

**Finding 2.** Business development skills significance. The larger part of the respondents raised the significance of the business development skills as pre-conditions for the further development of digital skills.

**Finding 3.** The need to embrace a “hands-on” active learning approach. A major issue raised from the respondents regards the hands-on” active and interactive learning approach.

**Finding 4.** E-learning is important as well as classic approaches such as seminar and workshops. Many respondents considered the mixture of classic and modern approaches of training, as optimal.

**Finding 5.** Education is the principal cause of Business skills knowledge gap. Many participants raised the importance the provision updated and integrated training on e-business skills.

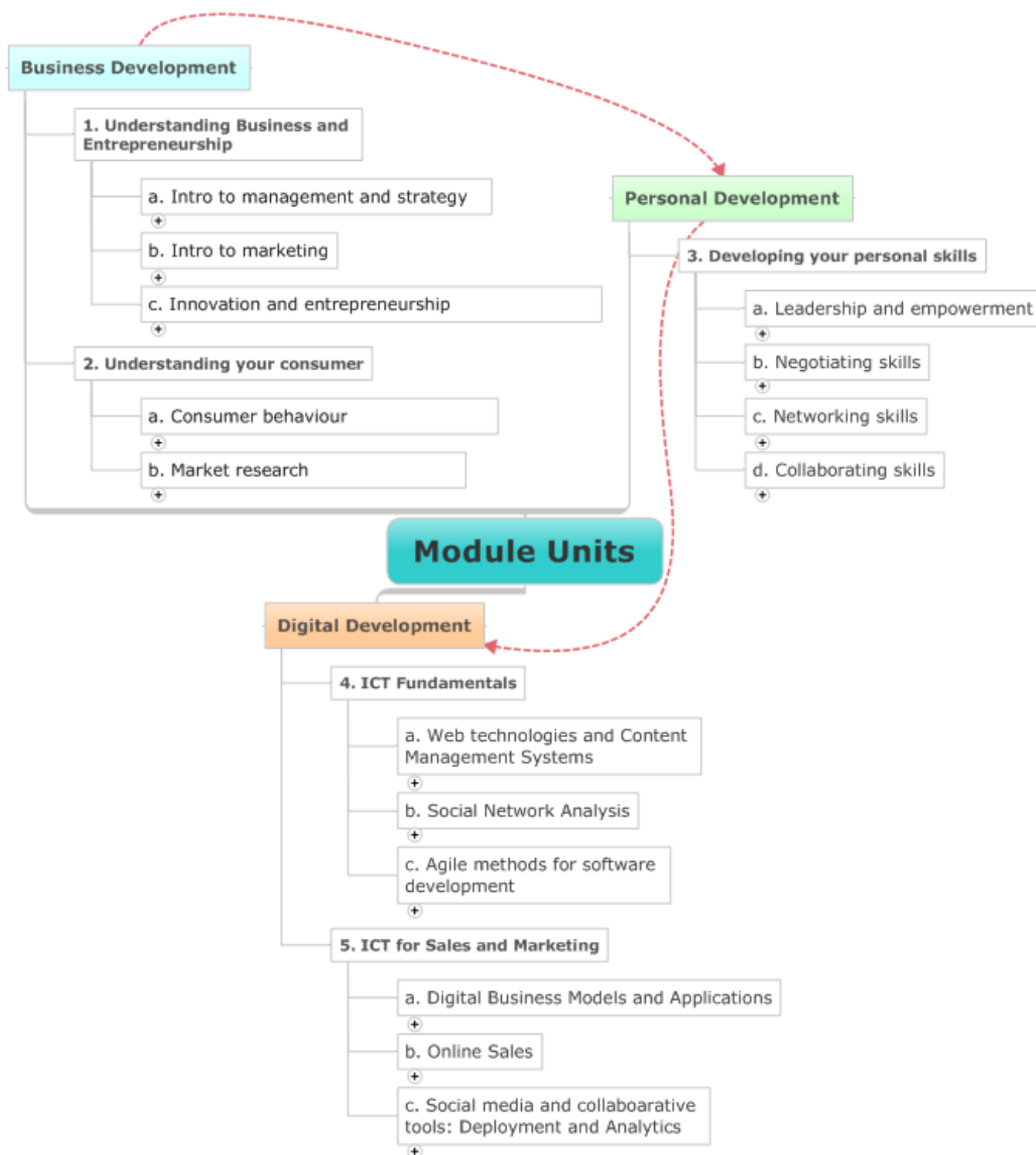
**Finding 6.** Sales and digital marketing. A remarkable sub-category in all countries (and almost all participants) is Sales and digital marketing.

**Finding 7:** Skills related with ICT mostly evolve around digital tools for promotion purposes, research/analysis, administration and internal business organization.

**Finding 8:** Skills gaps need more emphasis. As mentioned from the participants, a specialized focus should be given on 'soft skills', such as the areas of 'business ethics' and 'consumer behaviour'.

**Finding 9:** The need for interdisciplinarity, the advantages of teaming-up and developing synergies, the varying degrees in the need for digital skills, as well as the importance of training as a means to aid innovativeness and to overcome obstacles.

The present deliverable sets the course for the implementation of the Module Development, consisting of a specific number of module units. Based on the results of secondary and primary (cross-validation) research, specific skills were identified. The major skills' areas identified are presented in the Graph 1.



Graph 1. Skills' Chart

The main challenge of the module units' design is to provide domain knowledge in conjunction with an hierarchical domain structure for specific topics serving the purpose of the project OpEn. Based on a synthesis of results and findings in conjunction with a wide range of skills identified and cross-validated (Skills' List), a list of Skills' Classification has been formulated as follows:

### **Classification of module units based on identified significance:**

#### **Business Development**

1. Understanding Business and Entrepreneurship
  - a. Intro to management and strategy
  - b. Intro to marketing (i.e. market analysis, branding, channels and sales)
  - c. Innovation and entrepreneurship
2. Understanding your consumer
  - a. Consumer behaviour
  - b. Market research

#### **Personal Development**

3. Developing your personal skills
  - a. Leadership and empowerment
  - b. Negotiating skills
  - c. Networking skills
  - d. Collaborating skills (i.e. team working, communicating, establishing partnerships)

#### **Digital Development**

4. ICT fundamentals
  - a. Web technologies and Content Management Systems
  - b. Social Network Analysis
  - c. Agile methods for software development
5. ICT for Sales and Marketing
  - a. Digital Business Models and Applications
  - b. Online sales
  - c. Social media and collaborative tools: Deployment and Analytics

The structure of the Module will take into account the present classification in conjunction to the need of following a methodological sequence (from 'soft' to 'hard' skills).

The major emphasis the participants paid on issues related to business and personal development, prioritized those specific categories and hence, almost the 2/3 of module units include what we would define as ‘e-business skills’ (soft skills) and 1/3 ICT-related skills. A provisional structure providing a combination for both the specific classification and the methodological and educational sequence is presented below.

Module Units	Courses
<b>1. Business Development</b>	
<b>Module Unit 1: Understanding Business and Entrepreneurship</b>	
	a. Intro to management and strategy
	b. Intro to marketing
	c. Innovation and entrepreneurship
<b>Module Unit 2: Understanding your consumer</b>	
	a. Consumer behaviour
	b. Market research
<b>2. Personal Development</b>	
<b>Module Unit 3: Developing your personal skills</b>	
	a. Leadership and empowerment
	b. Negotiating skills
	c. Networking skills
	d. Collaborating skills (team working, communicating, establishing partnerships)
<b>3. Digital Development</b>	
<b>Module Unit 4: ICT fundamentals</b>	
	a. Web technologies and Content Management Systems
	b. Social Network Analysis
	c. Agile methods for software development
<b>Module Unit 5: ICT for Sales and Marketing</b>	
	a. Digital Business Models and Applications
	b. Online sales
	c. Social media and collaborative tools: Deployment and Analytics

The specific structure of the Module Units, based on the classification Business Development, Personal Development and Digital Development, will be finalized in the Deliverable 2: Module development.



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## Annex

### Interviews' and Focus Groups' Form

#### Concept note

The present Interviews' and Focus Groups' Form provides a useful framework within which to understand the e-business skills that are required in order to be a successful entrepreneur, the ways that these skills should be acquired and the potential needs for e-business and digital entrepreneurship skills to be developed and improved.

For this purpose, the Interviews' and Focus Groups' Form is accompanied by a provisional basic Skills' List which is based on existing and current state-of-the-art literature on the field, in order to facilitate a theoretical and empirical discussion as regards to the nature of e-business entrepreneurship and furthermore, in order to identify the e-business skills that are required for successful entrepreneurial activity.

The term "e-skills" encompasses a wide range of capabilities (knowledge, skills and competences) and issues. Additionally, e-skills dimension span over a number of economic and social dimensions. European Commission (2004) identifies certain e-skills which covers mainly three general categories:

- ICT practitioner skills: The capabilities required for researching, developing and designing, managing, the producing, consulting, marketing and selling, the integrating, installing and administrating, the maintaining, supporting and service of ICT systems;
- ICT user skills: the capabilities required for effective application of ICT systems and devices by the individual. ICT users apply systems as tools in support of their own work, which is, in most cases, not ICT. User skills cover the utilisation of common generic software tools and the use of specialised tools supporting business functions within industries other than the ICT industry;
- e-Business skills: the capabilities needed to exploit opportunities provided by ICT, notably the Internet, to ensure more efficient and effective performance of different types of organisations, to explore possibilities for new ways of conducting business and organisational processes, and to establish new businesses.

It should be emphasized that **e-business skills** are more strategic in nature and related in particular to innovation management, rather than technology-management, skills - which are part of ICT practitioner skills (European Commission, 2004).

Moreover, European Commission in its latest Final Report on e-Leadership Skills for Small and Medium Sized Enterprises defines e-Leaders as people capable of

driving successful innovation and capitalising on advances in information and communication technologies. Sufficient supply of e-leadership skills to the economy is believed to foster economic growth and create jobs through its key role in identifying and exploiting innovation opportunities. e-Leadership skills include the competences which enable an individual to initiate and guide ICT-related innovation at all levels of enterprise, from the start-up to the largest of corporations, from private to public (European Commission, 2015). In this respect, three domains of skills are defined: Digital skills, business skills and strategic leadership skills which can be further specified by enumerating skills that exemplify e-leadership in these areas, while e-Leadership skills needs are rather diverse across industries, enterprise sizes and life-cycle stages.

Under those different taxonomy, attention will be given at the level of e-business skills (business and strategic leadership skills), especially to those related to innovation/technology management, commercial thinking and entrepreneurship for the launch and growth of start-ups or existing businesses but also to selected technology-oriented (digital skills) and more advanced e-skills which are necessary effective application of ICT systems and devices.

The data will be collected within a common framework so that it is possible to compare countries and map needs and e-business skills gaps. The results collected will be used to inform the design of the curricula/training programme and teaching/learning methodologies.

The basic Skills' List encompasses two parts. The first one includes mostly e-Business skills while the second regards more technology oriented ones. The basic Skills' List will be used for the facilitation of data gathering and analysis within the framework of semi-structured interviews and Focus Groups. The analysis of Skills' List will lead to an efficient, updated and user-driven curriculum design and more specifically to the formulation of specific modules and units.

The Skills' List might be further developed/enriched/modified during the interviews and Focus Groups.

In this respect, it should be mentioned that the Open Up programme gives particular emphasis on two specific Target Groups:

- Existing ventures and prospective/potential;
- Existing SMEs.

Time required (for interviews' use):

- Approximately 20 minutes (in person).

### QUESTIONS<sup>21</sup>:

Please enter some personal information to show your consent (all information is for demographic reasons, is anonymised and confidential).

Name/Surname

.....

Age

.....

Company's title

.....

Sector

.....

Number of employees

.....

City/Country

.....

<b>Question 1.</b> <b>Would you</b> <b>be willing to</b> <b>receive</b> <b>training on e-</b> <b>business</b> <b>skills?</b>	<b>Number</b>	<b>1.1.</b>
	<i>YES</i>	
	<i>NO</i>	

<sup>21</sup> Personal data and information will be strictly used for the purposes of the present project.



<b>Question 1.</b> <b>Why would you want to receive training on e-business skills?</b> <b>Please state the main reasons.</b>	<b>Number</b>	<b>1.2.</b>
	<i>Reasons to receive training.</i>	

<b>Question 2.</b> <b>Which e-business skills do you consider as crucial for an entrepreneurial venture to grow (you could refer to your own business if you are an entrepreneur)?</b>	<b>Number</b>	<b>2.1.</b>
	<i>*Alignment to the basic skills list</i>	

<b>Question 2.</b> <b>What expected results (output or outcome) do you expect from e-business skills training?</b>	<b>Number</b>	<b>2.2.</b>
	<i>Theoretical Knowledge</i>	
	<i>Practical skills and competences</i>	

	<i>Other</i>	

<b>Question 3.</b> <b>Which do you consider the optimal method to receive training on e-business skills and why?</b>	<b>Number</b>	<b>3.1.</b>
	<i>Seminar</i>	
	<i>Workshop</i>	
	<i>E-learning</i>	
	<i>Other</i>	

### ***Sources***

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### Skills' List – Interviews and Focus Groups

			Skills significance	Skills Gap/Shortage	Gaps/Shortages factors	NOTES
		Skills	High; Medium; Low	High; Medium; Low	Policy; education; economy, technology etc.	
Business Development	Marketing	1	Identification and definition of a viable market niche (market analysis)			
		2	Marketing Research			
		3	Consumer behaviour (understanding the consumer)			
		4	Business Ethics (CSR)			
		5	Branding			
		6	Development of products or services appropriate to the firm's market niche / product innovations (and/or NPD)			
		7	Channels (distribution and suppliers)			
		8	Sales and digital marketing			
		9	E-commerce strategy			
		10	Loyalty			
	Management	11	Project Management			
		12	Process optimization			
		13	(Digital) product management			

		14	Finance (Raising capital/digital financial management tools/financial skills)				
		15	Agile methodology (an alternative to traditional project management, typically used in software development)				
		16	Business analytics/business analysis (data-driven decision making/ identifying business needs and determining solutions to business problems)				
		17	Human Resource Management (HR)				
		18	Advanced Sector/Industry Specific Issues (e.g. Tourism, Retail, Services)				
		19	International Business/Trade strategies				
<b>Digital Development</b>	ICT infrastructure	1	Introduction to Computer, Networks and Internet				
		2	ICT infrastructure (installation,integration, administration,support, systems service)				

		3	Cloud computing (infrastructure as a service)				
	Information Systems	4	Introduction to Information Systems				
		5	Standalone business applications (Accounting, CRM, Supply chain, payroll, etc.)				
		6	Integrated approaches (ERP systems)				
		7	Cloud computing (application as a service)				
	ICT for sales and marketing	8	E-shops				
		9	Digital enterprises				
		10	Selling through global marketplaces				
		11	Electronic payments				
		12	Social media - use of social networks				
		13	Search Engine Optimization, SEO & Search Engine Marketing, SEM				
	Big data analytics & tools	14	Introduction to Big data analytics & tools				
		15	Data Mining				
		16	Cloud computing (Processing)				
	Web development and tools	17	Web technologies				



		18	Site builder tools				
		19	Content management systems				
		20	ICT content and knowledge management				
	Security & Legal issues	21	Security issues				
		22	Privacy				
		23	Trust				
		24	Copyrights				
	ICT systems and application development	25	Introduction to ICT systems and application development				
		26	IT architecture and platforms				
		27	ICT systems and applications development (Methodologies, Software engineering versioning, open-source licensing)				
		28	Mobile app design and development				
	Future trends	29	Cryptocurrency				
		30	Sharing economy (Collaborative consumption, Crowdsourcing)				
		31	Virtual economy				
<b>Personal Development</b>	Personal/interpersonal skills and Leadership	1	Creativity-idea generation, strategy, innovation and planning				



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		2	User empathy skills ( website design)				
		3	Collaborative skills (team leader, communication, partnership establishment)				
		4	Adaptability				
		5	(e-) Leadership and Empowerment				
		6	Networking				