Deloitte.

Doing business in the digital age: the impact of new ICT developments in the global business landscape

Europe's vision and action plan to foster digital entrepreneurship

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Content

Foreword

Digital technologies are one of the most important sources of growth for national economies. They enable economies to create more jobs, improve people's lives and build better and greener societies. Citizens, enterprises, universities and governments become increasingly connected in the digital world. Digital is changing people's lives: the way they work, shop, socialise, communicate and educate.

It also reshapes traditional industries and transforms the business environment, from fashion to automotive, from transport and logistics to energy distribution. New technological developments speed up and improve the way new innovative products and services are conceived, developed, produced and accessed. They are enabling businesses to faster develop and bring to market innovative products and services that it was impossible to think about before.

Digital technologies help to totally re-shape value chains, sharpen market intelligence, improve efficiency, reduce time-to-market and increase customer satisfaction. In addition, with the aid of technology, SMEs can now go global from day one, reaching overseas markets and talent pools instantly. Not surprisingly, European SMEs grow two to three times faster when they are empowered by digital technologies.

Modern collaboration technologies not only put a much larger and more diverse talent pool within reach of any entrepreneur starting or scaling a business; they allow talented individuals to work together in a seamless, global operation, despite being separated by time zones and geography.

However, the huge potential of digital evolution still remains untapped in Europe. There is a need to stimulate a more innovative and entrepreneurial mind-set and accelerate smarter use of 'digital' technology in various sectors of the European economy.

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A business landscape in transition

The European business landscape: driven by SMEs

With a GDP of circa 13 trillion euros in 2011, the European economy is by far the leading economy worldwide. With almost 74% of the EU GDP, the service sector dominates, compared to industry with around 25% and agriculture with only 2% of GDP.

Representing 99.8% of all enterprises, SMEs[1] are the backbone of this service-driven economy. From Table 1, it is clear that the typical EU enterprise is a SME, or more specifically, a micro-enterprise with less than 10 employees.

In employment terms, almost 67% of workers are employed by SMEs of which 45% are employed by micro-enterprises, 30% by small companies and the remaining 25% by medium-sized companies. Additionally, according to a study analysing the role that SMEs play in creating more and better jobs, 85% of the net new jobs in the EU between 2002 and 2010 were created by SMEs. Because of larger scale and higher capital intensity, the difference between SMEs and large companies in terms of gross value added (GVA) is less extreme. SMEs accounted for approximately 58% of the total GVA in 2012 compared to almost 42% provided by large companies.

Table 1 – Number of enterprises, SME employment and gross valued added in EU 27 (2010)

SMEs are the backbone of the European economy, both in terms of number of enterprises and employment

	Micro	Small	Medium	SME	Large
Enterprises					
Number	19 198 539	1 378 401	219 252	**20 796 192**	**43 034**
%	92.1%	6.6%	1.1%	**99.8%**	**0.2%**
Employment					
Number	38 905 519	26 605 166	21 950 107	**87 460 792**	**43 257 098**
%	29.8%	20.4%	16.8%	**66.9%**	**33.1%**
Gross Value Added (GVA)					
Number	1 293 391	1 132 202	1 067 387	**3 492 980**	**2 485 457**
%	21.6%	18.9%	17.9%	**58.4%**	**41.6%**

Source: European Commission, 2011. Annual report on EU Small and Medium sized Enterprises 2010/2011

[1] According to EU recommendation 2003/361, a small and medium-sized company or SME is defined as any company with less than 250 employees and either an annual turnover of up to 50 million euros or a balance sheet total of no more than 43 million euros. SMEs are further subdivided into three different types: micro enterprises with 1 to 10 employees and a turnover or a balance sheet total less than 2 million euros, small enterprises with 10 - 49 employees and a turnover or a balance sheet total between 2 and 10 million euros and medium-sized enterprises, having 50-249 employees and a turnover less than 50 million euros or a balance sheet total less than 43 million euros.

Table 2 illustrates the size of six different industry clusters[2] in terms of the percentage of the total Member State workforce employed in a particular industry cluster. At Member State level, i.e. looking horizontally, most European citizens are employed in 'knowledge intensive business services'. Nevertheless, differences between Member States are significant, ranging from 9.3% in Lithuania to 37.8% in the UK In terms of employment size, this cluster is closely followed by 'labour intensive industries' with employment rates ranging from 20% (UK) to 44.2% (Slovakia). The lowest levels of employment are found in the 'life science' and 'tourism and hospitality' clusters.

The use of heat map colours in table 2 helps to analyse employment rates vertically. There is a geographical divide at cluster level as well; when comparing the different clusters it is clear that in particular Member States some clusters are more significant in terms of employment:

- **'Creative and cultural industries'** employ most people in the Netherlands, Latvia and the UK, closely followed by Denmark, Finland and Estonia.
- People employed in **'knowledge-intensive business services'** can be found in Central Europe, with Belgium, France and the UK taking a leading position.
- **'Labour-intensive industries'** employ most people in Eastern and Southern Europe.
- Tax and other incentives have made it attractive for pharmaceutical and medical companies to move to Ireland, resulting in their leading position within the **'Life science'** cluster.
- Cyprus, Austria and Ireland are taking a leading position in the '**Tourism & Hospitality cluster'**.
- The Baltic states Latvia and Lithuania take the lion share in terms of employment in the cluster **'Transport & distribution'**.

[2] See annex for definition and more details.

Table 2 – Cluster employment (% of total Member State workforce employed in particular cluster)

	Creative and cultural industries	Knowledge-intensive business services	Labour-intensive industries	Life science	Tourism & Hospitality	Transport & distribution	Other	
Austria	10.7%	23.1%	34.1%	1.9%	9.5%	9.5%	11.1%	*100.0%*
Belgium	10.2%	35.3%	29.2%	2.2%	2.3%	10.7%	10.1%	*100.0%*
Bulgaria	9.1%	16.8%	37.0%	1.1%	5.0%	11.1%	19.9%	*100.0%*
Cyprus	12.1%	20.8%	32.8%	0.9%	14.1%	13.0%	6.3%	*100.0%*
Czech Republic	10.7%	16.3%	43.3%	1.3%	2.9%	7.7%	17.7%	*100.0%*
Denmark	15.2%	29.4%	26.3%	3.5%	2.8%	12.8%	10.0%	*100.0%*
Estonia	13.5%	14.2%	36.5%	0.8%	3.4%	11.5%	20.2%	*100.0%*
Finland	14.3%	24.8%	36.6%	1.1%	3.8%	10.6%	8.7%	*100.0%*
France	12.2%	36.4%	26.5%	2.2%	3.7%	10.7%	8.3%	*100.0%*
Germany	10.9%	29.7%	36.1%	2.7%	3.2%	7.6%	9.7%	*100.0%*
Greece	11.7%	17.7%	41.1%	1.5%	5.2%	10.5%	12.2%	*100.0%*
Hungary	9.8%	25.9%	37.2%	2.3%	2.4%	11.3%	11.1%	*100.0%*
Ireland	13.5%	24.2%	24.0%	7.7%	9.6%	12.2%	8.7%	*100.0%*
Italy	12.2%	18.7%	35.9%	1.9%	4.3%	11.3%	15.7%	*100.0%*
Latvia	17.5%	22.1%	25.6%	1.0%	3.8%	16.2%	13.7%	*100.0%*
Lithuania	10.7%	9.3%	37.7%	1.0%	2.8%	15.2%	23.2%	*100.0%*
Luxembourg	12.9%	27.4%	36.1%	1.9%	3.9%	9.9%	7.9%	*100.0%*
Malta	8.7%	10.0%	38.9%	3.1%	0.0%	10.7%	28.5%	*100.0%*
Netherlands	19.3%	30.6%	26.0%	1.2%	3.3%	9.6%	10.1%	*100.0%*
Poland	10.1%	22.5%	38.0%	1.4%	1.9%	9.4%	16.6%	*100.0%*
Portugal	11.7%	13.9%	36.7%	0.7%	4.8%	11.1%	21.1%	*100.0%*
Romania	8.5%	11.6%	40.0%	0.8%	3.2%	12.4%	23.5%	*100.0%*
Slovakia	7.2%	12.9%	44.2%	1.1%	3.8%	11.8%	19.0%	*100.0%*
Slovenia	11.2%	22.5%	40.0%	2.2%	3.9%	6.9%	13.3%	*100.0%*
Spain	12.8%	19.8%	41.1%	1.0%	6.1%	9.7%	9.6%	*100.0%*
Sweden	15.5%	26.4%	35.3%	1.3%	3.8%	10.2%	7.5%	*100.0%*
United Kingdom	17.6%	37.8%	20.0%	1.2%	5.2%	10.7%	7.5%	*100.0%*

Colour reflects the value's tendency toward the top or bottom of the values in the range

Top values in the range
Medium values in the range
Bottom values in the range

At Member State level, i.e. looking horizontally, most European citizens are employed in 'knowledge intensive business services'. When comparing the different clusters it is clear that in particular Member States some clusters are more significant in terms of employment

Source: Deloitte, based on Clusterobeservatory.eu (2011)

Small and medium-sized enterprises are highly dependent on entrepreneurs, i.e. individuals who have the ideas and are willing to take the risks necessary to get a business off the ground. As the number of SMEs in the EU is significantly high, an entrepreneurial climate is very important. Nevertheless, in the EU many people are discouraged from starting a business as a truly entrepreneurial climate is often lacking. According to the 2012 Eurobarometer Survey on Entrepreneurship, which examines the motivation, choices, experiences and obstacles linked to self-employment and compares European opinions with those outside of Europe, the image of entrepreneurs is relatively low in the EU: 53% of EU citizens questioned said that they had a favourable image of entrepreneurs compared to 60% in the US Compared to 2009, this gap in 'entrepreneurial perception' between the two economies has surprisingly reduced as the image of European citizens towards entrepreneurs slightly improved (+4%) whilst the US fell by 13%. Within the European Union, the status of entrepreneurs varies considerably across different Member States, ranging from 74% with a favourable perception of entrepreneurs in Denmark to 26% in Hungary.

SMEs highly depend on entrepreneurs. Nevertheless, in the EU a truly entrepreneurial climate is often lacking

With a business climate currently being transformed by digital technologies – both disrupting existing businesses and opening opportunities for new companies and industries – it could be

said that an economy almost fully driven by (micro) SMEs could be the ideal catalyst to make the most of the huge potential of digital technologies.

An economy in transition: from digital to digitally-driven

There is no debate over whether digital innovation is a profound force in our economy. The digital economy isn't just about speeding up communication across borders or changing the skills workers need; it is about changing the very nature of consumption, competition and how markets operate. More profoundly, it is also driving a significant shift in the balance of power between organisations and individuals. The explosion in connectivity and the availability of information is putting today's consumers, employees, citizens, patients and other individuals in a controlling position.

A reference framework, illustrated in figure 1, has been developed to help examine and categorise the different identifiable technology trends. It acts as a starting point to focus on what are already seen as key technology trends:

- The rise of social business and mobility.
- The instrumental importance of analytics.
- The advent of cloud and industrial technologies.
- The all-pervasive criticality of cyber.

Figure 1 starts from the idea that any single force has the potential to reshape an industry or business function but it is where these forces interact that the real power resides. Three core forces and their combinations are the source of many technology trends: mobility, social and analytics. Both cloud computing and industrial technologies are considered enabling technologies, supporting the technology trends in the three core forces. Besides their ability to support these other forces, they can also have a disruptive and innovative influence. Finally, the cyber-intelligence layer is one that applies to all the other forces in one way or another and is therefore considered an overarching force.

Ambient marketing meets mobile commerce: Tesco's virtual store

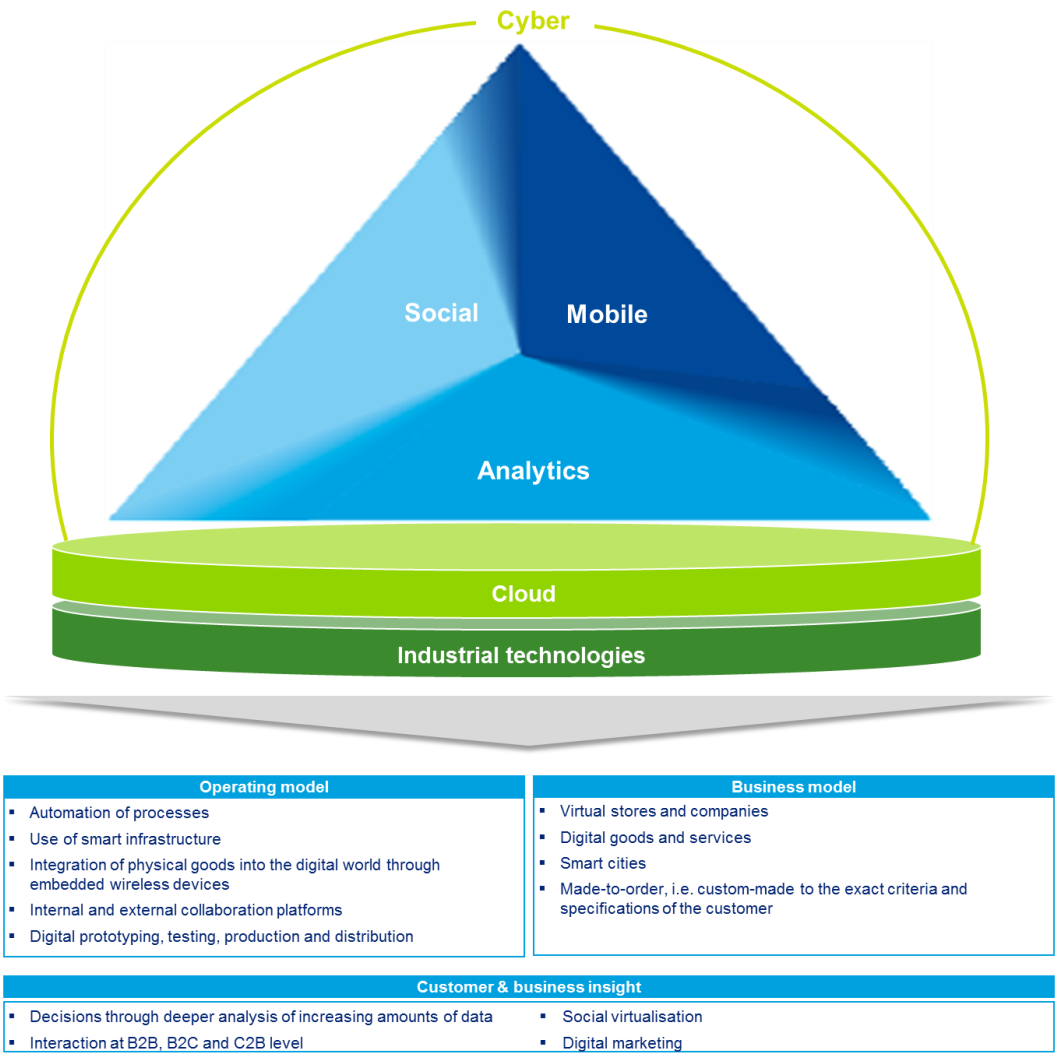
As customers are living their lives differently, Tesco believes they "have to be tuned into the technology they are using". As a result, from August 2011, South-Korean customers can shop at 'Tesco Homeplus'- Tesco's virtual grocery store. It allows commuters to shop for groceries by pointing their mobile devices at billboards in subway stations and at bus stops. After scanning the goods, groceries are delivered at home.

The supermarket group believes this new way of shopping could become "the future of shopping". Through this campaign, online sales increased by 130% and the number of new registered members rose by 76%. As a result of this success, Tesco is further expanding the trial of this virtual store.

More information: http://www.tescoplc.com

Figure 1 – Digital technology trends

Any single force has the potential to reshape an industry or business function but navigating the boundaries between them is where the real power resides.



Source: Deloitte

Digital technologies and innovations are powerful, pervasive and have multiple, indirect impacts. Digital technologies reduce barriers to entry, blur category boundaries, and open doors for a new generation of entrepreneurs and innovators. In turn, current market leaders will face substantial pressures. The idea of digital disruption is about how much additional change a business will experience in the years to come, and how a business can realise its potential across a spectrum of digital opportunities by building on the way it currently uses digital technologies and organises business processes. 'Digital disruption' refers to changes, both positive and threatening, and will affect industries in three ways:

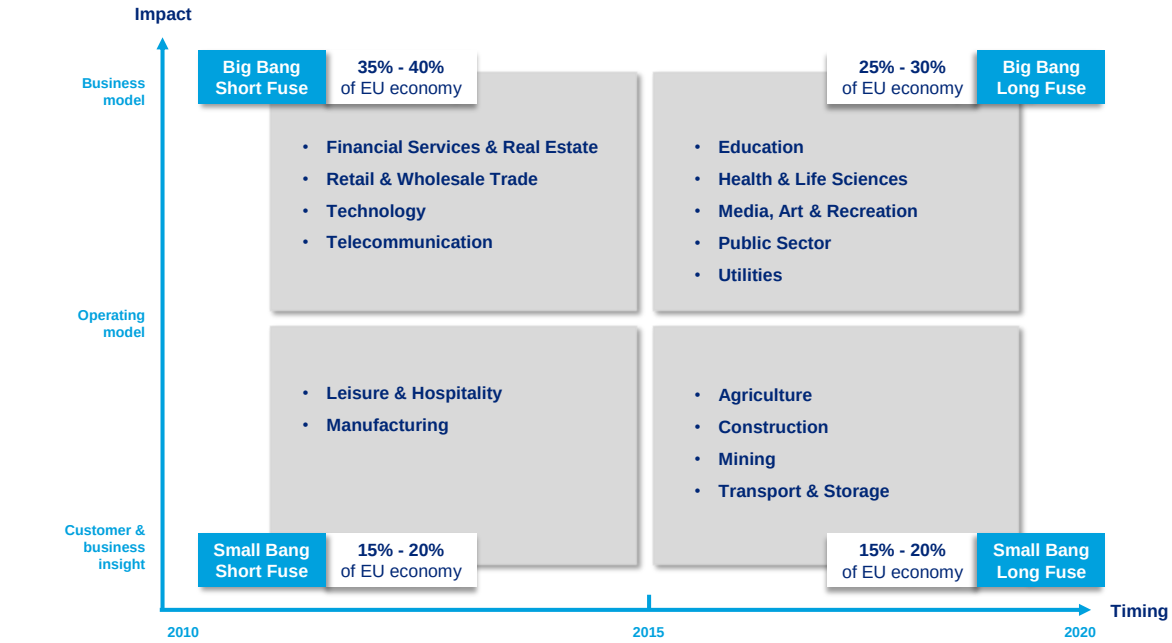
- Customer insights combined with the ability to reach out to customers more effectively.
- Operating models - the way daily operations and processes are organised.
- Business models - the way value is created, delivered and captured.

Though affecting every industry and business function, the impact and pace at which digitisation takes place differs across industries and businesses.

When investigating the different industry segments in more detail, they can be categorised in the four quadrants of an industry disruption map (see Figure 2). In this digital disruption map, different industries are compared by looking at their vulnerability to digital disruption from two perspectives: the impact intensity (bang) and the imminence of change (fuse).

Figure 2 – Digital disruption map

Though affecting every industry and business function, the impact and pace at which digitisation takes place differs across industries and businesses



Source: Deloitte

From this disruption map, it can be seen that most industry sectors can expect a high impact, but, for some industries, it will take longer to occur because of different barriers such as legal matters and regulations or the maturity of some of the influencing technologies.

Community-driven LEGO blocks: LEGO CUUSOO

LEGO CUUSOO, a crowdsourcing platform launched in 2008 by the Danish toy maker LEGO Group and CUUSOO, a company with over 10 years of crowdsourcing and open innovation experience, allows members of the public to post their ideas for potential LEGO products.

To be selected, ideas must receive at least 10,000 votes on the crowdsourcing site. Once the project has received its 10,000 supporters, it is reviewed (quarterly) by the LEGO CUUSOO team to see if it meets LEGO's standards for playability and safety and that it supports the LEGO brand. Final winners will earn 1% of the product's total net revenue. To date, four projects have been accepted of which three sets have been produced.

More information: http://lego.cuusoo.com/

Of course, these results will not apply to every company within a given industry. Within the

The impact of digitisation on marketing, sales and services is more obvious than on other business functions, though impact on other business functions cannot be neglected

different industry classifications, the amount of digital disruption will vary. Retail trade businesses generally face a relatively short time until disruption and an average magnitude of digital disruption. But there will be differences among, for example, department stores, supermarkets and entertainment goods stores. Entertainment goods stores will face greater and more imminent digital disruption. Department stores will also experience above-average digital disruption, as online retail and globalisation intensify competition. However, supermarkets face fewer direct threats from overseas players, due to the perishable nature of grocery goods and the relatively low value of many items, which means that online sales are still a low proportion of total grocery sales.

Even within one business, different business functions[3] (illustrated in Figure 3) will find themselves more or less exposed to digital. Digitisation is changing the way companies innovate and develop products and services. The impact of digitisation on marketing, sales and services is more obvious than on other business functions, though impact on other business functions cannot be neglected.

Nevertheless, it can be said that a huge digital potential is far from fully exploited. In the face of this current situation, European Member States and policy makers must not only react immediately, but should take the lead in order to leverage the digital potential for Europe's SME-driven economy.

Quenching customer insight: Gatorade 'Mission Control'

Gatorade is an important player in the sports-themed food and beverage products market. Its mission control centre for social media demonstrates the potential of social business, putting social media literally at the centre of the way the company approaches marketing.

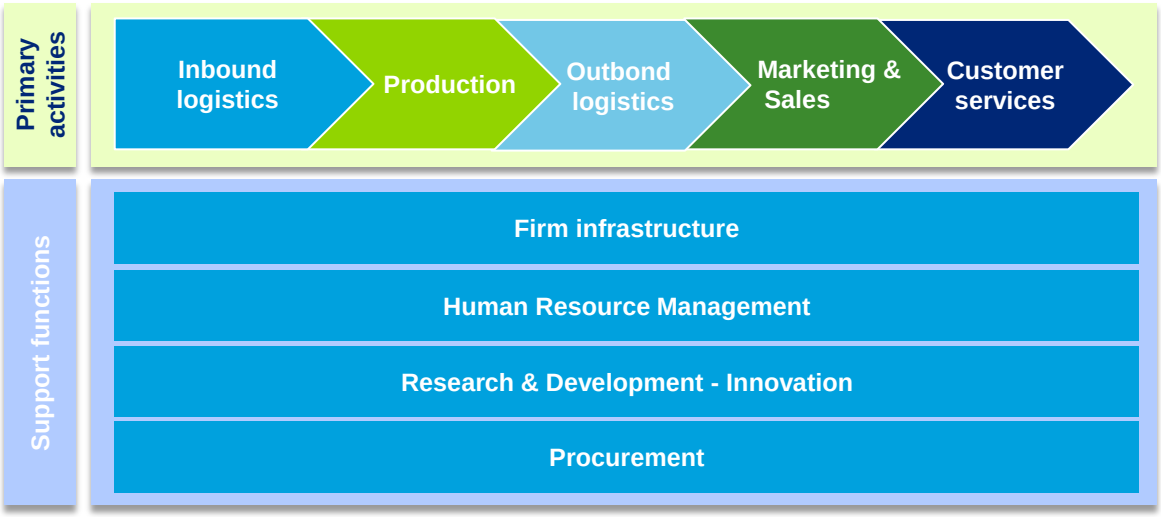
Gatorade created the Gatorade Mission Control Centre - a room that sits in the middle of the marketing department of its headquarters in Chicago - and could best be thought of as a war room for monitoring the brand. The room features six monitors to track a number of data visualizations and dashboards. Tweets, Facebook activities and blog postings that mention the brand, its endorsers, competitors and broader sports nutrition topics are tracked in real time, facilitating Gatorade reaching out more proactively to influencers and customers.

Initial results are impressive, with claims of a 250% increase in engagement and 65% reduction in early (web) page exits. It is likely that these social activities contributed to the 10% growth in volume of Gatorade's US sales in the second quarter of 2010, after three consecutive years of slumped sales.

More information: Research and Markets (2011). Gatorade Case Study: Using Consumer Segmentation and Social Media to Drive Market Growth

[3] Definitions see Annex.

Figure 3 - Business function classification based on value chain framework of Michael Porter



Phonak: 3D technology aided design for precision fitting

By using 3D technology Phonak – a Swiss company providing hearing acoustics – has been able to redesign and improve its Research & Development processes. As a result, Phonak is now able to design and cut individual hearing aid solutions for the smallest size and most comfortable fit, without the need of manual retouching its products.

More information: www.phonac.com

Vision and objectives

The way in which business is done today is very different from the way business was done before the turn of the millennium. Digital opens up unprecedented possibilities. These innovations are changing economies and markets, and reinventing relationships between organisations, suppliers and customers thus becoming critical elements for growth, innovation and job creation.

It is estimated by McKinsey that for every job destroyed by the adoption of digital technologies, 2.6 new jobs have been created. And this is not just about high-tech industries. On the contrary, in the same report, McKinsey states that more than 75% of the value add created by the internet can be found in traditional industries[4]. Digital technologies have become a key driver for economic modernisation and prosperity, eventually leading to higher productivity and growth in all industries and all sectors, both private and public.

As the process of digitisation evolves and matures, it is critical to monitor and anticipate the evolution of the business landscape. The future of doing business in the digital age will mainly depend on the pace of digital development and adoption as well as the outlook for the European business climate. This outlook will be highly influenced by the choices individuals and businesses make about using digital technologies and whether policy challenges are addressed at the same pace.

Vision

Europe's ambition is to accelerate the transformation of its business landscape through the development and smart use of digital technologies in order to increase growth and create employment.

Three priorities have been set to help achieve this vision:

- To become a magnet for highly skilled talent and a distinctive place for doing business, built upon Europe's unique identity.
- To foster a truly entrepreneurial culture to leverage the digital potential for Europe's SME-driven economy.
- To actively support and promote the connection between traditional industries and the digital economy.

[4] McKinsey & Company (2012). Internet Matters. Essays in Digital Transformation

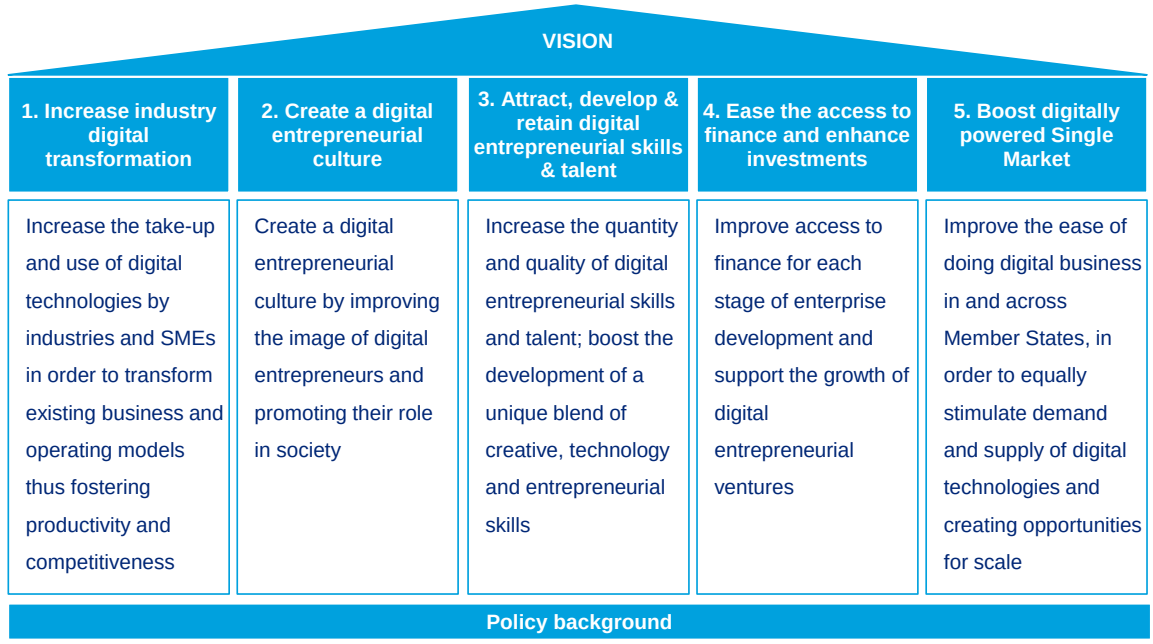
Objectives

Practically, five objectives have been set which need to be reached. These objectives, illustrated in Figure 4, cover the transformation to a digitally driven economy, digital entrepreneurship[5], high-tech skills and talent, access to finance and leveraging the opportunities of the digital single market.

1. **Increase industry digital transformation.** Increase the take-up and use of digital technologies by industries and SMEs in order to transform existing business and operating models thus fostering productivity and competitiveness.
2. **Create a digital entrepreneurial culture.** Improve the image of digital entrepreneurs and promote their role in society.
3. **Attract, develop and retain high-end digital skills and talent.** Increase the quantity and quality of digital entrepreneurial skills and talent; boost the development of a unique blend of creative, technology and entrepreneurial skills.
4. **Ease the access to finance and enhance investments.** Improve access to finance for each stage of enterprise development and support the growth of digital entrepreneurial ventures.
5. **Boost the digitally powered single market.** Improve the ease of doing digital business in and across Member States, by equally stimulating the demand and supply of digital technologies and creating economies of scale.

[5] Digital entrepreneurship embraces all new ventures and the transformation of existing businesses that drive economic and/or social value by creating and using novel digital technologies. Digital enterprises are characterised by a high intensity of utilisation of novel digital technologies (particularly social, big data, mobile and cloud solutions) to improve business operations, invent new business models, sharpen business intelligence, and engage with customers and stakeholders. They create the jobs and growth opportunities of the future.

Figure 4 – Objectives



The analysis in this paper is oriented around the above five pillars. Over the following chapters it examines the challenges and barriers of each of the five pillars for digital entrepreneurship, and provides recommendations for elevating the role of European public policy.

Barriers and challenges

It is an unusual, and perhaps even unique, time to have so many emerging forces, all rapidly evolving, technology-centric and each already impacting business so strongly. The convergence of these forces offers a new set of tools, opening the door to a new set of rules for operations, performance and competition. This is an opportunity for digital technologies to truly help elevate business performance.

Governments and policy makers are recognising the important role of digital in the economy and efforts are being made to foster digital entrepreneurship. However, despite these efforts, there are still many barriers and challenges that can stand in the way of doing business in the digital age. Understanding and anticipating these barriers and challenges is important when establishing the policy background for digital entrepreneurship.

Pillar 1 – Increase industry digital transformation

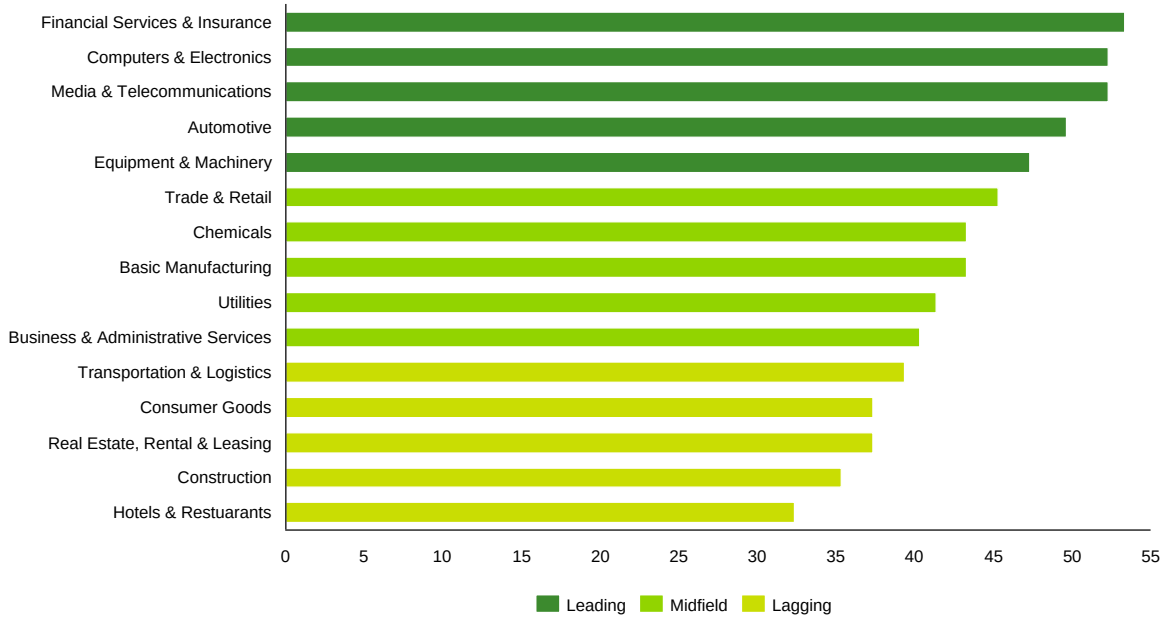
Digitisation is significant but it doesn't affect every industry and business function in the same way.

In order to increase the take-up of digital technologies and intensify the digitisation process in Europe's economy, one has to realise that the way of doing business in the digital age differs between industries and a differentiated approach at industry level will be needed to overcome barriers that might inhibit digital innovation in a given sector.

As illustrated in Figure 5, digitisation is a trend with many facets, impacting industries and businesses differently. 'Financial services & insurance', 'computers & electronics' and 'media & telecommunications' are leading the race to maximise the enabling and disruptive potential of digital technologies, whilst down at the bottom, industries such as 'hotels & restaurants' and 'construction' seem to have a lower affinity for digital technology.

There is a substantial – and growing – gap in terms of digital uptake across industries

Figure 5 – Digitisation Index[6] (2011)



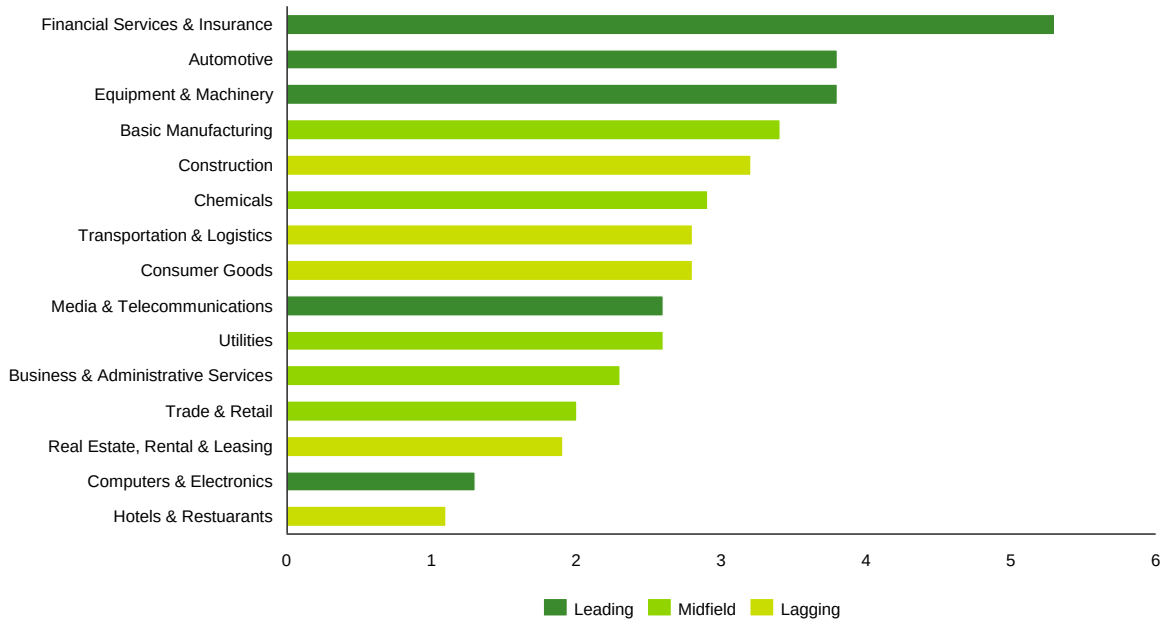
Source: Booz & Company (2011). Measuring Industry Digitisation - Leaders and Laggards in the Digital Economy

Not only is there a substantial gap between the leading and less digitised sectors in terms of digitisation, the pace at which digitisation takes place across industries differs as well. As illustrated in Figure 6, the difference between leading industry 'financial services & insurance' and laggard 'hotel & restaurants' measured 35% in 2010. Only one year later, the gap between the industries had risen to almost 40%.

[6] The Industry Digitisation Index is derived from by Eurostat's 2011–15 information society benchmarking framework. In creating the index, Booz & Company has divided the data into four separate factors, each of which is defined by several sub-factors and components: digital input, digital processing, digital output and infrastructure. More information about this index can be found in Annex.

Figure 6 – Industry digitisation index change 2010 – 2011

The pace at which the digitisation process takes place differs substantially across industries

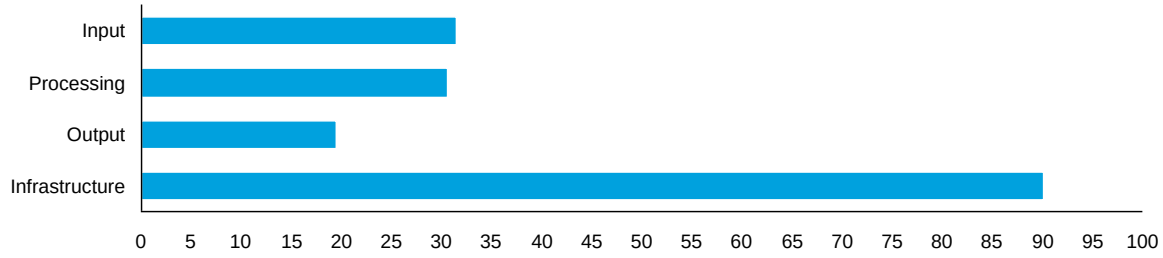


Source: Booz & Company (2011). Measuring Industry Digitisation - Leaders and Laggards in the Digital Economy

Additionally, policy makers should be aware that even within one industry, companies with different business models face very different questions as different business functions will find themselves more or less exposed to digital disruption. As illustrated in Figure 7, most progress in terms of digitisation can be found in the underlying ICT infrastructure and the presence and connection to internet (i.e. business function 'infrastructure'), whilst input, processing and output functions are less impacted by digital technologies. More information on those business dimensions can be found in the annex (digitisation index).

Figure 7 – Overall degree of digitisation across business processes (2011)

Digitisation is significantly higher in the 'infrastructure' business dimension



Source: Booz & Company (2011). Measuring Industry Digitisation - Leaders and Laggards in the Digital Economy

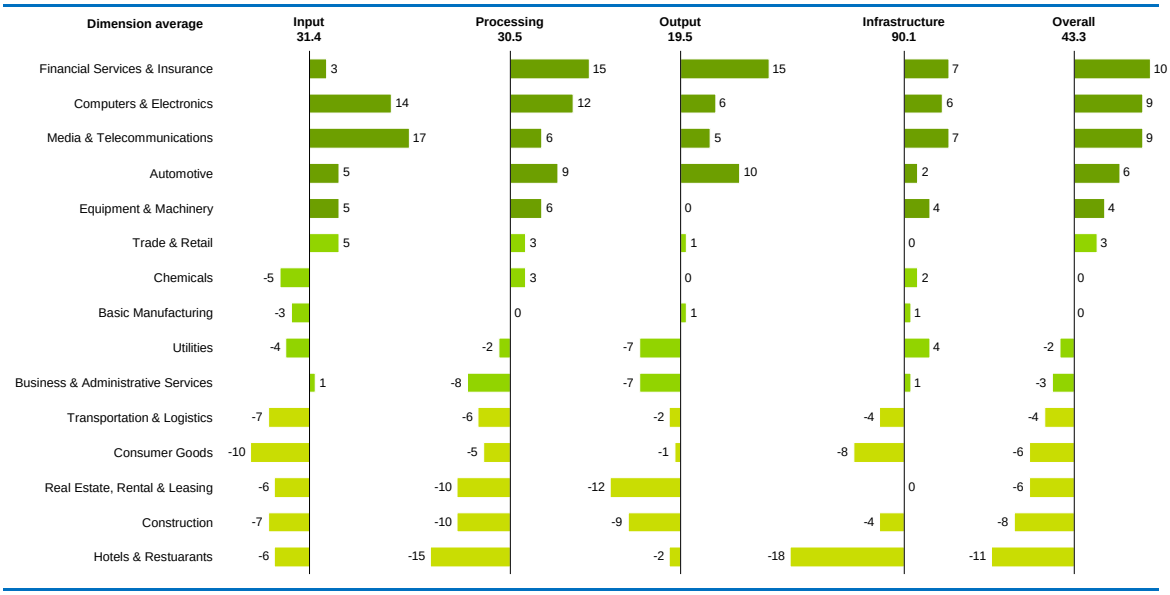
When looking into greater detail at companies in particular industries that are pushing the uptake of digital technologies – illustrated in Figure 8 – the differences among the four business process dimensions stand out even more vividly:

- Looking at the input dimension, there is a significant variation across industries, ranging from +17 points in the Media & Telecommunications industry to -10 points in the Consumer Goods industry;

- Analysing the processing dimension industries vary by no more than 15 points in their degree of infrastructure digitisation;
- Deviation from the output dimension average ranges from +15 points (Financial Services & Insurance) to -12 points (Real Estate, Rental & Leasing);
- As illustrated in Figure 7, the infrastructure dimension is most digitised as its average equals 90 points. Nevertheless variation across industries is significant for this dimension as well, ranging from +7 points (Financial Services & Insurance) to -18 points (Hotels & Restaurants).

Figure 8 – Industry variation from average across business functions (2011)

Information and service-driven industries have moved forward more quickly in digitising their business functions



Source: Booz & Company (2011). Measuring Industry Digitisation - Leaders and Laggards in the Digital Economy

As a result, it is clear that industries primarily dealing with information and services have moved forward more quickly in digitising their procurement processes, processing dimension, output contact with customers and infrastructure.

Based on all of the above, policy makers should take into account the differences at both industry and business function level when looking to harness digital potential. With this in mind, building on strengths and overcoming barriers and challenges will be crucial to capturing the true value of digitisation.

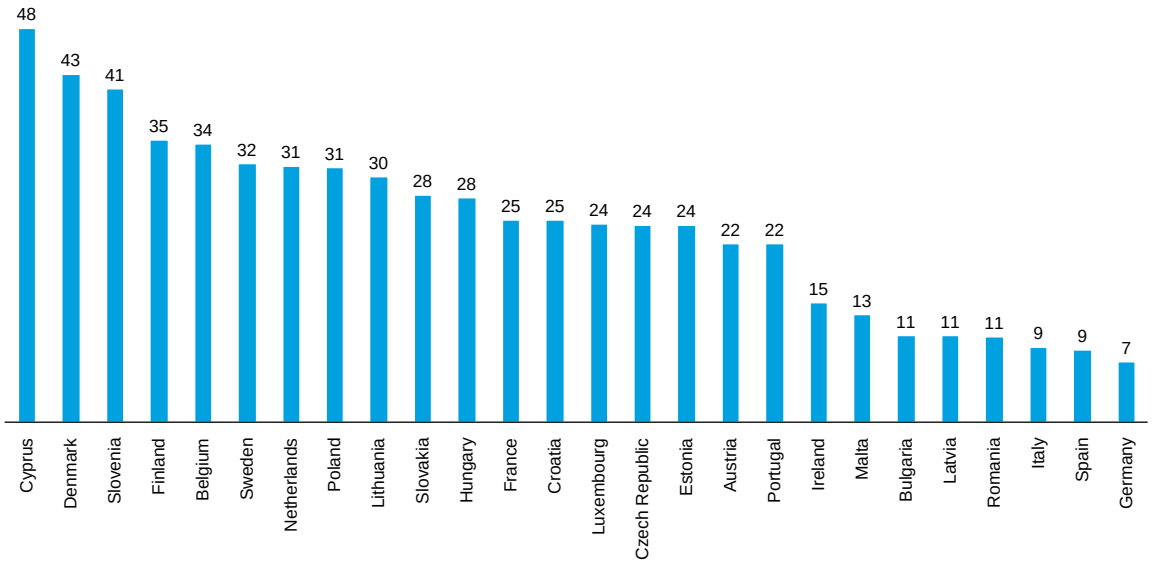
Digital technologies affect both those industries using and providing ICT technologies, changing the traditional way of doing business and posing challenges to connect them both.

Digitisation affects and connects both ICT technology providers and users. As both sides change disruptively, boundaries between them are becoming blurred: "*Players both old and new face real challenges in meeting the demand for new products and services in the age of digitisation, and the challenges aren't just technological. In what was used to be a relatively stable business environment for the old-line ICT service providers, new business models are emerging, as are new modes of innovation."* (Booz&Co, 2012)

In this respect, cooperation between the demand and supply side is crucial to accelerate the transformation of Europe into a competitive place for doing business through the smart use of digital technologies. However, the extent to which enterprises currently cooperate differs considerably across Member States and industries and will be an additional barrier policy makers will face when trying to connect traditional industries with more advanced and digitised industries. Over 2006–2008, cooperation between innovative enterprises[7] and suppliers of equipment, materials, components or software ranged between 10 and 50%, whilst the remaining enterprises relied solely on internal resources (see Figure 9).

Figure 9 – Enterprises cooperating with suppliers of equipment, materials, components or software (% of total innovative enterprises)

The extent to which enterprises currently cooperate differs across Member States



Source: European Commission (2011). *Science, Technology and innovation in Europe*; Deloitte analysis

Pillar 2 – Create a digital entrepreneurial culture

A truly entrepreneurial climate is currently missing in Europe.

Small and medium-sized enterprises depend highly on entrepreneurs - individuals who have the ideas and are willing to take the risks necessary to get a business off the ground. As the number of SMEs in the EU is significantly high, an entrepreneurial climate is very important. Nevertheless, the stigma attached to a failed entrepreneurial venture, the heavy administrative burdens, the social constraints and obligations and resulting difficulties in attracting investors make it challenging to develop a more entrepreneurial climate and to encourage more people to start a business.

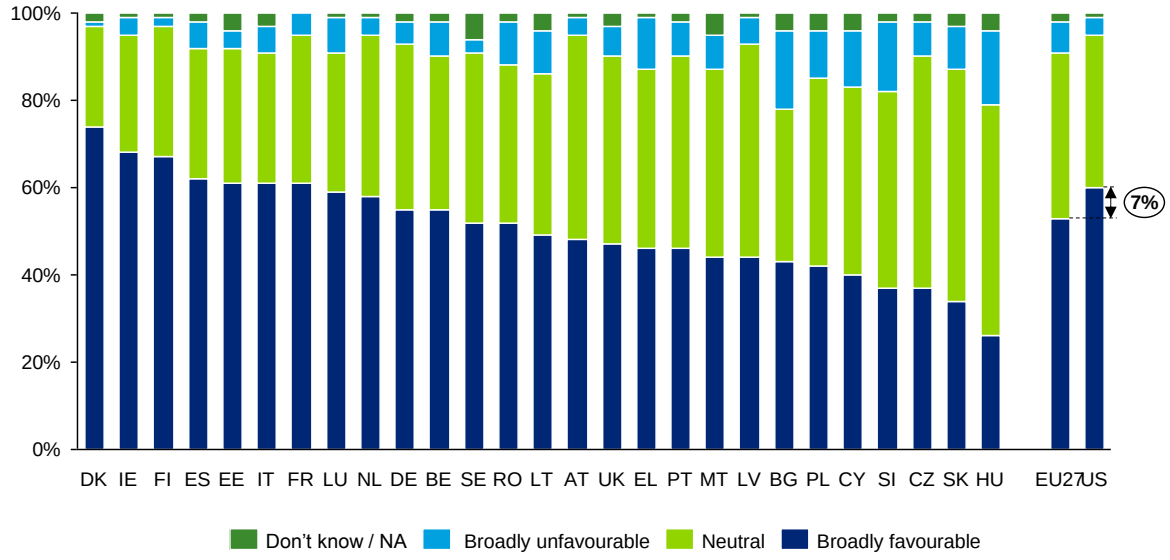
[7] Defined by the European Commission as enterprises with innovation activity, i.e. product, process, on-going or abandoned, organisational and marketing innovation (European Commission (2011). Science, Technology and innovation in Europe)

According to the 2012 Eurobarometer Survey on Entrepreneurship, which examines the motivation, choices, experiences and obstacles linked to self-employment, and compares European opinions with those outside of Europe, people all over the world agree that entrepreneurs are job creators and that they develop new products and services from which the whole of society benefits.

Within the European Union, the status of entrepreneurs varies greatly between Member States. As illustrated in Figure 10, entrepreneurship is very highly regarded in Denmark, Ireland and Finland, with 74%, 68% and 67% respectively of citizens questioned having a favourable image of entrepreneurs. In Eastern Europe however, regard for entrepreneurs is generally lower. Compared to 2009, the public opinion of entrepreneurs has improved in the EU by 4%, whereas that in the US – often cited as an 'entrepreneurial country' – recorded a large fall of 13%. By consequence, the gap between the EU and US in terms of entrepreneurial perception shrank in 2012 to 7%, compared with 24% in 2009.

Figure 10 – Image of entrepreneurs compared to other professions

Despite recent improvements in entrepreneurial perception, a truly entrepreneurial climate is still missing in many Member States



Source: European Commission (2012). *Entrepreneurship in the EU and beyond*; Deloitte analysis

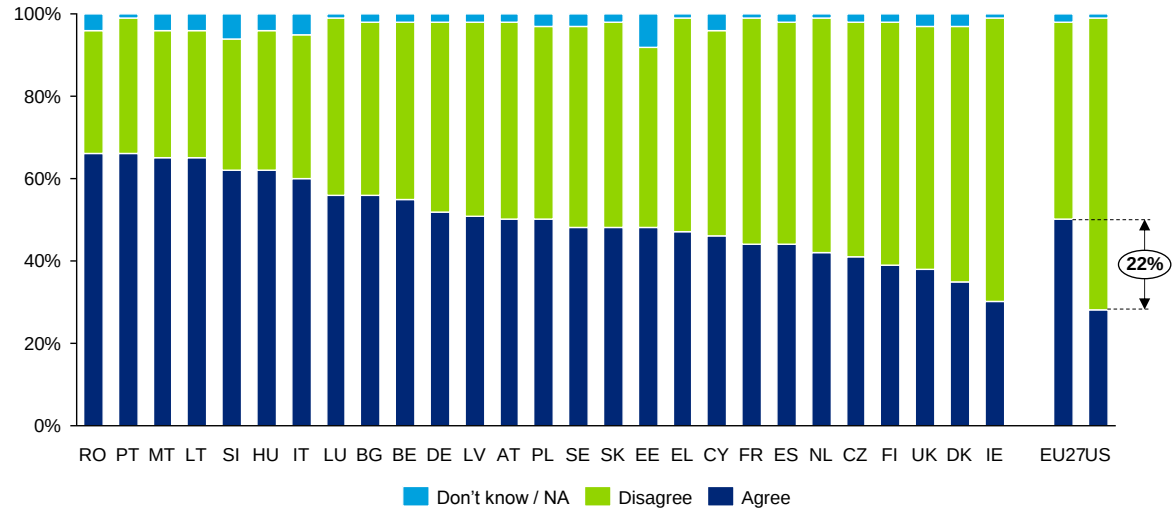
Additionally, there is too often a stigma attached to failure in the EU. According to Figure 11, 50% of the EU participants agreed that if there was a risk of failure, starting-up a business should be avoided, compared to only 28% in the US. Amongst its Member States, those in Ireland, the UK and Scandinavian countries – countries which also have a positive image of entrepreneurship – are more likely to start-up a business even when there is a risk of failure.

Based on all of the above, there is a clear need to endow European citizens with an entrepreneurial mind-set by developing a truly digital entrepreneurial culture where failing is not wrong and positively changing the perception of digital entrepreneurship into a desirable – and reasonable – career choice. This should encourage new, small and innovative digital entrepreneurs to offer new tools and services in the digital market. It should empower EU

businesses and citizens to exploit the opportunities provided by digital technologies more intensively than is currently possible.

Figure 11 – Risk perception: "One should not start a business if there is a risk of failing"

Compared to the United States, European Member States are in general more risk averse



Source: European Commission (2012). *Entrepreneurship in the EU and beyond*; Deloitte analysis

However, it must be remembered that not all European citizens are natural born entrepreneurs. Therefore, fostering an entrepreneurial mind-set 'along the way' and easing the process of creating an enterprise and jobs is necessary as well. In this respect, actions can be initiated to encourage and facilitate networking in order to support people with good ideas and helping them to find and meet the right partner(s) or by stimulating interdisciplinary, complementarity and teaming-up of people with different skills. StartUp America and StartUp Britain, for instance, both aim at creating those networking and mentoring platforms.

StartUp America aims to create networks facilitating start-ups in one city not only to connect to other start-ups and stakeholders in that city, but to adjacent cities and to the entire country as well. Once that network exists, other players, from government to media to educators, can plug in and add value. The same story goes for StartUp Britain. Since their launch in March 2011, they have been inundated with offers and requests to reach out at a local level. As a result, StartUp Local was launched, an initiative that allows experienced volunteers to register as a 'Local Champion' and shine a spotlight on the events, resources and activities that benefit start-ups and growing businesses in their area.

Additionaly, actions can be taken whilst being active in the job market, to encourage and enable 'intrapreneurship', i.e. taking initiative and developing new ways of working, products and services within existing enterprises, as well as to leverage valuable skills of senior workforce and immigrants.

Pillar 3 – Attract, develop and retain high-end digital skills and talent

Although the transition to a knowledge-based and innovation-driven economy will have a clear dependence on technology, high-tech skills and human capital are arguably also required for successfully doing business in the digital age.

High-tech skills

The current quantity and quality of high-tech skills is a challenge to overcome if Europe wants to become a distinctive place for doing business.

Today most jobs already require some kind of computer related knowledge. Whilst ICT specialists[8] accounted for around 3-4% of EU employment, OECD estimated that in 2010 a further 18.5% of employed persons relied entirely on ICT to perform their task, ranging from 9% in Romania to 31% in Luxembourg[9].

Doing business in the digital age will require enterprises to have access to a specific and scarce set of skills and talent, centred around mathematics, science and technology (MST). It has been forecast by IDC that, by 2015, 90% of jobs will need at least basic computer skills[10]. Acquiring those skills is thus rapidly becoming a precondition for employees to become and remain employable. In its 'Communication on e-Skills for the 21st Century and the Digital Agenda for Europe', the Commission presented a long-term EU e-skills strategy. Progress has been made, but efforts need to be accelerated and intensified as there are still 21% of European workers who believe that their ICT skills are currently insufficient for them to change job within one year (see Figure 12).

The President of the European Commission, Jose Manuel Barroso, together with four Commissioners (Neelie Kroes, Antonio Tajani, Laszlo Andor and Androulla Vassiliou), the Irish Presidency (Minister Richard Bruton) and several business leaders launched on 4 March 2013 a "Grand Coalition[11] for Digital Jobs" to accelerate and intensify current efforts to fill the digital gap. This gap is expected to reach 900,000 digital jobs by 2015[12]. In addition, the European Commission released in April 2013 two reports on "Towards a European Quality Label for ICT Industry Training and Certification" and on e-Leadership skills – "e-Skills for Competitiveness and Innovation: Vision, Roadmap and Foresight Scenarios". In the latter, e-leadership is defined as

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8 Defined by OECD as those people who have the ability to develop, operate and maintain ICT systems; ICT constitute as the main part of their job.

9 OECD (2012). ICT Skills and Employment. New competences and jobs for a greener and smarter economy

10 IDC (2009). Post Crisis: e-Skills are needed to drive Europe's Innovation Society

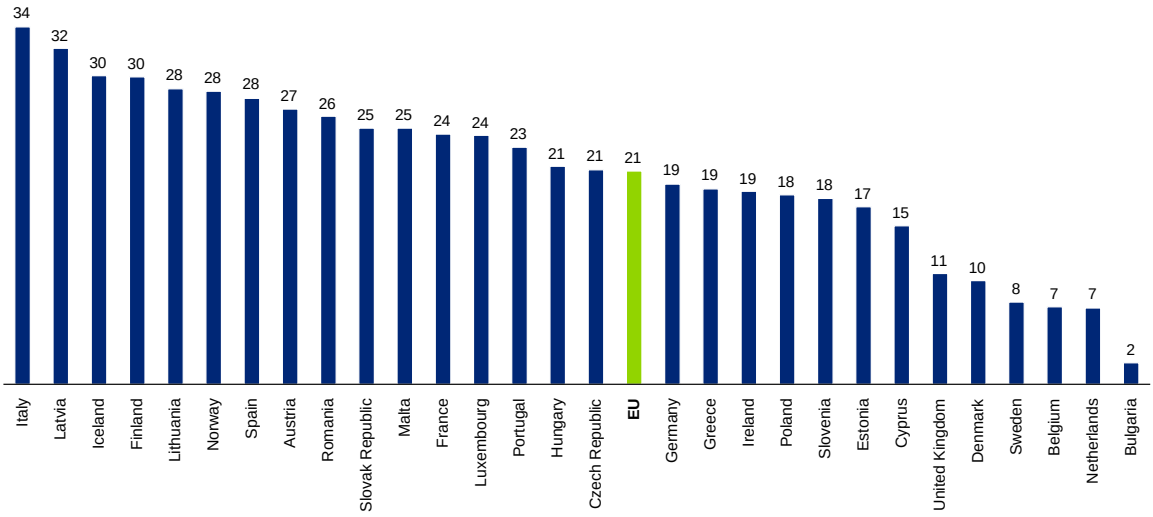
11 See: http://ec.europa.eu/digital-agenda/en/grand-coalition-digital-jobs-0

12 European Commission (2012). Exploiting the employment potential of ICTs.
Empirica and IDC Europe (2013). e-Skills for Competitiveness and Innovation: Vision, Roadmap and Foresight Scenarios

the accomplishment of a goal that relies on ICT through the direction of human resources and uses of ICT.

Figure 12 – % of workforce who believe their ICT skills are currently insufficient for changing job within one year (2011)

21% of European workers believe that their ICT skills are currently insufficient for them to change job within 1 year



Source: European Commission (2011). Digital Agenda for Europe - Digital Scorecard

As industry is increasingly sourcing talents and higher level skills wherever they are available on a world-wide basis, the separate disciplines of design, engineering, computer science, business and marketing have developed to a point that an integrated framework for the development of innovation skills is needed. If Europe wants to become a magnet for high-skilled talent, it must improve the dialogue between education and industry. The key to this is cooperation between enterprises and higher education in order to shape the curriculum and skills required for success.

Although there are some examples of successful cooperation between higher education and industry throughout Europe, Table 3 illustrates that the level of cooperation is currently rather limited and varies strongly between different Member States and industries.

Geographically, i.e. looking vertically at the left side of Table 3, most cooperation between enterprises and higher education can be found in Finland with a cooperation degree of 28%, followed by Slovenia (23%) and Austria (20%). Cooperation is less common in Southern and Eastern Europe as in those Member States less than 10% of all enterprises with NACE activities related to innovation, currently cooperate with universities or other higher education bodies.

At industry level, i.e. analysing horizontally the right-hand side of Table 3, cooperation is high in industries such as ‘utilities’ and ‘science and technology’ closely followed by ‘information and communication’. This should come as no surprise, given the fact that those industries are by definition closely related with higher education. At the bottom of the list there are industries such as ‘wholesale trade’, ‘transportation and storage’ and ‘financial and insurance services’, cooperating less with universities or other higher education bodies.

Table 3 – Enterprise cooperation with universities or other higher education bodies (% of innovative enterprises)

	All NACE activities related to innovation	Agriculture, forestry & fishing	Mining & quarrying	Manufacturing	Utilities	Water management	Construction	Business services	Wholesale trade	Retail trade	Transportation & storage	Accommo-dation & food	Information & communi-cation	Financial & insurance	Real estate	Science & technology	Administra-tion & support
Finland	28%			31%	51%	36%			13%		12%			22%			
Slovenia	23%							20%	10%							30%	
Austria	20%		19%	21%	48%	23%			14%		7%			11%			
Belgium	19%			24%	33%	42%		15%	9%		6%		27%	11%		44%	
Hungary	19%		29%	17%	67%	29%	13%	21%	14%		22%		24%	22%		31%	
Denmark	18%	75%	14%	23%	28%	21%	15%	15%	11%	4%	6%		15%	10%	16%	39%	10%
Sweden	14%		24%	16%	31%	29%		14%	11%		6%		12%	4%		39%	
Croatia	14%		29%	16%	17%	22%	6%	12%	9%		17%	10%	12%	5%	14%	18%	
Netherlands	14%	14%	15%	17%	49%	29%	15%	9%	8%	6%	6%	3%	10%	17%	5%	16%	8%
Czech Republic	13%		16%	14%	16%	16%	5%	9%	10%	2%	8%	0%	15%	5%	11%	18%	3%
Lithuania	13%		55%	12%	8%	30%	15%	11%			15%		27%			25%	
Norway	13%	34%	29%	15%	30%	19%	11%	11%	6%		7%		9%	6%		23%	2%
Slovakia	13%		12%	13%	37%	2%	6%	12%	7%		8%		19%	8%		40%	
France	12%		5%	14%	29%	10%	5%	9%	7%	3%	4%	10%	14%	12%	10%	16%	4%
Luxembourg	12%		0%	20%					9%		4%		20%	2%			
Germany	11%		8%	13%	20%	9%			3%		2%		13%	11%			
Poland	11%		35%	12%	23%	12%		8%	7%		6%		14%	2%		15%	
Latvia	11%			17%		4%		2%	2%		1%		5%				
Ireland	9%		21%	10%		12%			6%		5%			5%			
Portugal	9%		9%	8%	36%	24%	19%	9%	6%	33%	4%		32%	6%		13%	
Estonia	7%		9%	6%	18%	13%			7%		5%			5%			
Cyprus	6%			4%	100%	26%		7%	2%		6%		28%	8%		14%	
Spain	6%	8%	7%	6%	29%	16%	2%	5%	2%	2%	1%	0%	12%	3%	3%	15%	2%
Italy	5%		8%	5%		10%	2%	5%			2%		12%	9%	0%	30%	0%
Romania	5%			5%	10%	5%		8%	3%				13%	6%		26%	
Bulgaria	5%				0%	0%					6%		12%	13%			
Malta	3%			4%				1%	0%				5%				0%

Colour reflects the value's tendency toward the top or bottom of the values in the range

Top values in the range
Medium values in the range
Bottom values in the range

Source: European Commission (2011). *Science, Technology and innovation in Europe*; Deloitte analysis

Entrepreneurial education

In Europe, entrepreneurship is too often not embedded in education and training provision.

Although the emergence of digital technologies creates the potential for entrepreneurial and ICT talented practitioners to start up their own companies and lead digital transformation of existing businesses, an entrepreneurial mind-set is lacking in Europe as entrepreneurship is too often not fully embedded in education and training provision.

According to the 2012 Eurobarometer Survey on Entrepreneurship, illustrated in Figure 13, 50% of EU respondents agreed that their school education helped them to develop a sense of initiative and some kind of entrepreneurial attitude. More than 40% also agreed that their school education helped them to better understand the role of entrepreneurs in society (47%) and that their school education gave them the skills and know-how to enable them to run a business (41%).

Entrepreneurial education: examples of best practices

In Sweden, the region of Halland has managed to boost young people's interest in entrepreneurship in an exemplary way. Primary and secondary schools offer entrepreneurship classes, students are given the chance to participate in business-like projects and numerous teachers are trained to pass on entrepreneurial skills. As a result, 44% of young people in the region aged 18-30 now want to become self-employed, a record across the whole of Sweden.

More information: http://www.regionhalland.se/

In Denmark, the Foundation for Entrepreneurship -Young Enterprise aims to strengthen Denmark´s competitiveness and to position the country as one of the most leading European countries with regard to intrapreneur- and entrepreneurship. By influencing the interest in entrepreneurship, independence, and innovation at all levels of the Danish education system, the foundation aims to develop more competent pupils and students, hopefully starting up their own business one day.

More information: http://eng.ffe-ye.dk

The South East European Centre for Entrepreneurial Learning (SECEL),aims to support the needs of South East European countries for structured
strategic regional cooperation in the development of a lifelong entrepreneurial learning system as a part of their implementation of the Small Business Act for Europe (SBA) human capital dimension, their pre-accession process and the overall Europe 2020 strategy.

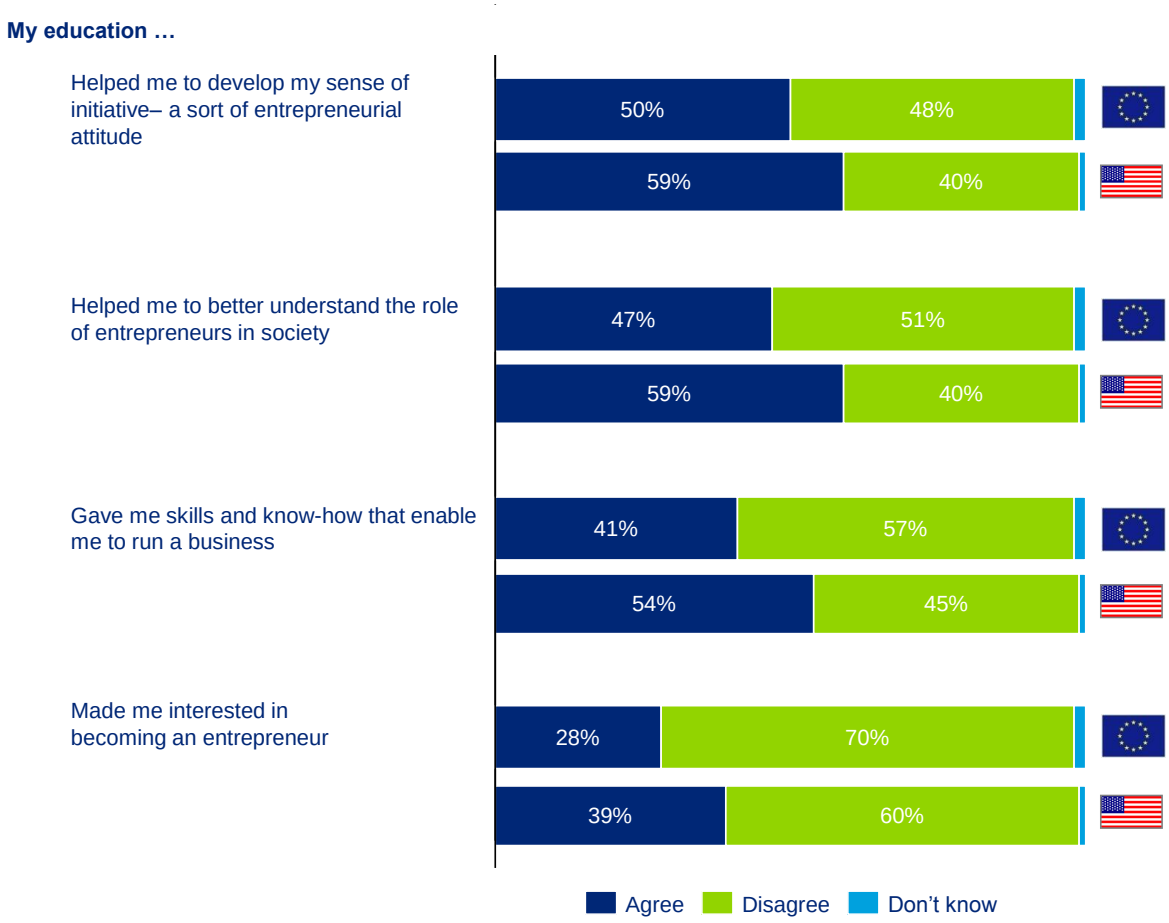
http://www.seecel.hr/

On the other hand, only one third (28%) agreed that their school education had made them interested in becoming an entrepreneur. Country variations on this question are huge, ranging

from 65% of respondents in Portugal agreeing that their school education had made them interested in becoming an entrepreneur to only 17% in both Germany and the UK. Benchmarking EU Member States with countries outside Europe illustrates that the difference is even wider, 74% in Brazil, 39% in the US and 15% in Japan. Although the number of people agreeing that their school education made them interested in becoming an entrepreneur is currently limited to just one third, Europe is slowly but surely gaining upon 'entrepreneurial countries' such as the US. On all four questions, 25% more people agreed in most Member States than did so in 2009. Despite this gain, too little action is being taken by Member States to promote entrepreneurship as a desirable career path upon graduation and when entering the job market. Changing mind-set and aspirations towards entrepreneurship are crucial to achieving this and can be supported by promoting internships or apprenticeships with SMEs or initiatives actively supporting the conversion of ideas into enterprises. The Entrepreneur First initiative for example - a not-for-profit programme launched by the UK Prime Minister in March 2011 - is a two-year programme which gives university graduates with promising business ideas the opportunity to start a business, supported by corporate mentoring, business training and networking. It differs from most other start-up programs by helping to create teams of like-minded individuals with participants selected on the basis of their potential rather than a specific start-up idea. Intensive team building, mentoring and administrative support is provided as well as a collaborative working space in central London so that they can create start-ups from scratch. Additionally, it is important to note that supporting a change in mind-set towards entrepreneurship should not be limited to formal education and training settings only, but should include campaigns and support services targeted at the needs of adults too.

Figure 13 – Entrepreneurship and the educational system: EU versus US

To some extent, education supports the development of an entrepreneurial attitude in Europe. Nevertheless, only 28% of the respondents agree that education has made them interested in becoming an entrepreneur



Source: European Commission (2012). *Entrepreneurship in the EU and beyond*; Deloitte analysis

Attracting talent

A coordinated (re)action to attract high-tech skills and talent to the European Union needs to be further developed.

Statistics on the number of ICT graduates in the EU are showing that, though their number increased from 71,000 per year in 2000 to 127,000 in 2006, it decreased in the following years, down to 114,000 by 2009. An additional challenge arises from the increasing number of ICT retirements - from around 80,000 per year in 2010 to about 120,000 in 2015 – and the fact that the digital transformation process will create a further boom of ICT vacancies. Consequently, it is estimated – as mentioned in the paragraph focusing on 'high-tech skills - that there will be up to 900,000 unfilled digital jobs vacancies in the EU by the year 2015.

To ease the constraints faced when trying to attract skills and talent, countries like Singapore and the UK have relaxed their visa requirements for highly skilled individuals willing to work in their national economies. The Singapore Entrepass is especially geared towards entrepreneurs who might not pass the severe visa requirements regarding education and salary. It is intended for those foreign entrepreneurs who are planning to start up a business in Singapore and who either

have a proven track record of running successful businesses or who have an innovative idea. To be eligible, an investment of at least S$50k (equivalent to ca. € 30k) is required and a 10-page business plan must be submitted. In the UK, the Entrepreneurs' Visa was introduced in April 2011 to attract foreign, high-qualified talent to start up their business. Unlike the tier 2 route (work permits) which is only granted for a limited period of time, this visa will lead to permanent residency after 5 years. Additionally, it provides more flexibility as entrepreneurs and investors may be absent from the UK for 180 days a year, rather than the usual 90 days, without losing the right to apply for settlement.

With this new visa, the UK has stolen a march on Silicon Valley as the US government seems unwilling or unable to make progress with the Startup Visa Act. This initiative, launched by Silicon Valley entrepreneurs in 2010, proposes an amendment to immigration law to create a visa category for foreign entrepreneurs[13]. Surprisingly, despite the limited visa options currently available to foreign entrepreneurs who are willing to start up a company in the US, the country has traditionally benefitted from large immigrant communities as in the US 24% of all enterprises are founded by immigrants. In Silicon Valley this percentage almost doubles to 44%.

In the EU, the Blue Card work permit – adopted in 2009 – allows high-skilled non-EU citizens to work and live in any country within the European Union, except for Denmark, Ireland and the United Kingdom. However, as Member States are allowed to set quotas on Blue Card holders or to ban them altogether if they see fit, and as the work permits do not cover all 27 Member States the Blue Card results in considerable diversity in the conditions and rights accorded to Blue Card holders across Member States.

Additionally, the European Union has recognized the key contribution that migrant entrepreneurs can make to sustainable growth and employment by stating in the European Agenda for the Integration of Third Country Nationals that "their creativity and innovation capacity should be reinforced". Moreover, the Entrepreneurship 2020 Action Plan[14] proposes to consider initiatives which would remove barriers to entrepreneurship, be it among migrants already present in the EU or arriving for reasons other than setting up business. It also suggests to analyse the opportunity of giving qualified third-country entrepreneurs a permit to allow them to set up a business in Europe. More recently (March 2013), the Commission proposed to make it easier and more attractive for non-EU national students and researchers to stay in the EU and to identify job opportunities or set up a business upon completion of their studies or research.[15] A coordinated reaction, with Member States and other stakeholders at its centre, however, needs to be further strengthened and further developed.

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[13] The Startup Visa Act does not allocate any new visa numbers but draws from unused numbers out of the EB-5 visa category (limited to 9 940 visas of which ca. 3 800 visas were used in FY 2011).

[14] COM (2012) 795 final. Entrepreneurship 2020 Action Plan: reigniting the entrepreneurial spirit in Europe

[15] COM (2013) 151 final. Proposal for a Directive of the European Parliament and of the Council on the conditions of entry and residence of third-country nationals for the purposes of research, studies, pupil exchange, remunerated and unremunerated training, voluntary service and au pairing.

Pillar 4 – Ease the access to finance and enhance investments

Access to finance

In the European Union, access to finance is the second most pressing problem faced by SMEs.

Finance is crucial to business success and an important factor for economic growth in Europe, especially in view of any past or future economic crisis.

At European level, finance is provided by a balanced mix of financing mechanisms: through structural funds, the Competitiveness and Innovation Framework Programme, Progress Microfinance as well as lending from the European Investment Bank. This financial support is complementing finance provided by the Member States, such as 'export loans' in Sweden, offered to SMEs selling to foreign markets or seeking finance to develop their activities via export, the 'High-Tech Gründerfonds' in Germany, aiming to reduce the financing gap for high-tech enterprises in their seed phase and to contribute to the creation of highly-skilled jobs, or 'Starteo' in Belgium, supporting financing the launch of a company or self-employed activity.

Despite this support, access to finance is the second most pressing problem faced by SMEs, mentioned by 15% of business managers[16] in the EU survey 'SMEs' Access to Finance'[17]. Almost two-thirds (63%) of the EU SMEs who applied for a bank loan during the last six months received the whole amount requested and 11% of the applications were rejected, with the highest rejection rate among the micro companies (16%) and SMEs active between 2 and 5 years (24%). Additionally, 18% received less than they applied for and 4% declined the loan offer because of unacceptable conditions. At Member State level, access to finance is the most pressing problem in Greece, Slovenia and Estonia.

To improve access to finance, and in particular to help early-stage companies with raising equity finance, the Seed Enterprise Investment Scheme (SEIS) was created in the UK. To be eligible, a business receiving the investment must be a UK resident unquoted company, less than two years old, have fewer than 25 employees and have less than £20,000 in gross assets. Additionally, the investor cannot be an employee of the company nor have more than a 30% interest.

Use of alternative financing sources

The legal and regulatory framework currently leaves too much opportunity for fragmentation and does not always take into account new and alternative financing sources like crowdsourcing.

[16] After finding customers, cited by 24% business managers.

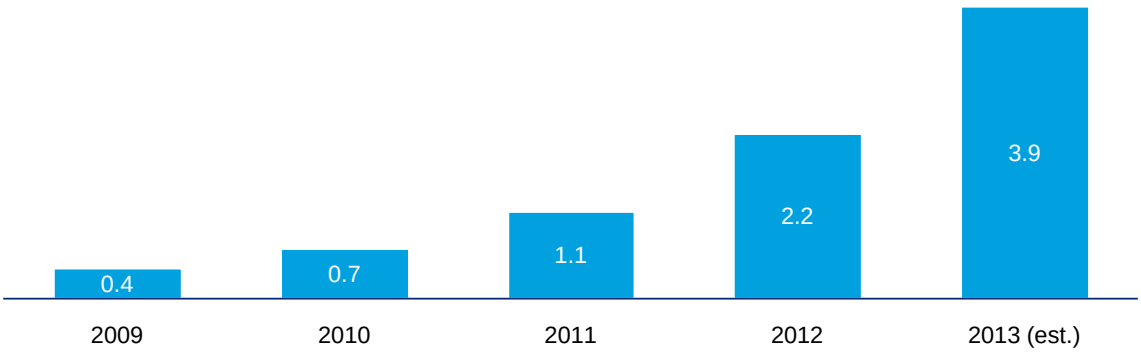
[17] European Commission - DG Enterprise and Industry (2011). SMEs' Access to Finance. Survey 2011

Traditional financing sources such as bank loans are still by far the most preferred financing sources for SMEs. On the other hand, the growing importance of alternative financing channels like crowdfunding platforms cannot be neglected.

Figure 14 shows that the amount raised globally by crowdfunding platforms in 2012 equals €2.2 billion, almost twice the amount raised in 2011 (€1.1 billion), and successfully funded more than 1 million campaigns. In Europe, the amounts raised by crowdfunding platforms grew 65% to €0.7 billion. For 2013, Massolution forecasts an increase in global crowdfunding volumes up to €3.9 billion[18].

Figure 14 – Amount raised by crowdfunding platforms (€ billions)

The amounts raised by crowdfunding platforms are growing significantly



Source: World Economic Forum (2012), Crowdsourcing.org & Massolution; Deloitte analysis

Innovative and growth-oriented SMEs and entrepreneurs often depend on capital from external sources as they do not have their own resources or cannot access loans. However, many investors are reluctant to invest in start-ups and innovative firms because of the high risks and transaction costs, or because they estimate that the expected returns will not compensate for the risk. As access to these traditional financing sources seems to be a barrier for many SMEs and start-ups, crowdfunding might be one of the solutions for restoring capital to entrepreneurs and SMEs.

According to the 2012 Crowdfundingframework.eu report 'A framework for European crowdfunding', crowdfunding can not only provide start-up capital for SMEs and entrepreneurs, it includes several non-financial benefits: validation of product features, market segmentation, price and demand, pre-sales and customer feedback as well as word-of-mouth marketing and a stable, committed shareholding structure.

Although the European Commission issued an action plan to improve access to finance for SMEs in 2011[19], it did not include crowdfunding as an alternative, viable option for finance. As crowdfunding is continuing to boom, Member States are taking different actions, resulting in a European legal and regulatory framework leaving too much opportunity for fragmentation and

[18] Massolution (2013). The crowdfunding industry report

[19] European Commission (2011). An action plan to improve access to finance for SMEs

making it difficult to access finance across borders. The Prospectus Directive[20], for instance, offers freedom to Member States to implement a country-specific promotional regime for crowdfunding campaigns and has resulted in many different national regimes ranging from full prospectus regimes to complete exemptions. Moreover, an expert group for the Directorate-General Enterprise and Industry working on cross-border matching of innovative firms with suitable investors, argued that the "*fragmented European regulatory environment along national lines for cross border platforms are among the emerging challenges which pose issues for entrepreneurs, platform providers and investors alike*"[21].

To avoid a fragmented European regulatory environment the European Commission is, amongst others, currently taking actions aimed at monitoring the various initiatives already been put in place by organising workshops with European stakeholders and regulators and by networking with U.S. counterparts in the realm of the TEC Council[22]. Additionally, the Entrepreneurship 2020 Action Plan on Entrepreneurship invites Member States to assess the need of amending current national financial legislation with the aim of facilitating new, alternative forms of financing for start-ups and SMEs in general and crowdfunding platforms in particular. Furthermore, the Green Paper on long term investment[23] has formulated a specific question on crowdfunding, aimed at receiving different views on this topic and reviewing the impact on regulation. Also, the 2013 Commission Staff Working Document 'Strengthening the environment for Web entrepreneurs in the EU'[24] proposes an action with regard to venture capital and crowdfunding, aiming at supporting a network of European crowdfunding platforms to support, provide visibility, transparency and interconnectivity among existing EU crowdfunding platforms.

Finance knowledge

Lack of information and financial knowledge is for some SMEs and entrepreneurs a barrier to accessing finance.

Looking at access to equity financing, the 2011 EU survey 'SMEs' Access to Finance' states that equity finance was used by only 7% of SMEs, concluding that the main challenge to increasing this percentage is to overcome the lack of readiness to invest or financial knowledge. Only 16% of SME managers felt confident to talk with equity investors and venture capital firms, compared to 63% when talking with banks. In this respect, the 2012 report 'A framework for European

[20] Directive designed to improve the quality of information provided to investors by companies wishing to raise capital in the European Union (2003/71/EC, amended by 2010/73/EC)

[21] European Commission (2012). Report of the Chairman of the expert group on the cross border matching of innovative firms with suitable investors

[22] The TEC Council is a political body to oversee and accelerate government-to-government cooperation with the aim of advancing economic integration between the EU and the U.S.

[23] European Commission (2013). Green paper on long-term financing of the European economy

[24] European Commission (2013). Strengthening the environment for Web entrepreneurs in the EU

crowdfunding' indicates that SMEs often fail to attract venture capital finance as a result of information asymmetry between entrepreneurs and investors.

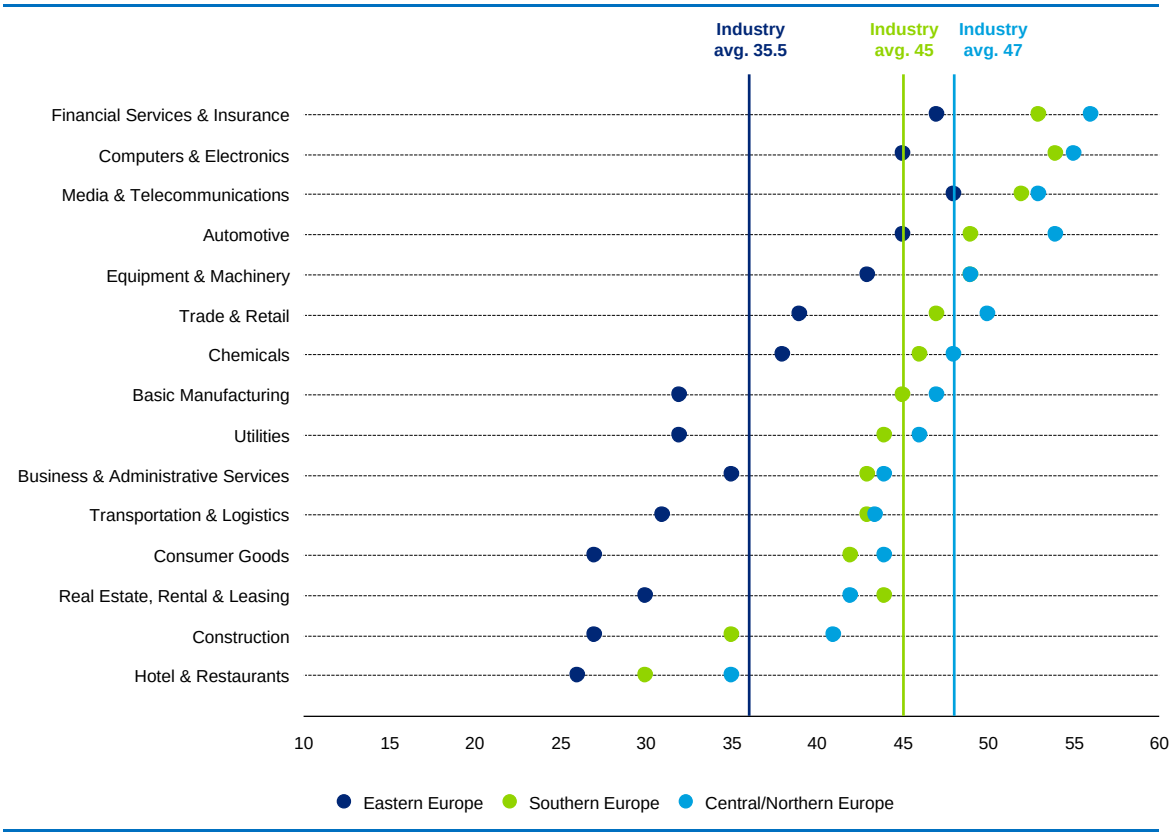
Pillar 5 – Boost digitally powered single market

Digital technologies divide the European business landscape both at industry/business function and geographic level.

As mentioned before, the European business landscape is fragmented, as industries and business functions are impacted differentially, both in terms of impact and pace at which the digitisation process takes place. Additionally, Figure 15 indicates that the process of digitisation differs not only along sectors, but across geographic borders as well.

Figure 15 – Digitisation differences across industries and regions (2011)

The process of digitisation differs, not only across sectors, but across geographic borders as well



Source: Booz & Company (2011). Measuring Industry Digitisation - Leaders and Laggards in the Digital Economy

Generally, central and northern economies are more digitised and those economies lead Eastern and Southern Europe in all but one industry ('real estate, rental & leasing'). The gaps between regions tend to be the largest in Europe's traditional, non-service oriented economies like 'chemicals' and 'basic manufacturing'. Given the link between the extent of digitisation in a particular country and its GDP per capita (see annex), these differences should come as no surprise.

Figure 15 illustrates clearly that it's not possible to speak about one digitally empowered single market in Europe as the European business landscape is a patchwork of national economies and

legal frameworks, too often preventing SMEs and entrepreneurs from enjoying the benefits of a truly digital single market. If Europe wants to accelerate the transformation of its business landscape through the smart use of digital technologies, one has to realise that digital fragmentation along industrial and geographic borders is a barrier to be overcome.

A non-harmonised regulatory and legislative framework prevents European businesses from working together as well as they should.

Additionally, it is often stated that digital technologies reduce barriers to entry, blur category boundaries, and open doors for a new generation of entrepreneurs and innovators. If social platforms succeeded in connecting people everywhere and anytime, would it be possible to connect industries and businesses across Member States borders by using new digital technologies as well?

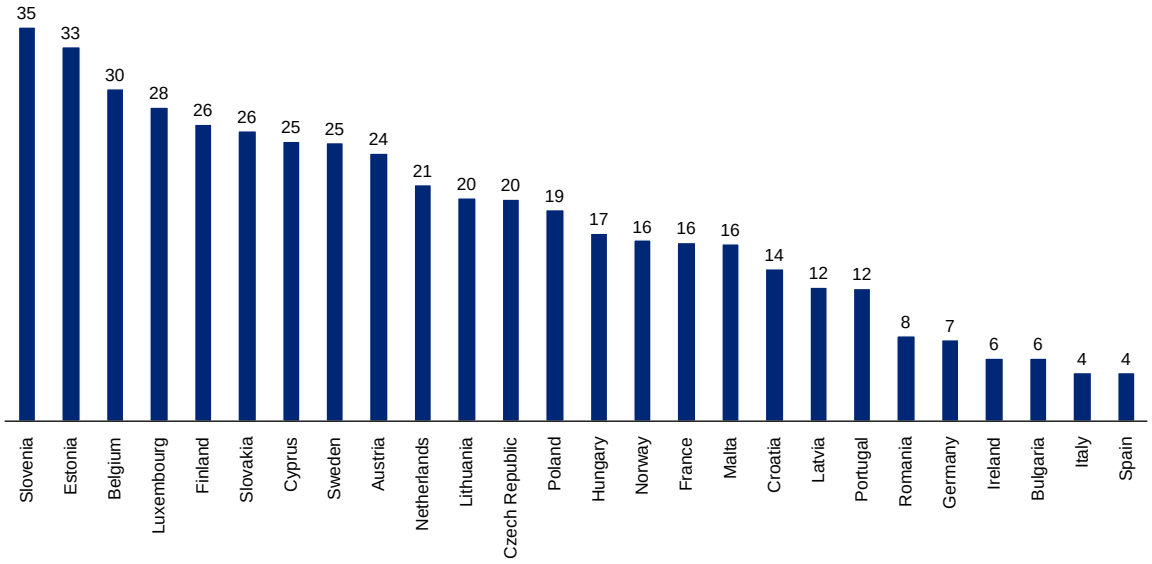
Figure 16 illustrates that the current level of cooperation between enterprises from different Member States (MS), EFTA countries and EU candidate Member States is rather limited, ranging from 35% in Slovenia to only 4% in Spain and Italy. Additionally, the European Commission states in its communication on clusters in the European Union[25] that "persistent market fragmentation, weak industry-research linkages and insufficient cooperation within the EU" mean that industry clusters in the EU do not always have the necessary critical mass and innovation capacity to grow and face global competition. In this respect the European's Commission statement[26] that weaknesses in standard-setting, cross-border regulation and legislation and coordination between public authorities currently prevent European businesses from working together as well as they should, can only be endorsed.

[25] European Commission (2008). Towards world-class clusters in the European Union: Implementing the broad-based innovation strategy

[26] European Commission (2010). A Digital Agenda for Europe

Figure 16 – Enterprises engaged in any type of innovation co-operation with a partner in EU countries, EFTA or EU candidate countries (except for a national partner)

The current level of cooperation between enterprises from different MS, EFTA countries and EU candidate MS is rather limited



Source: European Commission (2011). *Science, Technology and innovation in Europe*; Deloitte analysis

Options for policy action

How to overcome the stumbling blocks?

In the previous chapters this report focused on the impact of ICT developments in the global business landscape taking into account the specifics of the European industry dominated by small and medium enterprises. The evidence that supports greater use of ICT by businesses in different sectors and across business functions - even in times of recession and sluggish growth prospects – has been demonstrated.

Small and medium-sized enterprises (SMEs) that are intensive users of technology not only grow and export more than their peers, but also create more jobs. Technology is therefore not only – or even most importantly – about technology start-ups; greater use of technology is needed in all companies across all sectors.

Despite this convincing evidence, many SMEs are held back from utilising the transforming potential of digital because of numerous stumbling blocks. These barriers have been identified according to five different pillars:

- Low take up and transformational use of digital technologies by industries and SMEs.
- Lack of digital entrepreneurial culture in Europe.
- Low level of entrepreneurial skills and talent.
- Difficult access to finance and investments.
- Fragmented digital market.

By not tackling these stumbling blocks, policymakers not only compromise the economic recovery but also impose limitations on the digital industrial development of Europe. Therefore, for each of these problem areas, objectives have been defined and a list of potential policy options developed. These objectives and policy options have been discussed extensively with stakeholders - industry, academics and European policy makers.

The policy actions developed to overcome the challenges and to achieve the objectives – illustrated in Figure 4 - are listed by each pillar in Figure 17.

Figure 17 – Policy actions: overview

Overcoming the stumbling blocks: benchmark analysis of existing schemes and policies to boost digital entrepreneurship

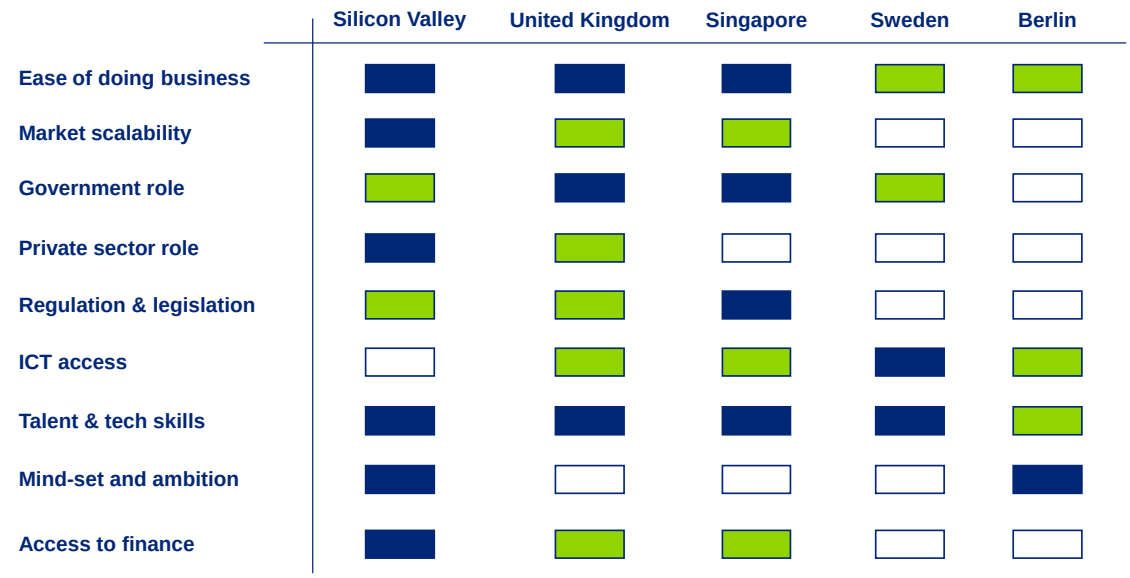
To understand what actions can be initiated both by public and private sector in order to boost digital entrepreneurship, digital and entrepreneurial policies and schemes across five countries, regions or cities were assessed in a benchmark analysis[27].

According to this analysis digital entrepreneurship is in most cases determined by a combination of key factors – illustrated in Figure 18 - which not always directly can be influenced by policy makers. Therefore, one should take into account that "endowing European citizens with an entrepreneurial mind-set" and "developing a truly digital entrepreneurial culture", cannot be achieved solely by policy making.

In Sweden, for instance, for a long time entrepreneurship was not something 'admirable'. However, by the end of the 1990s, the success of a number of start-ups had a profound effect on entrepreneurship and helped break the stigma Swedish society associated with start-ups. As a result, entrepreneurship became 'hot' in Sweden with digital icons such as Niklas Zennström (Skype) and Daniel Ek (Spotify) putting entrepreneurial success in the picture and promoting entrepreneurship as a desirable career choice. At European level, however, limited action is currently taken to celebrate those success stories or to strengthen awareness campaigns more.

[27] Deloitte (2013). Doing business in the digital age: the impact of new ICT developments in the global business landscape - Benchmark analysis. See also annex.

Figure 18 – Overview of key success factors boosting digital entrepreneurship

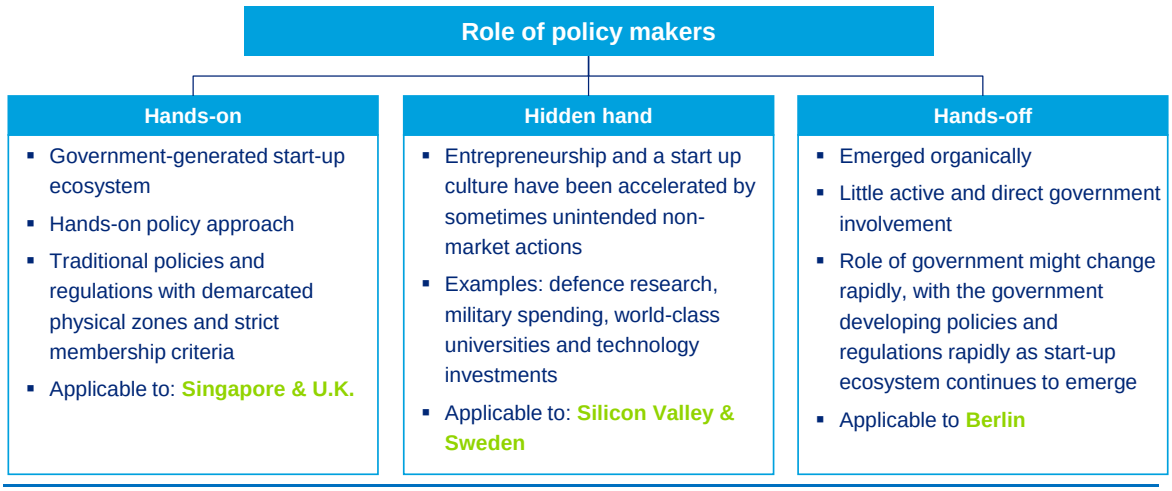


Source: Deloitte benchmarking analysis

As there is no one single factor able to explain the success of digital entrepreneurship in a particular country, region or city, neither there is one single answer on which role policy makers should play in order to encourage entrepreneurship and create a successful start-up ecosystem.

As illustrated in Figure 19, policy makers can approach digital entrepreneurship in three different ways, i.e.: a hands-on, hidden hand or hands-off approach.

Figure 19 – Potential role of policy makers



Source: Deloitte benchmarking analysis

EXHIBIT – KEY FINDINGS BENCHMARK ANALYSIS

Silicon Valley

- Silicon Valley emerged organically as a start-up ecosystem with little deliberate public sector involvement
- The presence of Stanford University and its entrepreneurial-minded education model positively influenced the entrepreneurial climate in the San Francisco's Bay Area
- The importance of non-native entrepreneurs cannot be neglected as 44% of all companies in Silicon Valley were founded by immigrants. To guarantee this access to new ideas in the future as well, a private initiative has been launched to create a visa category for foreign entrepreneurs
- The tax climate in Silicon Valley – and in California in general – has not made doing business attractive and is offset by factors such as access to finance, a vibrant culture of knowledge sharing and trial-and-error. Nevertheless, tax reforms are currently on-going
- On the other hand, labour law flexibility allows employees to switch between employees competitors easily

United Kingdom

- Since early 2000 U.K.'s digital economy is steadily growing
- To take up this trend, the U.K. government commitment has articulated a strong vision for the U.K. to emerge as a leading centre in the new high tech economy and to be the best place in the world for entrepreneurs to launch and grow innovative digital business – embedded in the Plan for Growth
- Underneath this national programme a long list of policies and initiatives has been initiated – both at national and local level
- Those initiatives focus amongst others on supporting early-stage companies to gain access to finance, attracting foreign talent with an entrepreneur's visa or providing alternatives to the go traditional graduate route
- Those policy initiatives were implemented relatively quick (up to 6 months)
- Strong collaboration between the U.K. government and the start-up scene has been key to improve the entrepreneurial climate

Singapore

- The Singapore government has always been eager to seek for new growth opportunities
- To capture the potential of (digital) technologies and create a vibrant start-up ecosystem that provides opportunities for local and foreign start-ups, investors, venture capitalists and talent, several agencies and initiatives were put in place to actively promote and facilitate doing business

- As a consequence, nowhere it is so easy to do business as in Singapore
- This is perhaps best illustrated by the EnterpriseOne portal, bringing together a range of information, services and support from 30 different government ministries and public organisations and aiming to be the first point of contact for SMEs and start-ups
- This direct and active government involvement has been key for Singapore's success

Sweden

- Entrepreneurship and the start-up culture in Sweden have been accelerated by government's philosophy to have world-class broadband, going together with infrastructure investments
- This has resulted in a tech savvy population (engineering background), eager to adopt new technologies and Sweden being the most connected economy in the World
- Role models and big exits were – and are – a source of inspiration for (future) entrepreneurs
- Due to 'limited' internal market opportunities, Sweden is often considered as an excellent test market
- Additionally, these internal scalability constraints make Swedish entrepreneurs to think international and out-ward looking as from the very beginning
- Entrepreneurship is supported by several agencies; although direct involvement is rather limited

Berlin

- Because of a low cost of living and a lot of office space available, many young entrepreneurs (average age of 31.9 years) are attracted by Berlin's start-up ecosystem: in 2011 68% of all people moving to Berlin were between 18 and 32 years old
- The number of entrepreneurs who have lived in Silicon Valley is rather limited (7%). Additionally, taking into account the fact that historically mainly creative people were attracted to Berlin's vibrant culture, doing business in Berlin is less 'indoctrinated' by the traditional way of doing business / Silicon Valley model
- In Berlin, entrepreneurs tend to focus on niche markets, targeting specific needs and less focusing on market scalability
- Direct and active government involvement – both at federal and state level – is rather limited and above all not demanded by entrepreneurs
- Consequently, policy makers currently face difficulties to interact with entrepreneurs. Therefore, actions are recently taken at federal level to enter into dialogue with the start-up scene to better understand their needs

The European policy background

Before detailing each of the suggested actions, a high level – non exhaustive – overview of the EU policy background is provided. This overview focuses on those over-arching policy initiatives which are believed to cover, to some extent, the suggested policy actions, discussed in the subsequent sections.

Europe 2020

The Europe 2020 strategy is about delivering growth that is smart - through more effective investments in education, research and innovation - sustainable, thanks to a decisive move towards a low-carbon economy, and inclusive, with a strong emphasis on job creation and poverty reduction.

Looking at education in particular, the European Commission published in September 2011 a new agenda for modernisation of Europe's higher education systems[28]. The agenda aims to support Member States' reforms and to contribute to the goals of Europe 2020 and identifies several areas for reform in this respect:

- Increasing the number of higher education graduates;
- Improving the quality and relevance of teaching and researcher training, to equip graduates with the knowledge and core transferable competences they need to succeed in high-skill occupations;
- Providing more opportunities for students to gain additional skills through study or training abroad, and to encourage cross-border cooperation to boost higher education performance;
- Strengthen the 'knowledge triangle', linking education, research and business;
- Creating effective governance and funding mechanisms in support of excellence.

Additionally, the Commission adopted the Rethinking Education Communication[29] in November 2012, including recommendations at European and Member State level in this policy area. This communication gives particular attention to combatting youth unemployment, covering four areas which are defined as essential to be addressed and where Member States should step up efforts:

- Developing world-class vocational education and training to raise the quality of vocational skills;
- Promoting work based learning including quality traineeships, apprenticeships and dual learning models to help the transition from learning to work;
- Promoting partnerships between public and private institutions in order to ensure appropriate curricula and skills provision;
- Promoting mobility through the proposed Erasmus for All programme.

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[28] COM (2011) 567. Supporting growth and jobs – An agenda for the modernisation of Europe's higher education systems

[29] COM (2012) 669. Rethinking Education: Investing in skills for better socio-economic outcomes

European Digital Agenda

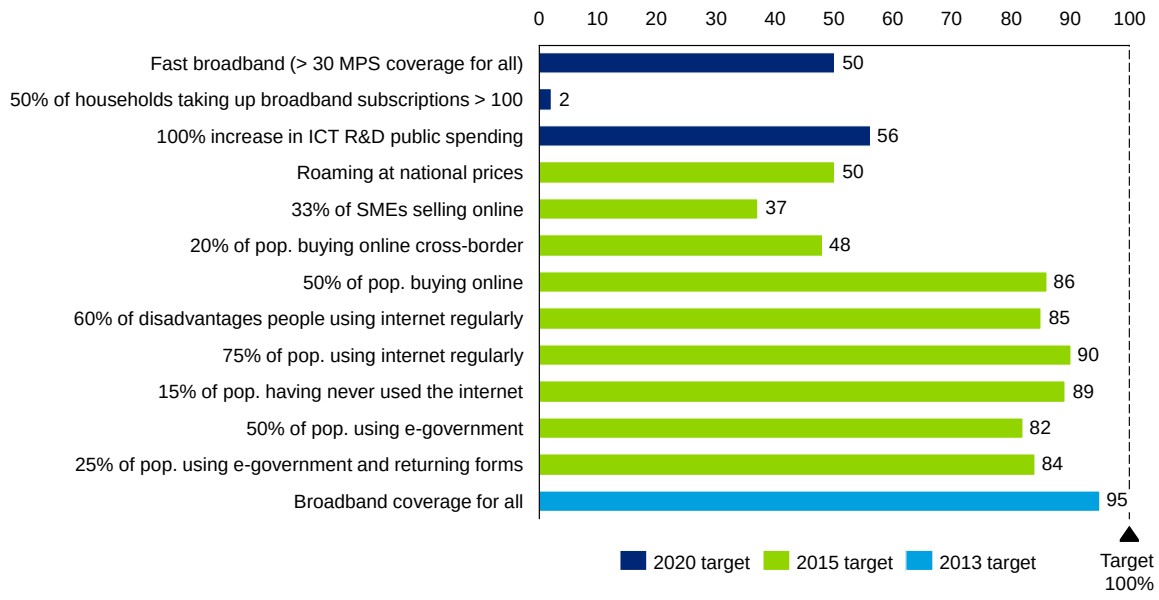
'The European Union's Digital Agenda' – one of the flagship initiatives of the Europe 2020 Strategy – firmly recognises the revolutionary potential that information and communication technology (ICT) offers to boost growth, increase productivity and improve the welfare of citizens and consumers.

Figure 20 presents the digital scoreboard, which assesses progress with respect to the targets set out in the Digital Agenda. The Digital Agenda proposes 101 specific policy actions across 7 domains to stimulate a virtuous circle of investment in and usage of digital technologies:

1. Digital single market.
2. Interoperability and standards.
3. Trust and security.
4. Fast and ultra-fast internet access.
5. Research and innovation.
6. Digital literacy, skills and inclusion.
7. ICT-enabled benefits for EU society.

Figure 20 – Digital Scoreboard: progress in % (2011)

Progress has been made, however efforts need to step up in order to turn Europe's ambitions from vision into reality



Source: European Commission. Digital Agenda

With regard to e-commerce, the Digital Agenda aims to have 50% of the population buying online by 2015, 20% buying cross-border and 33% of the SME's conducting online purchases by this date. As e-commerce remained insufficiently developed, the Commission adopted the communication on e-commerce and other online services in January 2012, containing 16 actions aimed at identifying the main obstacles to the Digital Single Market an doubling the volume of e-commerce in Europe by 2015[30].

[30] COM (2011) 942 final. A coherent framework for building trust in the Digital Single Market for e-commerce

A recent report, analysing the progress made in the implementation of this action plan[31], shows that important actions defined in the action plan are initiated, amongst others by:

- Reinforcing consumer protection by the adoption of the 'consumer agenda', the development of tools for administrative cooperation and better enforcement of EU law;
- The launch of public consultations in order to improve parcel delivery and payments;
- Fighting abuse by the establishment of the European Cybercrime Center and definition of a cyber-security strategy;
- Integrating technological developments such as cloud computing, communication on radio spectrum sharing, guidelines on state aids on broadband, etc.

In order to respond to the fast pace of change in ICT and the appearance of new challenges and opportunities, the European Digital Agenda was reviewed in December 2012. This review identifies seven key areas, and presents in each of them an initiative or key transformative action, which could deliver significant results:

1. For the **digital single market**, the Commission will complete the on-going review of the Copyright Framework.
2. For **digital public services**, the Commission will develop and implement public digital service infrastructures, policy and support in the framework of the Connecting Europe Facility.
3. For **broadband**, the Commission will propose durable regulatory measures on non-discrimination and wholesale pricing to promote investments in high-speed networks and strengthen competition across all networks.
4. For **cloud computing**, the Commission will launch pilot actions in the European Cloud Partnership, harnessing public buying power to help create the world's largest cloud-enabled ICT market, dismantling current national fortresses and negative consumer perceptions.
5. **For Trust & Security**, the Commission will propose a Directive on network and information security.
6. For **Entrepreneurship, Digital jobs and Skills**, the European Commission launched on 4 March 2013 the 'Grand Coalition for Digital Jobs' to address the shortage of ICT professionals. Additionally, the Commission will launch new initiatives to foster e-leadership skills for ICT practitioners, managers and entrepreneurs.
7. **Key Enabling Technologies**, the Commission will propose an industrial strategy for micro- and nano-electronics, to increase Europe's attractiveness for investment in design and production as well as growing its global market share**.**

and online services

[31] European Commission (2013). E-commerce Action plan 2012-2015 – State of play 2013

By refocusing the Digital Agenda, the European Commission aims to further stimulate the digital economy. According to the European Commission, full implementation of the updated Digital Agenda would enhance growth with a 5% expected increase of European GDP by 2020. Furthermore, employment would be boosted, with 1.2 million jobs expected to be created in infrastructure construction in the short term, rising to 3.8 million jobs throughout the economy in the long term.

An industrial policy for the globalisation era

The industrial policy for the globalisation era is one of the seven flagship initiatives of the Europe 2020 strategy and sets out a strategy that aims to boost growth and jobs by maintaining and supporting a strong, diversified and competitive industrial base in Europe offering well-paid jobs while becoming more resource efficient.

This flagship initiative highlights ten key actions for European industrial competitiveness:

1. 'Competitiveness proofing' i.e. analysis of the impact on competitiveness of all policy proposals.
2. 'Fitness checks' of existing legislation aimed at reducing the cumulative effects of legislation so as to cut the costs for businesses in Europe.
3. Making it easier for SMEs to access credit and help their internationalisation.
4. A strategy to strengthen European standardisation.
5. More efficient European transport, energy and communication infrastructure and services to serve European industry.
6. A new strategy on raw materials creating the right framework conditions for sustainable supply and management of domestic primary raw materials.
7. Addressing sector-specific innovation performance with specific actions, in areas such as advanced manufacturing technologies, construction, bio-fuels and road and rail transport, particularly in view of improving resource efficiency.
8. Actions to improve framework conditions and support innovation in energy-intensive industries.
9. An aerospace policy, creating a solid industrial base and covering the whole supply chain.
10. Reporting on Europe's and Member States' competitiveness, industrial policies and performances on an annual basis.

As a response to the important challenges the European industry currently faces, the European Commission has reinforced its industrial policy at the end of 2012 by presenting a number of priority actions, covered by four pillars, designed both to assist recovery in the short and medium term and to ensure the long-term competitiveness and sustainability of the European industry:

1. **Investment in innovation** - providing the right framework conditions for investment.

2. **Better market conditions** – improvements in the functioning of the Internal Market and opening up international markets.
3. **Access to finance and capital** – to improve lending to the real economy by better mobilising and targeting public resources.
4. **Human capital and skills** – equipping the labour force for industrial transformations, notably by better anticipating skills needs and mismatches.

Entrepreneurship 2020 Action Plan

The Entrepreneurship Action Plan is a blueprint for decisive action to unleash Europe's entrepreneurial potential, to remove existing obstacles and to foster the culture of entrepreneurship in Europe.

The Entrepreneurship Action Plan proposes three areas for immediate intervention:

1. Entrepreneurial education and training to support growth and business creation.
2. Strengthening framework conditions for entrepreneurs by taking actions in six areas:
    - Access to finance
    - Support for entrepreneurs in the crucial phases of the business lifecycle and growth
    - Unleashing new business opportunities in the digital age
    - Transfers of businesses
    - Bankruptcy procedures and second chances for honest entrepreneurs
    - Regulatory burden reduction.
3. Making the culture of entrepreneurship in Europe more dynamic by nurturing the new generation of entrepreneurs.

Digital technologies create new business opportunities for entrepreneurs. As indicated in the Commission Industrial Policy Communication, "entrepreneurs need to exploit the full potential of the digital single market in the EU that is expected to grow by 10% a year up to 2016".[32] In this respect, the European Commission took action to help entrepreneurs and SMEs to fully exploit the potential of those technologies, both in terms of supply of new digital products and services and in terms of demand and smart use of these technologies by a.o. launching the Digital Agenda and the Industrial policy flagship initiatives. In addition to those initiatives, a number of specific actions are taken within the Entrepreneurship 2020 Action Plan to enhance trust towards online trade, i.e.:

- Foster the knowledge base on major market trends and innovative business models.
- Raise awareness through a Europe-wide information campaign for entrepreneurs and SMEs on the benefits from the new digital evolutions.

[32] European Commission (2012). A Stronger European Industry for Growth and Economic Recovery. Industrial Policy Communication Update

- Facilitate networking to spark and support new business ideas.
- Launch specific actions for web entrepreneurs.
- Strengthen competences and skills.

Small Business Act for Europe (SBA)

Adopted in June 2008, the Small Business Act for Europe reflects the European Commission's political will to recognise the central role of SMEs in the EU economy. It puts into place a comprehensive SME policy framework covering ten principles to lower existing barriers to entry and to improve the overall approach to entrepreneurship:

1. Create an environment in which entrepreneurs and family businesses can thrive and entrepreneurship is rewarded.
2. Ensure that honest entrepreneurs who have faced bankruptcy quickly get a second chance.
3. Anchor the 'Think Small First' principle in policy making, i.e. listening to SMEs before introducing new laws and examining the effect legislation will have on small businesses;
4. Make public administrations responsive to SMEs' needs.
5. Adapt public policy tools to SME needs: facilitate SMEs' participation in public procurement and better use state aid possibilities for SMEs.
6. Facilitate SMEs' access to finance and develop a legal and business environment supportive to timely payments in commercial transactions.
7. Help SMEs to benefit more from the opportunities offered by the single market.
8. Promote the upgrading of skills in SMEs and all forms of innovation.
9. Enable SMEs to turn environmental challenges into opportunities.
10. Encourage and support SMEs to benefit from market growth.

Between 2008 and 2010, Member States achieved good results in boosting entrepreneurship and promoting SMEs as shown by the following examples relating to the first principle 'promoting entrepreneurship':

- Entrepreneurship programmes were introduced to foster the entrepreneurial attitudes and skills of young people and to make them aware of the possibility of starting an enterprise.
- In Member States such as Denmark, the Netherlands, Sweden and the UK, entrepreneurship education became the object of a coherent national strategy.
- Some Member States are involved in national or European programmes encouraging female entrepreneurship.

To encourage Member States to step up their efforts to promote and support entrepreneurship and SMEs, a review of the SBA was initiated in February 2011. In order to reflect current economic developments, bring the SBA into alignment with the priorities of the Europe 2020

strategy and continuously improve the business environment for SMEs, the review proposes further action in four priority areas:

1. Improve access to finance to invest and grow.
2. Smart regulation to enable SMEs to concentrate on core business.
3. Making full use of the single market.
4. Helping SMEs face the challenges of globalisation and climate change.

In November 2011, the European Commission presented a new approach to further ensure that it better responds to the needs of SMEs, wherever possible, exempting micro-enterprises from EU legislation or introducing special regimes so as to minimise the regulatory burden.

European e-Business Support Network for SMEs

The European e-Business Support Network for SMEs (eBSN) was established in response to high-level political focus on the important role of ICT in boosting the competitiveness of the overall EU economy. Its goal is to improve the effectiveness of public SME policies in fostering competitiveness by promoting the innovative use of ICT.

eBSN is an open policy coordination platform for e-business, bringing together decision makers and public policy experts in the field of e-business, to share experiences and best practices and discuss strategic policy direction in Europe. eBSN has supported a broad spectrum of actions such as policy benchmarking, analysis and awareness raising, shaped new policy trends, generated synergies between national policies and inspired new e-business policies through the exchange of good practice.

eBSN analyses the evolution of e-business policies and shapes policy action at the European level: e-business policies for SMEs have evolved as they have tried to adapt to the changing needs of enterprises. Starting from raising general ICT awareness and financing basic ICT investments and internet connectivity, e-business policies have matured towards personalised e-business coaching, and more recently towards a more holistic, sector oriented, policy approach promoting smart use of ICT and the integration of SMEs in industrial value chains.

In recent years, eBSN deployed the EU initiative: "Stimulating smart use of information technologies and the integration of SMEs in global digital value chains". The objective is to modernise industrial value chains through the smart use of ICT and, in particular, to help SMEs connect better to larger enterprises and become fully integrated international business partners.

This initiative consists of a series of industry-specific demonstration actions (in the automotive, fashion, transport and logistics sectors, tourism, agro-food supply-chain and the construction sectors), with the objective of catalysing the creation of interoperable e-business frameworks that would help link SMEs to larger enterprises in an efficient way. While the focus of these actions is on smaller enterprises, the ultimate beneficiary is the entire European economy.

The first results are remarkable. The business benefits of digital supply chains lie in significant gains in efficiency, speedier and affordable integration of SMEs, cost savings, better time

management, error-free communication and demand-driven production, but also in better services to customers, new market opportunities and better time to market. In the actions completed already, there are good prospects for mass market adoption through sound industry-led leadership and European standardisation initiatives.

Towards world-class clusters in the European Union: implementing the broad-based innovation strategy

This communication outlines a policy framework for better complementarities and synergies between the different policy levels with a view to supporting the development of more "world-class" clusters in the EU. It includes a number of measures to improve synergies between the different policy levels that affect further strengthening of clusters:

- Deepening the EU internal market by removing barriers to trade, mobility and free movement of knowledge.
- Improving cluster policies through the Lisbon National Reform Programmes.
- Fostering transnational cooperation to match complementary strengths.
- Promoting excellence of cluster organisations through professionalising cluster management.
- Improving the integration of innovative SMEs into clusters to promote technology transfer and support the internationalisation of SMEs' activities.

Detailed overview of the policy actions

This section presents a list of options for policy action which target digital entrepreneurship and aim to contribute to the realisation of EU's ambition to accelerate the transformation of the European business landscape through the use of digital technologies.

This section looks into options for policy action in all industries and sectors of the economy as there is potential or actual entrepreneurial activity in all economic sectors and since it is increasingly relevant for all industries to integrate digital technologies into the business process in an innovative way.

The options for policy actions are related to the needs and barriers identified in the previous chapter of this study ('Barriers and Challenges') and are organised according to five pillars:

1. Pillar 1 – Increase industry digital transformation.
2. Pillar 2 – Create a digital entrepreneurial culture.
3. Pillar 3 – Attract, develop and retain high-end digital skills and talent.
4. Pillar 4 – Ease the access to finance and enhance investments.
5. Pillar 5 – Boost digitally powered single market.

This list of policy actions is the result of in-depth research and analysis, complemented by insights gained during numerous interviews and workshops with key stakeholders from both private and public sectors. Some options for policy action build further upon what has already

been initiated by the European Commission or leverage achievements and key lessons learned from completed actions. In addition, , some actions have been identified to cover those areas where currently no action has been taken but where action is crucial in order to achieve Europe's vision as mentioned above.

In the following sections, the options for policy action for each pillar are separately discussed, taking into account, where relevant, the characteristics of the different industrial clusters. For each of the areas of proposed policy action the relevant information is provided within the format of a table.

Each table describes specific options for policy action, mentioning the extent of the impact expected (low, medium, high). The table also refers to the potential owner of the policy action (European Commission, Member States, private parties) and also to the effort required to implement the policy option (low, medium, high).

Pillar 1: Increase industry digital transformation

The digital transformation of industry has been on the European policy agenda for many years. Looking at the digitisation index (see also the chapter 'Barriers and Challenges') it is clear that overall digitisation has gone up for all industries, however, when looking into specific sectors of the economy, some differences are observed in the degree of digital transformation among traditional businesses and SMEs or start-ups. The main barriers and challenges currently hindering digital transformation across different industries are depicted by the limited collaboration between traditional industries with the ICT sector. It seems that there is a gap between traditional businesses and start-ups or SMEs in terms of IT interoperability issues, closed procurement systems, etc. (see the chapter 'Barriers and Challenges').

The policy options presented hereafter are targeted at fostering the digital transformation of industries.

1

Impact: **LOW - MEDIUM**

Effort: **MEDIUM**

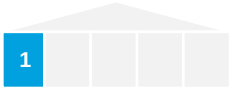
ACTION 1 - European Digital Innovation campaigns
Initiate a series of European Digital Innovation programs targeted at less digitised industry sectors with high potential (e.g. 'life-science', 'tourism & hospitality' and 'transportation & distribution' clusters and business functions 'support' and 'production process') by involving policy makers, industry associations, universities and private partners.
Description ▪ Setting up of cooperative frameworks with specific education and industry associations to understand the drivers of low digital uptake and to jointly identify innovative ideas to increase digitisation in these sectors. ▪ Development and promotion of information sessions on digital innovation, by inviting industry associations and academics with expert knowledge on and experience in specific sectors to collaborate with policy makers and to jointly define actions to increase digitisation. ▪ Design and launch of a series of digital innovation campaigns targeting less digitised

industry sectors in the EU.

- First phase: generate as many ideas as possible to increase digitisation in less digitised industry sectors.
- Second phase: organisation of workshops contributing to and challenging selected ideas.
- Third phase: build business case for a particular, less digitised industry sector.
- Fourth phase: promotion of information sessions on business cases (potentially followed by an implementation phase).

Owner: ☒ European Commission ☒ Member States ☒ Private partners

The first option for policy action refers to the development and promotion of European Digital innovation campaigns. Receiving input about innovative ideas for the promotion of the digitisation of industrial sectors is important for the increase of actual entrepreneurship related to digital applications. This type of platform should bring together stakeholders with hands-on experience in their field of specialisation as well as entrepreneurs with specific ideas about opportunities fostering digital applications into sectors less digitally transformed.



Impact: **MEDIUM - HIGH**

Effort: **LOW - MEDIUM**

ACTION 2 – Reinforcing existing industry clusters

Reinforcing existing industry clusters in the EU by integrating more ICT dynamics and facilitating the partnerships and close collaboration between industries and digital innovators within industry hubs, promoting awareness and training within clusters and encouraging collaboration between clusters with a view to showcasing success stories.

Description

- Build further on the Commission's communication entitled 'Towards world-class clusters in the European Union: implementing the broad-based innovation strategy' and the work done by the Cluster Observatory, the online platform for information and analysis of clusters and cluster policy in Europe.
- Develop and implement a model of digital innovators and embedded clusters in specific industries, in close collaboration with European sector organisations.
- Promoting awareness and defining training programmes within clusters and encouraging collaboration between clusters with a view to showcasing success stories of "digital embracement".

Owner: ☒ European Commission ☒ Member States ☒ Private partners

Clusters are powerful engines of economic development and drivers of innovation. They provide a fertile business environment for companies, especially SMEs, to collaborate with research institutions, suppliers, customers and competitors located in the same geographical area.

The EU does not lack clusters, but needs more world-class excellence. There are a growing number of policies and initiatives designed to support clusters and these initiatives need to be used to introduce the concept of 'digital innovation embracement'.

1

Impact: **LOW -MEDIUM**

Effort*:* **MEDIUM – HIGH**

ACTION 3 – Industry-specific digital solutions distribution platforms
Encouraging industry-specific digital solutions distribution platforms to promote both the connection of smaller enterprises to the digital market (e.g. for tourism, automotive, construction, healthcare, etc.), and the development and distribution of smart applications and digital solutions for specific industries.
Description ▪ Analyse, fund and promote the idea of sector-specific digital platforms on which developers of digital solutions can distribute sector-specific applications aimed at boosting the efficiency and competiveness of specific industries. ▪ It is supposed that private partners are to be key stakeholders. ▪ Take into account issues concerning market distortion and competition. ▪ Organise digital contests for the development of apps in specific sectors.
Owner: ☒ European Commission ☒ Member States ☒ Private partners

In order to foster collaboration and the exchange of information between different sectors, setting up platforms promoting industry-specific digital solutions will be beneficial. These platforms would present and promote business models, best practices and information about specific know-how on applications that can be developed or used in different sectors.

The idea is that best practices and examples of cooperation among companies in different sectors are presented and made known to potential entrepreneurs. This would meet the need for low-barrier, accessible platforms for all entrepreneurs across Europe together with the need for closing the gap between start-ups, SMEs and traditional companies. In addition, this is expected to promote the sharing of information and best practice amongst industry peers and across industries.

Pillar 2: Create a digital entrepreneurial culture

It is important to foster the digital entrepreneurial culture in order to develop a more entrepreneurial climate which encourages people to start a business. The barriers which have been identified that need to be overcome are the stigma that is put on failed entrepreneurs and heavy administrative burdens.

The following policy actions seek to enhance the digital entrepreneurial culture in a positive manner.

2

Impact: **MEDIUM**

Effort: **LOW - MEDIUM**

ACTION 4 – Awareness campaign on digital entrepreneurship
Launch an awareness campaign on digital entrepreneurship to identify and promote European digital icons, serial entrepreneurs, intrapreneurs and success stories. Share industry specific success stories and innovative development.
Description ▪ Identification of digital icons, serial entrepreneurs, intrapreneurs and success stories throughout the European Union. ▪ Organisation of yearly events on entrepreneurship targeting digital entrepreneurship. ▪ Promotion of awareness campaigns through: - An EU-wide portal with information on entrepreneurial events across Member States. - Launch initiatives to make local events available for every European citizen, for example by making local events available by using streaming technology. - Involving public broadcasting companies to promote the European entrepreneurial spirit.
Owner: ☒ European Commission ☒ Member States ☒ Private partners

As entrepreneurs too often believe they are missing some crucial support to start-up, expand or transform their business, further targeted actions are needed to collect and distribute information about specific state-of-the-art technologies, promote skills, launch supportive programs and schemes or celebrate success stories in the field of digital entrepreneurship. In this respect, action should also be taken to tackle the mismatch between measures or initiatives already in place and people's perception on available support responding to their needs.

2

Impact: **MEDIUM**

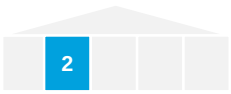
Effort: **MEDIUM**

ACTION 5 – Mentoring and networking platforms
Create industry specific digital entrepreneurship mentoring and networking platforms to which experts from various industries can subscribe as a mentor (cfr. StartUp Britain's Local Champions)
Description ▪ Defining a European mentoring framework aiming to set-up a national platform or portal to which experienced citizens can subscribe (either having entrepreneurial experience or experience in a particular industry) to become a mentor for (future) entrepreneurs. ▪ Identification of key responsibilities at Member State level, for the implementation of the action and the creation of awareness involving local stakeholders. ▪ Initiative events at European level at which mentors can exchange experiences and network.
Owner: ☒ European Commission ☒ Member States ☒ Private partners

Actively sharing ad hoc and specialised knowledge amongst entrepreneurs is essential for fostering a more entrepreneurial environment. Sharing information about new technologies, success stories of fostering digital entrepreneurship, available skills and experts in the market

are all very important. However, in addition, guidance and mentoring provided by experienced people in the area is also very crucial.

Setting up a mentoring programme linking successful entrepreneurs to potential future entrepreneurs can build up their practical specialised knowledge allowing them to be as successful. This way, potential entrepreneurs can have access to people with hands-on experience in the field and share experiences and knowledge of their success stories together with tips on how to avoid common pitfalls and how to be more efficient in certain aspects of entrepreneurial activities.

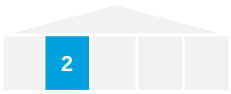


Impact: **LOW**

Effort: **LOW**

ACTION 6 – Promote the 'ERASMUS for young entrepreneurs'
Promote an initiative to encourage exchanges and 'new business ventures' between young and digitally-minded entrepreneurs and existing enterprises in any other sector.
Description ▪ Leverage the existing 'Erasmus for Young Entrepreneurs' exchange programme to encourage exchanges and new business ventures between young and digitally-minded entrepreneurs and existing enterprises in any other sector. ▪ Encourage the applications for exchanges of young entrepreneurs or talented graduates in companies which apply digital applications in order to transfer the know-how to set-up entrepreneurial activities in other EU countries (e.g. the country of origin of the young entrepreneur).
Owner: ☒ European Commission ☒ Member States ☒ Private partners

'Erasmus for Young Entrepreneurs' is a cross-border exchange programme which gives new and aspiring entrepreneurs the chance to learn from experienced entrepreneurs running small businesses in other European Union countries. The programme can be used to boost the concept of digitally embedded exchanges of digitally minded entrepreneurs and more traditional enterprises and sectors.



Impact: **MEDIUM**

Effort: **LOW - MEDIUM**

ACTION 7 – Open data initiatives
Connect to the Commission's open data initiatives in order to stimulate the use of open public data for the creation of new business opportunities and services.
Description ▪ Leveraging and connecting to the EU Open Data Strategy for Europe, initiated in 2011 ▪ Strengthen existing initiatives on open data such as: - The European Union Open Data Portal, a single point of access to data from the institutions and other bodies of the EU - PublicData.eu, a pan European data portal providing access to open, freely reusable datasets from local, regional and national public bodies across Europe. This portal has been developed by the Open Knowledge Foundation, a UK-based

non-profit foundation as part of the LOD2 (Creating knowledge out of interlinked data) project, an ICT research project financed under the European Commission's 7th Framework Programme
- The Open data challenge, Europe's biggest open data competition

- Encourage European entrepreneurs to access and use this data to transform raw data into apps, websites or other products.
- Leverage success stories to increase awareness and encourage more people to use data and transform it into innovative products or services.
- Feature best practices in order to attract more data, both from public authorities and the private sector.

Owner: ☒ European Commission ☒ Member States ☒ Private partners

Data has been referred to as the new raw material of the twenty-first century. Open data, employed by digital entrepreneurs in combination with open platforms, open standards and open licences, has the potential to create enormous business opportunities. However, companies and entrepreneurs using open data need to be nurtured and supported if they are to succeed. In this respect, action can be taken by the European Commission to encourage the supply side of the business landscape in opening (public) data and supporting digital entrepreneurs willing to use this data (demand side).

2

Impact: LOW - **MEDIUM**

Effort: **HIGH**

ACTION 8 – Embedding entrepreneurship in education

Strengthen the development of the European reference framework on embedding entrepreneurship in education (especially in the fields of science, technology, engineering and mathematics) listing best practices and providing Member States with recommendations on how this framework should be translated into national policies.

Description

- Strengthen the on-going development of policy guidance on entrepreneurship education, announced in the Rethinking Education Communication and providing rationale, advice and practical examples to policy makers on why and how to effectively embed entrepreneurship education across education and training systems.
- Supporting schools to incorporate entrepreneurship in their curriculum e.g. distribution of teaching materials, funding of pilots, promotion of best practices through various channels and promotion of partnerships with businesses.
- Introduction of specific topics on entrepreneurship in the curricula of universities and colleges e.g. enhance business games or competitions where scholars are encouraged to start a mini- business.
- Provision of training and awareness sessions for teachers on entrepreneurship. Build awareness amongst heads of schools, through targeted information sessions, to ensure that time and resources are freed up to follow these sessions.

Owner: ☒ European Commission ☒ Member States ☒ Private partners

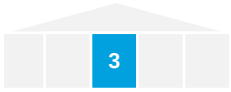
Europe is known for its academic excellence. However, a European paradox is often mentioned, referring to lagging-behind other economies (primarily the US) in applying science into marketable technological applications. The role of university and college education in some fields of training is of importance in this respect.

At the same time, the ICT sector is a fast evolving business market and requires highly skilled and specialised personnel. Therefore, universities should stay ahead and develop the skills of their students in the newest technologies (including e-leadership skills). Keeping the curricula of the universities and colleges up-to-date in a fast-growing technological environment is a prerequisite for graduates with a good 'match' to the evolving needs of the labour market.

The EC could foster this through the development of a European reference framework that will embed entrepreneurship into education. This can involve the introduction of entrepreneurship subjects in the curriculum not only of universities and colleges but also of schools, at the same time, updating the knowledge of teachers with respect to entrepreneurship and the educational approach to entrepreneurship in secondary education.

Pillar 3: Attract, develop and retain high-end digital skills and talent

Entrepreneurs are finding it harder and harder to source staff possessing the right high-tech skills (e-skills and e-leadership skills) and with the right entrepreneurial attitude. All in all, it is crucial to enhance digital talent and high-tech skill throughout Europe. The following policy actions are aimed at doing exactly that.



Impact: **LOW**

Effort: **LOW**

ACTION 9 – Encourage students and graduates to start a digital start-up
Initiate a pilot program to work with large companies to encourage students and/or graduates to acquire and demonstrate e-leadership skills and found a digital start-up, paying some of those or co-founding a start-up – and holding a graduate job open for one or two years in case it doesn't work out (cfr. Entrepreneur First in UK).
Description ▪ Promoting entrepreneurship as a desirable career path in the EU by offering students and graduates alternatives to the classic route (i.e. working at 'traditional' companies). ▪ Encourage higher education to invite start-ups and entrepreneurs to career fairs. ▪ Invite 'icon companies' to jointly provide funding schemes for graduates willing to start-up their own company when graduating. ▪ Foster collaboration between universities and SMEs, for instance through the provision of funding schemes, pilot projects or apprenticeships/internships.
Owner: ☒ European Commission ☒ Member States ☒ Private partners

Very often it seems that what keep people from starting up a company is the fear of risk and the lack of confidence in starting entrepreneurial activities alone. Therefore, supporting the 'first steps' of recent graduates or young potential entrepreneurs can boost entrepreneurship. The role of universities and colleges, on the one hand, and that of existing companies, on the other hand, are both crucial. Collaborative projects between educational bodies and companies that promote internships and funding schemes for young, talented, entrepreneurially-minded people can prove key in promoting entrepreneurship.

3

Impact: **LOW - MEDIUM**

Effort*:* **HIGH**

ACTION 10 – Europe Entrepreneurs' Visa Act

Initiate 'Europe Entrepreneurs' Visa Act' towards Member States in order to attract talent outside the European Union and to create jobs.

Description

- Lower barriers for foreign entrepreneurs - willing to invest and start-up a business and create jobs in Europe - by introducing an entrepreneurial visa.
- Support Member States in defining eligibility criteria for potential entrepreneurs (start-up capital, type of business, controlling interest, business plan requirements, etc.) in order to guarantee a certain level of harmonisation across Member States
- Initiate a campaign/agency aiming to promote Europe as an attractive and distinctive place to start up your business and to attract foreign entrepreneurial talent (cfr. Invest UK).

Owner: ☒ European Commission ☒ Member States ☒ Private partners

A future 'Europe Entrepreneurs' Visa Act' should target entrepreneurs founding an enterprise and willing to hire non-European highly skilled employees and non-European graduates from European universities with advanced degrees in science, technology, engineering or mathematics.

3

Impact: **LOW - MEDIUM**

Effort*:* **MEDIUM - HIGH**

ACTION 11 – Relax the visa requirements applied to highly skilled individuals

Provide recommendations to relax the visa requirements applied to highly skilled individuals (science, technology, engineering and mathematics fields) wanting to work in the digital sector in Europe.

Description

- Recommend that Member States reduce the visa requirements applied to highly skilled individuals (in particular those with high STEM skills, e.g. science, technology, engineering, and mathematics) wanting to work in Europe's digital economy.
- Development of a funding programme or a tax reduction system that will support established businesses when hiring a specialised individual in specific fields vital for the business of the company.
- Coordinate the implementation of relaxed visa requirements at Member State level in order to guarantee a certain level of harmonisation.

Owner: ☐ European Commission ☒ Member States ☐ Private partners

As in the previous policy action, the above-mentioned policy option is important as a means of increasing the mobility of engineers in a sector in which industrial developments are often concentrated in particular industries. The relaxing of the requirements for mobility will enable the physical presence and engagement of engineers in specific sectors and regions where they will be able to attain relevant knowledge and know-how.

3

Impact: **LOW**

Effort: **MEDIUM**

ACTION 12 – Online courses to close knowledge gaps

Analyse which skills digital entrepreneurs are currently lacking in the European Union and develop - in close collaboration with education bodies and the private sector - online courses to close knowledge gaps (e.g. accounting, web development, coding,).

Description

- Leverage the European e-Competence Framework to identify which e-leadership skills are currently lacking across the European Union.
- Set up collaboration platforms with private partners to provide specific skills and know-how (e.g. accounting, coding, finance, etc.).
- Foster knowledge sharing by developing online platforms where entrepreneurs can access industry specific knowledge and expertise.
- Development and promotion of open online courses in various fields (e.g. accounting, web development, finance).

Owner: ☒ European Commission ☒ Member States ☒ Private partners

In their search for knowledge and ready-to-use materials, entrepreneurs are looking for easily accessible information available to all, allowing them to learn throughout their career. Developing and rolling out open online courses in various relevant fields for entrepreneurs would assist businesses at low cost and within a mouse click.

Today, the EC is planning some workshops around seed funding, etc. However, online courses would have a broader and cost-effective impact on SMEs and start-ups.

Pillar 4: Ease the access to finance and enhance investments

Throughout the business life cycle, it is very important to have access to sufficient financial resources which in turn boost growth. The Commission is undertaking a number of actions to facilitate the access to financial resources. However, the actions listed below take some of them to the next level or make them more targeted for digital entrepreneurship.

4

Impact: **MEDIUM**

Effort: **LOW**

ACTION 13 – Promote use of existing financial instruments

Promote the use of existing European financial instruments and initiatives such as Horizon2020, the European Investment Fund, JEREMIE (Joint European Resources for Micro to medium Enterprises) and JASMINE (Joint Action to Support Micro-finance Institutions in Europe) regional funds and the EU programme for the Competitiveness of enterprises and SMEs (COSME)

Description

- Strengthen the Your Europe - finance and support - web portal as single point of information on existing financial instruments for entrepreneurs
- Actively promote these financial instruments through:
  - Events and promotional activities via industry associations and national bodies.
  - Campaigning.
  - Promotion via funding programmes/schemes (regional development, FP7,).

- Testimonials (videos).
Owner: ☒ European Commission ☐ Member States ☐ Private partners

Europe has a rich array of initiatives aimed at developing and supporting entrepreneurs financially. However, the availability of information about the existing support is crucial. Knowing what type of funding exists and when it can be used most effectively is equally important. The organisation of events that promote existing financial instruments is crucial especially in the environment of potential entrepreneurs or young talented graduates who do not necessarily have a full 'picture' of the available options.

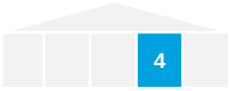
4

Impact: **MEDIUM**

Effort: **MEDIUM - HIGH**

ACTION 14 – Tax incentives for a capital gains tax rollover relief for shares
Share, promote and support best practices on tax incentives for digital entrepreneurship to encourage more people to reinvest their gains in the digital business (cfr. SEIS the Seed Enterprise Investment Scheme in UK).
Description ▪ Consider the case for a capital gains tax rollover relief for shares in order to attract and encourage a wide range of investors eager to reinvest their gains into funding new businesses. ▪ Work on the listing and promotion of tax relief systems to help early-stage companies raising equity finance across Europe in order to facilitate cross border investments in digital businesses. ▪ Tax relief systems can combine income tax relief for individuals who subscribe for qualifying shares in a company which meets the 'digital' requirements, and who have tax liability in a European country, … ▪ …with a capital gains re-investment relief system in which an asset which would give rise to a chargeable gain, in and as far as all or part of the amount of the gain is reinvested in shares which also qualify for 'digital' income tax relief, the amount reinvested will be exempt from capital gains tax.
Owner: ☒ European Commission ☒ Member States ☐ Private partners

Taxes influence decisions regarding hiring, financing structure, and ownership structure of SMEs but they also effect the decision to launch a business. For potential investors looking for an eventual exit and gain, the tax treatment of those gains is an essential consideration. Therefore, those tax incentives can be an important trigger for those planning to reinvest in a (new) business. European Member States have developed different tax incentive schemes with the tax treatment of capital gains varying from the very simple to the very complex. Exchanging knowledge and sharing experiences on these schemes can promote the idea of a level playing field in Europe for entrepreneurs.



Impact: **LOW**

Effort: **MEDIUM**

ACTION 15 – Implementation of the European Intellectual Property framework

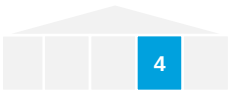
Accelerate the implementation of the European Intellectual Property framework, to give digital entrepreneurs and investors the legal certainty they need to invest and to guide them in understanding the full value of digital intangibles.

Description

- Strive for an ambitious implementation of the European Strategy for Intellectual Property Rights.
- Creation of a unitary patent protection system so inventors need register only one patent covering most EU countries – reducing costs and red tape.
- Better protection of brands through a modernised trademark system – simpler, faster, more effective, efficient and consistent.
- Facilitating EU access to copyright-protected works, particularly online and including those relating to Europe's cultural heritage.
- More effective cooperation in the EU against counterfeiting and piracy.
- Organise a communication and dissemination campaign promoting the new initiatives for a single market for intellectual property rights.

Owner: ☒ European Commission ☒ Member States ☐Private partners

Intellectual property is of prime importance for companies active in sectors where digital applications are developed. Ensuring the property rights of digital applications is a prerequisite for the setting up of the company that will develop the application. In this context, the framework of property right protection needs to become 'modernised' in order to accommodate the changes in the digital applications sectors and to answer to the challenges of the respective industries. At the same time, cooperation at EU level is necessary in order to promote similar standards across EU industries and to promote the competitiveness of the EU market as a whole.



Impact: **LOW**

Effort: **MEDIUM**

ACTION 16 – Harmonisation of crowdfunding policies

Harmonisation of the single market with regards to crowdfunding by listing various national crowdfunding policy frameworks and providing an overarching European policy structure in order to harmonise national regulations and policies.

Description

- Carry out a study on the various crowdfunding policy frameworks in the Member States.
- Develop an overarching European policy structure in order to harmonise national regulations and policies.
- Reduce the administrative burden for crowdfunding platforms, simplifying the licensing requirements for these platforms.
- Develop awareness campaigns among stakeholders and decision makers for the opportunities of crowdfunding.
- Support research on the impact of new forms of funding for entrepreneurs.
- Use the success of crowdfunding as an example of how digital technologies can impact business models.

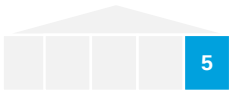
Owner: ☒ European Commission ☒ Member States ☐Private partners

Getting access to early-stage growth capital remains one of the challenges facing young entrepreneurs. Crowdfunding provides a response to this challenge. Crowdfunding is offered in different Member States, but different rules and conditions apply in the different Member States making it difficult to provide a harmonised environment in this respect for all digital entrepreneurs independently of the Member State in which they operate. Taking action to harmonise the different rules and conditions among the Member States will also provide an environment promoting cross-border collaboration.

Pillar 5: Boost the digitally powered single market

The digital industry should be able to benefit from the EU single market environment. However, there are a number of challenges and barriers hindering this, such as language barriers, barriers for doing business across Member State borders, a protectionist mind-set etc.

The following policy options seek to overcome these barriers and are aimed at optimising the opportunities of the single market.



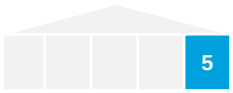
Impact: **LOW**

Effort: **MEDIUM**

ACTION 17 – Monitor the evolution of digital entrepreneurship
Establish a digital entrepreneurship scorecard and monitor the evolution of digital entrepreneurship across Member States: perceptions and aspirations towards digital entrepreneurship, the quantity and quality of digital and e-leadership skills, entrepreneurial talent, access to finance, etc.
Description ▪ Develop a monitoring mechanism to follow-up and measure in a systematic way the evolution of key trends in digital entrepreneurship, including: - Emerging technological trends and their potential impact on business and new business opportunities. - The evolution of the digital entrepreneurial culture, the perception of and expectations from digital entrepreneurship. - The take-up of digitisation across industries and the evolution of digital skills, e-leadership skills and talent across Europe. - Emerging market needs, new business paradigms and their impact on the European economy. ▪ Develop a scorecard with indicators for monitoring the key aspects across Europe. ▪ Create a digital interactive platform in order to publish the results. ▪ Use the platform as a knowledge sharing instrument between digital entrepreneurs, industries, science and politics.
Owner: ☒ European Commission ☒ Member States ☒Private partners

Digital entrepreneurship is developing fast and will continue to do so in the decades to come. The needs of the companies in this sector are also growing quickly along with the rapid advancement in technological achievements and the new applications that continue growing over

time. Monitoring in a systematic way the developments and evolutions in the digital entrepreneurship landscape is going to be crucial. This need for monitoring will be important not only in order to develop a 'picture' of the relevant industrial activities but also, for policy-makers, in order to monitor the changes in needs for policy support and the identification of the areas in which policy instruments will need to be adapted or developed.



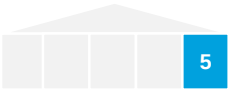
Impact: **LOW- MEDIUM**

Effort: **LOW**

ACTION 18 – Leverage the national "*Points of Single Contact*" (PSC)
Leverage and create awareness on the national Points of Single Contact, resulting from the Service Directive[33], and existing portals providing access to legal and regulatory information in each Member State, listing all existing start-up programs, initiatives and schemes currently being initiated at European, Member State and private level that support digital entrepreneurs and increase the ease of doing business.
Description ▪ Strengthen and create awareness on the Your Europe – a EU site designed to help citizens for instance when moving, studying, working or travelling abroad or, as a company, doing business in other European countries – and the EUGO portal, a central website linking to the national Points of Single Contact. ▪ Leverage the Service Directive to extend the scope of PSCs to other sectors (currently covers the services sector only). ▪ Increase the digital transaction capabilities of the PSCs in order to transform them into a more comprehensive e-government for businesses.
Owner: ☒ European Commission ☒ Member States ☐ Private partners

Acquiring information about the existing programmes and schemes, relevant to the various sectors, helps potential investors and entrepreneurs to get access to the most relevant information. Direct access to the Points of Single Contact is a way to facilitate this access. Therefore, leveraging and creating awareness on platforms linking those PSCs will further improve the ease of doing business, making it more attractive for entrepreneurs to start-up or transform their business.

[33] The Services Directive aims to improve the ease of doing business in the European Union. The Directive defines the rules that apply to entrepreneurs wishing to establish a business or perform temporary services in the EU/EEA area. The Directive obliges Member States to eliminate unnecessary bureaucracy, simplify formalities for businesses and make public administrations more efficient. To implement the Directive, each Member State needs to set up 'Points of Single Contact (PSC)', e-government portals which help businesses complete their administrative procedures on-line. All PSCs are part of the European EUGO network, a central website to access all PSCs in Europe. More information: http://ec.europa.eu/internal_market/eu-go/index_en.htm



Impact: **LOW**

Effort*:* **MEDIUM**

ACTION 19 – Monitoring, coordinating and leveraging different DG actions

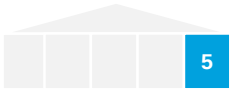
Set up a strategic policy group at the European level monitoring, coordinating and leveraging the different actions currently being taken at the different DGs, NGOs, Member States and in the private sector to foster digital entrepreneurship and do business in the digital age.

Description

- Set up a strategic policy group at the level of the European Commission in order to coordinate and leverage the different programmes and policies aimed at fostering digital entrepreneurship, comprising DG Enterprise, DG Connect, DG Market, DG EAC, DG RTD, different NGO's, the Member States and private sector organisations.
- Define a proper governance system for strategic policy group.
- Develop methods to mutually reinforce efforts and inputs across programmes and initiatives.
- Combine the collective monitoring of results and impacts of existing programmes with the preparation and implementation of new initiatives across domains and services.

Owner: ☒ European Commission ☐ Member States ☐ Private partners

The existence of several policy initiatives applicable to various sectors in different Member States needs coordination efforts to make the operations of these schemes as efficient as possible. Additionally, the different actions applied by different DGs or relevant NGOs also need to be coordinated. This coordination can be facilitated by the setting up of a strategic policy group at the European level with the aim to monitor, coordinate and leverage the different actions which are currently being taken at the different DGs, NGOs, Member States, and the private sector and which are focusing on fostering digital entrepreneurship and doing business in the digital age.



Impact: **LOW - MEDIUM**

Effort*:* **MEDIUM**

ACTION 20 – Explore possibilities to develop multilingual solutions

In collaboration with private partners, explore the possibilities of developing powerful European digital translation solutions for (digital) businesses.

Description

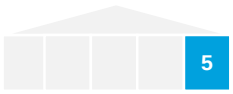
- Explore possibilities of support programmes for translation services for SMEs (tax incentives, grants…).
- Support multilingualism in campaigns, information sharing and platforms for (digital) entrepreneurs.
- Reduce administrative burden by simplifying the language requirements in case of cross-border business development.
- Support the development of standards for services and products for digital entrepreneurs in order to facilitate and strengthen the digital single market.

Owner: ☒ European Commission ☒ Member States ☒ Private partners

SMEs and start-ups have fewer resources at their disposal to cope with language barriers; entrepreneurs seek to improve their own language skills or obtain language services at low cost. The existent language barriers can be significant for small companies that need to hire people

from abroad or who need to have increased interaction with foreign markets. There is certainly a continued need to intensify actions that aim to reduce language barriers at EU level.

The policy actions mentioned above are intended to cope with the need to continuously provide the knowledge needed for a workforce that can communicate in different languages.



Impact: **MEDIUM - HIGH**

Effort*:* **MEDIUM**

ACTION 21 – Facilitation of public procurement of digital innovations developed by SMEs
Set up actions to facilitate the public procurement of digital innovations developed by SMEs.
Description ▪ Enforce a larger roll-out of the existing EC schemes for Pre-Commercial Procurement (PCP) and Public Procurement of Innovation (PPI) initiated by DG Enterprise and Industry. ▪ Community development, raising of awareness, capability development and mutual learning amongst all relevant parties to procurement of innovation, contracting authorities, organisations and SMEs in order to show how contracting authorities and SMEs can engage in procurement of innovation.
Owner: ☒ European Commission ☒ Member States ☒ Private partners

SMEs and start-ups often have very limited access to public procurement procedures. This is chiefly as a result of a lack of awareness but also a limited knowledge of the specific issues to be dealt with during such a procedure.

However, public procurement is an important source of financing which can be a great support to entrepreneurs who want to introduce new technologies in their production process or who need to invest in R&D and need financing for this. Within this context, policy actions facilitating public procurement for digital innovations developed by SMEs will be welcomed by the industry.

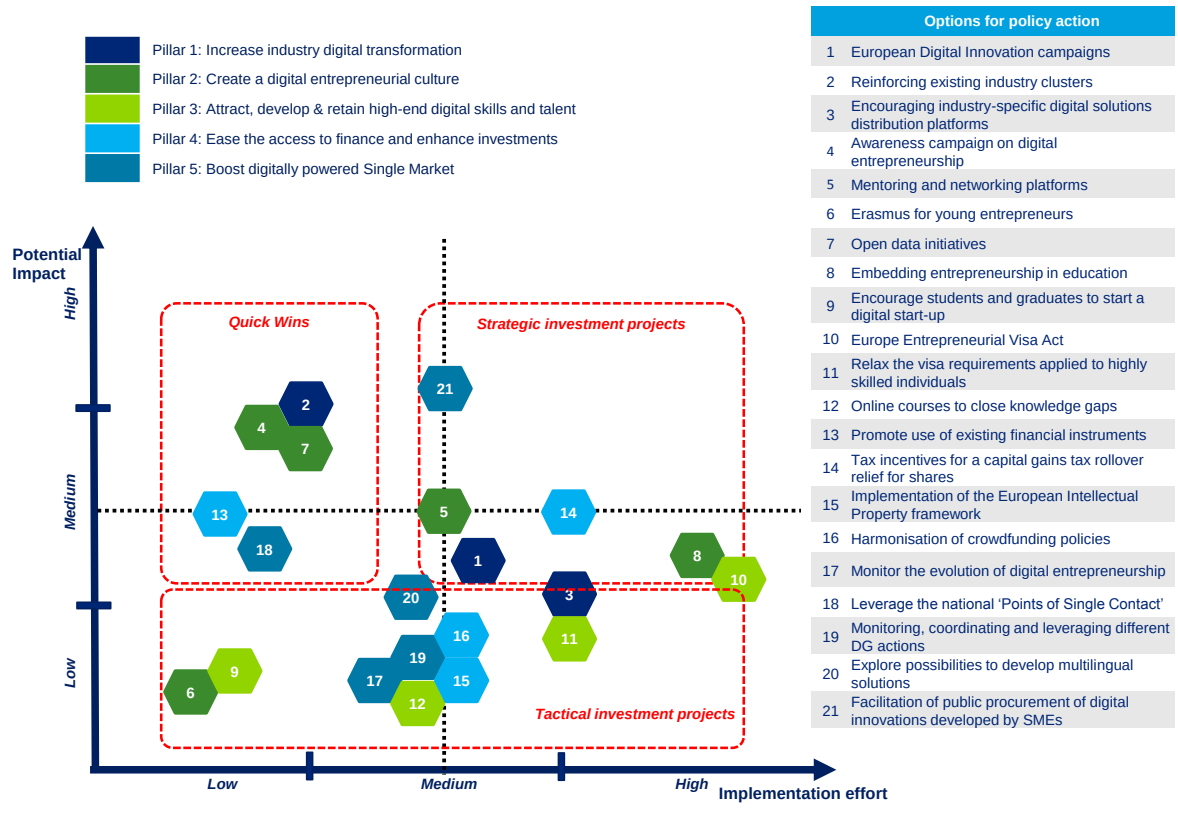
Impacts

This section takes into account the impacts of all policy options as described in the previous chapter and maps them against the implementation effort estimated for each policy action. This assessment is based on qualitative indicators and does not take into account items such as investment and maintenance costs.

Here, in order to estimate effort to implement policy actions, in a qualitative way, the time needed to establish the policy action as well as the estimated cost of implementation is taken into account. At the same time, the estimated impact of the policy action on the objectives is mapped.

Based on the policy actions discussed in the previous chapter, Figure 21 represents the effort required to implement and the impacts to be expected per policy action and per pillar. Although there is no cost-benefit analysis made here for the different actions, the concept of 'cost' is included in the estimation of feasibility for the different policy actions.

Figure 21 – Impact matrix



The matrix shows that a number of policy actions in pillar 2, related to the promotion of an entrepreneurship culture, have, in general, a relatively high estimated impact.

A handful of policy actions, e.g. policy actions 2, 4, 7, 13 and 18 can be implemented with relatively low effort and have a medium or high impact. These are typically called 'quick wins' and are described in Table 4.

Table 4 – Quick Wins projects

Objective	Action	Description
Pillar 1: Increase industry digital transformation	**(2) Reinforcing existing industry clusters**	Reinforcing existing industry clusters in the EU by integrating more ICT dynamics and facilitating the partnerships and close collaboration between industries and digital innovators within industry hubs, promoting awareness and training within clusters and encouraging collaboration between clusters with a view to showcasing success stories.
Pillar 2: Create a digital entrepreneurial culture	**(4) Awareness campaign on digital entrepreneurship**	Launch an awareness campaign on digital entrepreneurship to identify and promote European digital icons, serial entrepreneurs, intrapreneurs and success stories. Share industry specific success stories and innovative development.
	(7) Open data initiatives	Connect to the Commission's open data initiatives in order to stimulate the use of open public data for the creation of new business opportunities and services.
Pillar 4: Ease the access to finance and enhance investments	**(13) Promote use of existing financial instruments**	Promote the use of existing European financial instruments and initiatives such as Horizon2020, the European Investment Fund, JEREMIE (Joint European Resources for Micro to medium Enterprises) and JASMINE (Joint Action to Support Micro-finance Institutions in Europe) regional funds and the EU programme for the Competitiveness of enterprises and SMEs (COSME)
Pillar 5: Boost digitally powered Single Market	**(18) Leverage the national Points of Single Contact**	Leverage and create awareness on the national Points of Single Contact, resulting from the Service Directive, and existing portals providing access to legal and regulatory information in each Member State, listing all existing start-up programs, initiatives and schemes currently being initiated at European, Member State and private level that support digital entrepreneurs and increase the ease of doing business.

The policy actions that are located in the top-right area of the matrix are typically strategic investment projects and require time and or bear a significant cost (high implementation effort) but are expected to have a high impact on the economy. These projects are described in Table 5.

Table 5 – Strategic investment projects

Objective	Action	Description
Pillar 1: Increase industry digital transformation	**(1) European Digital Innovation campaigns**	Initiate a series of European Digital Innovation programs targeted at less digitised industry sectors with high potential (e.g. 'life-science', 'tourism & hospitality' and 'transportation & distribution' clusters and business functions 'support' and 'production process') by involving policy makers, industry associations, universities and private partners.
Pillar 2: Create a digital entrepreneurial culture	**(5) Mentoring and networking platforms**	Create industry specific digital entrepreneurship mentoring and networking platforms to which experts from various industries can subscribe as a mentor (cfr. StartUp Britain's Local Champions)
	(8) Embedding entrepreneurship in education	Strengthen the development of the European reference framework on embedding entrepreneurship in education (especially in the fields of science, technology, engineering and mathematics) listing best practices and providing Member States with recommendations on how this framework should be translated into national policies.
Pillar 3: Attract, develop & retain high-end digital skills and talent	**(10) Europe Entrepreneurs' Visa Act**	Initiate 'Europe Entrepreneurs' Visa Act' towards Member States in order to attract talent outside the European Union and to create jobs.
Pillar 4: Ease the access to finance and enhance investments	**(14) Tax incentives for a capital gains tax rollover relief for shares**	Share, promote and support best practices on tax incentives for digital entrepreneurship to encourage more people to reinvest their gains in the digital business (cfr. SEIS the Seed Enterprise Investment Scheme in UK).
Pillar 5: Boost digitally powered Single Market	**(21) Facilitation of public procurement of digital innovations developed by SMEs**	Set up actions to facilitate the public procurement of digital innovations developed by SMEs.

The bulk of proposed policy actions have a medium or low impact and can be implemented relatively easily (medium effort). For these actions, probably a more in-depth cost calculation is needed in order to take a go/no-go decision. These policy actions are described in Table 6. For all these options, further detailing and costing will be required.

Table 6 – Tactical investment projects

Objective	Action	Description
Pillar 1: Increase industry digital transformation	**(3) Encouraging industry-specific digital solutions distribution platforms**	Encouraging industry-specific digital solutions distribution platforms to promote both the connection of smaller enterprises to the digital market (e.g. for tourism, automotive, construction, healthcare, etc.), and the development and distribution of smart applications and digital solutions for specific industries.
Pillar 2: Create a digital entrepreneurial culture	**(6) Erasmus for young entrepreneurs**	Promote an initiative to encourage exchanges and 'new business ventures' between young and digitally-minded entrepreneurs and existing enterprises in any other sector.
Pillar 3: Attract, develop & retain high-end digital skills and talent	**(9) Encourage students and graduates to start a digital start-up**	Initiate a pilot program to work with large companies to encourage students and/or graduates to acquire and demonstrate e-leadership skills and found a digital start-up, paying some of those or co-founding a start-up – and holding a graduate job open for one or two years in case it doesn't work out (cfr. Entrepreneur First in UK).
	(11) Relax the visa requirements applied to highly skilled individuals	Provide recommendations to relax the visa requirements applied to highly skilled individuals (science, technology, engineering and mathematics fields) wanting to work in the digital sector in Europe.
	(12) Online courses to close knowledge gaps	Analyse which skills digital entrepreneurs are currently lacking in the European Union and develop - in close collaboration with education bodies and the private sector - online courses to close knowledge gaps (e.g. accounting, web development, coding,).
Pillar 4: Ease the access to finance and enhance investments	**(15) Implementation of the European Intellectual Property framework**	Accelerate the implementation of the European Intellectual Property framework, to give digital entrepreneurs and investors the legal certainty they need to invest and to guide them in understanding the full value of digital intangibles.
	(16) Harmonisation of crowdfunding policies	Harmonisation of the single market with regards to crowdfunding by listing various national crowdfunding policy frameworks and providing an overarching European policy structure in order to harmonise national regulations and policies.
Pillar 5: Boost digitally powered Single Market	**(17) Monitor the evolution of digital entrepreneurship**	Establish a digital entrepreneurship scorecard and monitor the evolution of digital entrepreneurship across Member States: perceptions and aspirations towards digital entrepreneurship, the quantity and quality of digital and e-leadership skills, entrepreneurial talent, access to finance, etc.
	(19) Monitoring, coordinating and leveraging different DG actions	Set up a strategic policy group at the European level monitoring, coordinating and leveraging the different actions currently being taken at the different DGs, NGOs, Member States and in the private sector to foster digital entrepreneurship and do business in the digital age.
	(20) Explore possibilities to develop multilingual solutions	In collaboration with private partners, explore the possibilities of developing powerful European digital translation solutions for (digital) businesses.

As a final remark, it is important to note that the true impact will only be realised when delivering a set of all projects together. Stand-alone action implementation will not deliver the desired effect.

Conclusion

Putting all the pieces together, this report shows that digitisation is a trend with many facets. Though affecting every industry and business function, the impact and pace at which digitisation takes place differs across industries and businesses.

Digital technologies disrupt not only existing businesses, but also open up opportunities for new companies in new industries. With a European economy, consisting of more than 60% of traditional, service-orientated companies, there is a huge potential to be leveraged.

The future of doing business in the digital age will mainly depend on the outlook of both digital progress and the European business climate. This outlook will be highly influenced both by the choices individuals and businesses make on using digital technologies and the way policy and regulatory challenges are addressed at the same pace.

This study focused on the impact of ICT developments in the global business landscape taking into account the specifics of European industry dominated by small and medium enterprises. It has been demonstrated that intensive use of ICT by businesses in different sectors and across business functions not only fosters growth, but also creates more jobs.

Digitisation is therefore not only about technology start-ups; greater use of technology is needed in all companies across all sectors.

Governments and policy makers are beginning to recognise the important role of digital in the economy and efforts are being made to foster digital entrepreneurship. However, despite these efforts, there are still many barriers and challenges that can stand in the way of doing business in the digital age. Understanding and anticipating these barriers and challenges is important when establishing the policy background for digital entrepreneurship. These barriers have been identified according to five different pillars:

- Low take-up and use of digital technologies by industries and SMEs;
- Lack of digital entrepreneurial culture in Europe;
- Low level of entrepreneurial skills and talent;
- Difficult access to finance and investments;
- Fragmented digital market.

To turn ambitions from vision to reality, bold policy reforms are needed for Europe to accelerate its transformation. Policymakers need to act fast, and cannot simply rely on Europe's past performance and a business environment designed for the analogue era.

In this study, for each of the problem areas, objectives have been defined and a list of potential policy options developed.

When taking into account the potential impact and implementation effort required a set of 'quick wins', 'strategic investment and 'tactical investments' projects were identified. Embedding digital innovators in existing industry clusters, launching awareness campaigns on digital entrepreneurship, the use of open data, promotion of existing financial instruments and leveraging the national Points of Single Contact are classified as 'quick win' projects.

It is important to take into account that the real impact will only be realised when delivering a set of all projects together. Stand-alone policy action implementation might, and most probably will not, deliver the desired effect.

In general, policy actions related to the promotion of an entrepreneurship culture have the highest estimated impact.

As the process of digitisation evolves and matures, it is critical to continuously monitor the evolution of the European digital transformation. Academics, policy makers and the public need to understand how Europe's ambition to accelerate the transformation of its business landscape through the smart use of digital technologies in order to increase growth and create employment evolves.

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Annex

Industry clusters

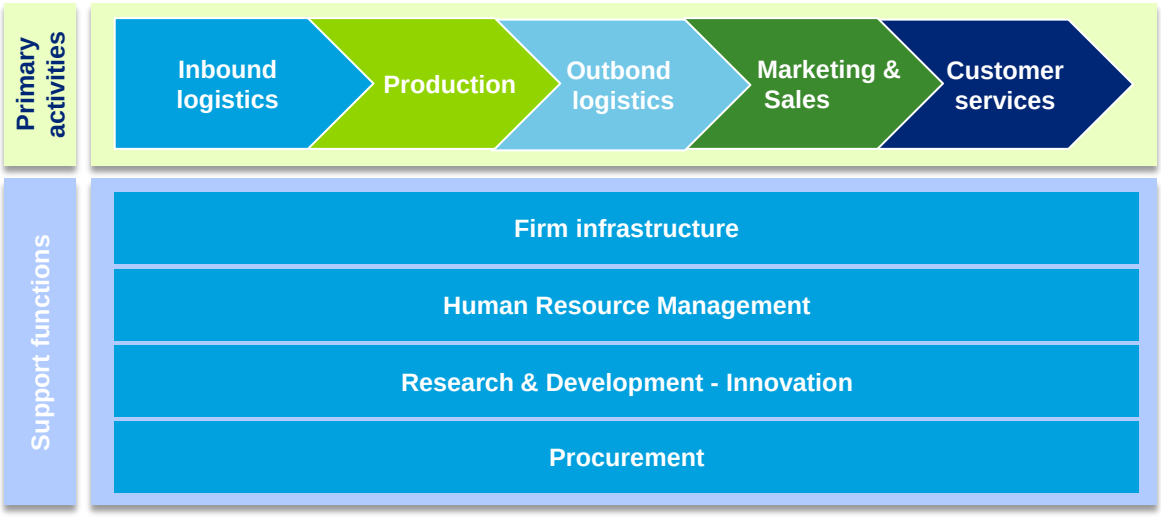
Table 7 - Industry clusters in Europe (% of total Member State workforce employed in particular cluster)

	Austria	Belgium	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	UK
Creative and cultural industries	**10.7%**	**10.2%**	**9.1%**	**12.1%**	**10.7%**	**15.2%**	**13.5%**	**14.3%**	**12.2%**	**10.9%**	**11.7%**	**9.8%**	**13.5%**	**12.2%**	**17.5%**	**10.7%**	**12.9%**	**8.7%**	**19.3%**	**10.1%**	**11.7%**	**8.5%**	**7.2%**	**11.2%**	**12.8%**	**15.5%**	**17.6%**
Advertsing	1.8%	0.6%	0.7%	1.0%	1.0%	1.2%	1.0%	1.1%	1.3%	0.8%	0.8%	0.5%	0.9%	0.6%	1.3%	1.3%	1.2%	0.0%	1.4%	0.7%	0.8%	1.1%	1.0%	0.5%	1.6%	1.7%	0.8%
Artistic creation and literary creation	1.6%	1.0%	1.1%	2.0%	1.6%	1.6%	1.1%	1.3%	1.4%	1.2%	1.9%	1.2%	2.3%	2.4%	3.1%	1.2%	2.1%	0.0%	2.9%	1.5%	2.6%	0.9%	1.0%	1.5%	2.0%	1.5%	2.4%
Entertainment	0.4%	1.6%	1.1%	1.5%	1.4%	1.7%	1.6%	1.3%	2.0%	1.2%	1.0%	1.3%	0.4%	1.4%	2.9%	0.6%	0.4%	0.0%	2.0%	1.4%	1.3%	0.3%	0.7%	1.0%	1.7%	1.6%	2.9%
Media and publishing	1.9%	2.2%	2.1%	1.9%	2.4%	3.0%	3.1%	2.9%	2.6%	2.3%	2.7%	2.2%	2.6%	2.7%	3.3%	2.5%	2.1%	3.7%	4.3%	2.1%	3.1%	1.5%	1.5%	2.6%	2.4%	2.9%	3.6%
Museums and preservation of historical sites and buildings	0.0%	0.3%	0.4%	0.4%	0.7%	0.6%	0.1%	0.0%	0.4%	0.2%	0.4%	0.9%	0.0%	0.1%	1.6%	0.0%	0.0%	0.0%	0.9%	1.0%	0.1%	0.0%	0.0%	0.9%	0.5%	0.1%	0.9%
Printing and publishing	1.7%	1.8%	1.4%	1.7%	1.7%	2.6%	2.8%	3.0%	1.8%	2.2%	2.5%	1.7%	2.6%	1.8%	2.2%	2.4%	2.4%	5.1%	4.1%	1.6%	1.9%	1.5%	1.4%	2.2%	1.9%	2.6%	3.0%
Radio and television	0.8%	0.9%	0.9%	1.6%	0.6%	1.2%	0.7%	1.0%	1.0%	0.7%	1.0%	0.6%	1.3%	0.7%	0.7%	0.3%	1.0%	0.0%	0.6%	0.5%	0.5%	0.9%	0.3%	0.9%	1.0%	0.9%	1.1%
Retail and distribution	0.7%	0.4%	0.6%	0.6%	0.6%	0.5%	0.8%	0.4%	0.4%	0.5%	1.2%	0.4%	1.1%	0.8%	0.8%	0.8%	0.7%	0.0%	0.9%	0.3%	0.8%	0.6%	0.4%	0.4%	0.6%	0.4%	1.0%
Software	1.6%	1.5%	0.8%	1.5%	0.7%	2.9%	2.2%	3.2%	1.2%	1.8%	0.3%	1.0%	2.4%	1.7%	1.7%	1.4%	3.2%	0.0%	2.2%	0.9%	0.7%	1.7%	0.8%	1.1%	1.2%	3.8%	2.1%
Knowledge-intensive business services	**23.1%**	**35.3%**	**16.8%**	**20.8%**	**16.3%**	**29.4%**	**14.2%**	**24.8%**	**36.4%**	**29.7%**	**17.7%**	**25.9%**	**24.2%**	**18.7%**	**22.1%**	**9.3%**	**27.4%**	**10.0%**	**30.6%**	**22.5%**	**13.9%**	**11.6%**	**12.9%**	**22.5%**	**19.8%**	**26.4%**	**37.8%**
Business services	10.1%	14.7%	3.2%	3.3%	2.8%	7.4%	6.3%	9.6%	14.5%	11.4%	4.2%	7.9%	12.9%	7.8%	2.9%	4.3%	20.6%	0.0%	10.2%	3.4%	10.9%	5.2%	5.6%	5.9%	7.2%	11.8%	15.2%
Education and knowledge creation	0.6%	5.5%	4.1%	2.9%	3.2%	6.0%	0.6%	1.0%	5.8%	3.8%	3.2%	6.1%	1.2%	0.6%	8.3%	0.9%	0.7%	0.0%	6.1%	7.4%	0.9%	1.0%	1.2%	5.5%	3.5%	1.4%	7.9%
Financial services	8.0%	10.7%	5.7%	10.8%	4.8%	10.0%	0.0%	5.9%	11.8%	9.4%	7.7%	5.4%	0.0%	5.9%	7.0%	0.0%	0.0%	0.0%	9.3%	8.1%	0.0%	0.0%	0.0%	7.1%	6.4%	6.1%	9.5%
IT	2.2%	1.9%	1.1%	1.6%	2.0%	3.3%	3.5%	3.7%	1.8%	3.1%	0.3%	2.7%	6.4%	2.3%	1.8%	1.6%	3.3%	6.9%	2.6%	1.5%	0.9%	2.4%	2.5%	2.0%	1.4%	4.2%	2.5%
Telecom	2.2%	2.5%	2.6%	2.3%	3.5%	2.7%	3.7%	4.7%	2.4%	2.0%	2.2%	3.9%	3.7%	2.2%	2.0%	2.5%	2.7%	3.1%	2.5%	2.1%	1.2%	2.9%	3.6%	2.1%	1.2%	2.9%	2.8%
Labour-intense industries	**34.1%**	**29.2%**	**37.0%**	**32.8%**	**43.3%**	**26.3%**	**36.5%**	**36.6%**	**26.5%**	**36.1%**	**41.1%**	**37.2%**	**24.0%**	**35.9%**	**25.6%**	**37.7%**	**36.1%**	**38.9%**	**26.0%**	**38.0%**	**36.7%**	**40.0%**	**44.2%**	**40.0%**	**41.1%**	**35.3%**	**20.0%**
Agricultural products	0.6%	0.8%	1.7%	0.8%	1.1%	1.2%	1.2%	0.6%	1.1%	1.2%	4.6%	1.2%	0.6%	0.7%	0.7%	0.7%	1.1%	1.4%	2.7%	0.8%	1.1%	0.9%	0.6%	0.4%	3.0%	0.6%	0.3%
Automotive	2.5%	3.7%	0.6%	0.4%	5.5%	0.7%	2.0%	1.2%	3.2%	6.2%	0.2%	4.6%	1.0%	2.6%	0.5%	0.6%	2.5%	2.8%	1.0%	4.2%	1.9%	3.8%	8.2%	3.3%	2.3%	4.6%	2.0%
Construction	9.2%	7.7%	11.3%	17.2%	11.1%	6.1%	13.8%	11.7%	5.3%	5.1%	12.9%	6.3%	7.5%	11.4%	10.0%	15.7%	17.0%	18.2%	7.8%	9.5%	18.8%	14.7%	9.7%	10.8%	18.5%	9.9%	6.2%
Construction materials	0.4%	0.3%	0.5%	0.5%	0.6%	0.2%	0.8%	0.3%	0.3%	0.3%	0.6%	0.5%	0.3%	1.2%	0.7%	1.0%	0.2%	0.9%	0.1%	0.6%	1.3%	0.3%	0.4%	0.4%	0.9%	0.3%	0.2%
Farming and animal husbandry	0.1%	0.7%	4.0%	3.5%	1.7%	2.8%	2.6%	3.8%	1.1%	0.7%	8.8%	4.3%	0.1%	0.0%	1.9%	0.0%	0.0%	0.0%	3.2%	0.6%	0.1%	0.0%	0.0%	0.5%	3.9%	1.1%	0.2%
Heavy Machinery	1.4%	1.2%	1.2%	0.2%	1.5%	1.3%	0.9%	1.6%	0.9%	1.5%	0.4%	2.9%	0.6%	1.3%	0.7%	0.9%	0.2%	0.9%	0.5%	1.6%	0.7%	3.6%	2.6%	1.8%	0.7%	1.6%	0.6%
Metal manufacturing	5.8%	4.3%	4.3%	0.8%	8.9%	3.2%	2.6%	5.3%	3.9%	6.8%	1.9%	4.3%	1.9%	6.6%	2.1%	2.5%	3.6%	1.5%	1.7%	5.0%	3.4%	4.0%	8.8%	10.8%	3.2%	6.5%	3.2%
Paper products	2.9%	1.5%	1.8%	3.0%	2.9%	1.7%	4.1%	4.8%	1.5%	1.7%	1.9%	1.9%	1.6%	2.1%	1.5%	2.8%	1.0%	2.8%	1.5%	2.6%	1.6%	1.5%	2.1%	2.8%	1.5%	3.6%	1.3%
Plastics	1.1%	1.4%	0.6%	0.3%	1.0%	1.1%	1.0%	0.8%	1.0%	1.8%	0.4%	1.8%	0.7%	1.4%	0.4%	0.7%	1.2%	1.2%	0.9%	1.5%	1.0%	0.7%	2.4%	2.0%	0.9%	0.9%	1.0%
Processed food	7.2%	6.0%	8.9%	6.0%	6.5%	5.9%	6.7%	4.0%	6.9%	5.5%	7.2%	7.8%	8.4%	5.6%	6.6%	12.2%	7.5%	8.7%	4.9%	10.2%	6.1%	8.9%	6.5%	5.1%	4.7%	4.0%	4.1%
Production technology	3.0%	1.4%	1.6%	0.1%	2.5%	2.1%	1.0%	2.3%	1.1%	5.0%	0.6%	1.5%	1.3%	3.0%	0.6%	0.6%	1.5%	0.5%	1.2%	1.3%	0.7%	1.4%	2.9%	2.1%	1.0%	2.3%	1.0%
Tobacco	0.0%	0.1%	0.5%	0.1%	0.1%	0.0%	0.0%	0.2%	0.0%	0.1%	1.6%	0.1%	0.1%	0.0%	0.0%	0.0%	0.2%	0.1%	0.5%	0.2%	0.0%	0.1%	0.1%	0.0%	0.6%	0.0%	0.0%
Life science	**1.9%**	**2.2%**	**1.1%**	**0.9%**	**1.3%**	**3.5%**	**0.8%**	**1.1%**	**2.2%**	**2.7%**	**1.5%**	**2.3%**	**7.7%**	**1.9%**	**1.0%**	**1.0%**	**1.9%**	**3.1%**	**1.2%**	**1.4%**	**0.7%**	**0.8%**	**1.1%**	**2.2%**	**1.0%**	**1.3%**	**1.2%**
Biotech	0.2%	0.1%	0.1%	0.0%	0.2%	0.2%	0.1%	0.0%	0.1%	0.2%	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%	0.1%	0.0%	0.2%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%	0.2%
Medical devices	0.8%	0.3%	0.2%	0.1%	0.5%	0.9%	0.5%	0.5%	0.6%	1.4%	0.4%	0.8%	4.0%	0.9%	0.2%	0.8%	0.5%	1.9%	0.4%	0.4%	0.3%	0.2%	0.6%	0.4%	0.2%	0.8%	0.4%
Pharmaceuticals	0.9%	1.8%	0.8%	0.7%	0.7%	2.3%	0.2%	0.6%	1.5%	1.2%	1.1%	1.5%	3.6%	1.0%	0.8%	0.2%	1.4%	1.2%	0.7%	1.0%	0.4%	0.5%	0.5%	1.7%	0.7%	0.4%	0.6%
Other	**11.1%**	**10.1%**	**19.9%**	**6.3%**	**17.7%**	**10.0%**	**20.2%**	**8.7%**	**8.3%**	**9.7%**	**12.2%**	**11.1%**	**8.7%**	**15.7%**	**13.7%**	**23.2%**	**7.9%**	**28.5%**	**10.1%**	**16.6%**	**21.1%**	**23.5%**	**19.0%**	**13.3%**	**9.6%**	**7.5%**	**7.5%**
Aerospace	0.1%	0.4%	0.1%	0.0%	0.2%	0.3%	0.0%	0.1%	1.2%	0.6%	0.2%	0.0%	0.6%	0.4%	0.0%	0.1%	0.0%	0.1%	0.2%	0.4%	0.1%	0.2%	0.3%	0.0%	0.2%	0.1%	0.8%
Apparel	0.5%	0.5%	7.6%	0.7%	1.5%	0.2%	3.3%	0.3%	0.5%	0.4%	2.6%	1.2%	0.2%	3.0%	2.4%	4.7%	1.6%	9.6%	0.2%	2.3%	6.2%	6.8%	2.5%	1.4%	1.1%	0.1%	0.5%
Building fixtures, equipment and services	2.8%	2.4%	2.7%	2.7%	5.1%	3.8%	3.7%	2.9%	1.8%	2.3%	2.4%	3.3%	2.9%	3.1%	3.6%	5.6%	2.5%	3.4%	2.0%	4.9%	3.7%	3.9%	5.0%	3.1%	2.7%	2.8%	1.9%
Chemical products	0.9%	2.2%	0.9%	0.2%	1.4%	1.2%	0.7%	1.1%	1.0%	1.6%	0.7%	0.5%	1.1%	1.1%	0.7%	0.5%	0.7%	1.1%	1.5%	1.0%	0.5%	0.9%	1.3%	1.6%	0.7%	0.8%	0.8%
Footwear	0.1%	0.0%	1.3%	0.1%	0.3%	0.0%	0.4%	0.2%	0.1%	0.1%	0.3%	0.5%	0.0%	1.0%	0.0%	0.2%	0.0%	1.5%	0.0%	0.4%	2.5%	2.7%	1.6%	0.4%	0.4%	0.0%	0.0%
Furniture	2.2%	0.7%	1.6%	1.1%	1.7%	0.9%	4.2%	1.0%	0.4%	0.6%	1.4%	1.0%	1.1%	1.7%	2.3%	5.4%	0.2%	3.9%	0.5%	3.0%	1.9%	3.1%	2.2%	1.5%	1.1%	0.6%	0.6%
Instruments	0.4%	0.2%	0.2%	0.0%	0.3%	0.9%	0.3%	0.3%	0.6%	1.0%	0.0%	0.3%	0.2%	0.2%	0.1%	0.2%	0.6%	0.7%	0.2%	0.2%	0.0%	0.3%	0.5%	0.4%	0.1%	0.7%	0.6%
Jewellery and precious metals	0.1%	0.1%	0.1%	0.3%	0.2%	0.1%	0.2%	0.1%	0.1%	0.1%	0.4%	0.1%	0.3%	0.5%	0.0%	0.2%	0.0%	0.4%	0.7%	0.1%	0.3%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Leather products	0.1%	0.1%	0.3%	0.1%	0.2%	0.0%	0.2%	0.1%	0.2%	0.1%	0.4%	0.3%	0.0%	0.4%	0.1%	0.1%	0.0%	0.5%	0.0%	0.2%	0.2%	0.4%	0.4%	0.6%	0.1%	0.0%	0.0%
Lighting and electrical equipment	0.9%	0.6%	0.4%	0.1%	1.0%	0.4%	0.7%	0.5%	0.6%	0.6%	0.3%	0.7%	0.4%	0.5%	0.1%	0.4%	0.5%	1.3%	0.1%	0.7%	0.3%	0.5%	1.2%	0.8%	0.3%	0.7%	0.5%
Maritime	0.1%	0.3%	0.4%	0.5%	0.8%	0.7%	1.7%	0.6%	0.5%	0.3%	1.5%	0.3%	0.6%	0.5%	2.2%	2.2%	0.1%	1.0%	0.5%	0.9%	1.8%	0.2%	0.4%	0.3%	1.4%	0.5%	0.4%
Oil and gas	0.3%	0.2%	0.1%	0.0%	0.8%	0.6%	0.8%	0.2%	0.2%	0.3%	0.5%	0.5%	0.1%	0.2%	0.1%	0.1%	0.1%	0.4%	1.1%	0.6%	0.1%	1.1%	0.7%	0.0%	0.0%	0.2%	0.1%
Power generation and transmission	1.1%	0.2%	0.4%	0.0%	0.7%	0.4%	1.2%	0.7%	0.2%	0.6%	0.1%	0.6%	0.1%	0.3%	0.3%	0.1%	0.7%	0.2%	0.1%	0.3%	0.2%	0.4%	1.0%	1.3%	0.3%	0.3%	0.2%
Sporting, recreational and childrenâ€™s goods	0.5%	0.1%	0.4%	0.0%	0.6%	0.1%	0.1%	0.2%	0.1%	0.2%	0.0%	0.3%	0.1%	0.4%	0.2%	0.1%	0.0%	2.1%	2.5%	0.2%	0.1%	0.2%	0.2%	0.2%	0.1%	0.2%	0.1%
Stone quarries	0.0%	0.2%	0.1%	0.1%	0.2%	0.0%	0.1%	0.1%	0.1%	0.1%	0.3%	0.1%	0.3%	0.1%	0.0%	0.0%	0.1%	0.3%	0.0%	0.2%	0.4%	0.2%	0.2%	0.1%	0.1%	0.0%	0.1%
Textiles	0.9%	2.0%	3.4%	0.4%	2.6%	0.5%	2.7%	0.5%	0.7%	0.7%	1.1%	1.4%	0.6%	2.0%	1.5%	3.2%	0.9%	2.1%	0.4%	1.2%	2.8%	2.6%	1.4%	1.4%	0.7%	0.4%	0.6%
Tourism & Hospitality	**9.5%**	**2.3%**	**5.0%**	**14.1%**	**2.9%**	**2.8%**	**3.4%**	**3.8%**	**3.7%**	**3.2%**	**5.2%**	**2.4%**	**9.6%**	**4.3%**	**3.8%**	**2.8%**	**3.9%**	**0.0%**	**3.3%**	**1.9%**	**4.8%**	**3.2%**	**3.8%**	**3.9%**	**6.1%**	**3.8%**	**5.2%**
Tourism and hospitality	9.5%	2.3%	5.0%	14.1%	2.9%	2.8%	3.4%	3.8%	3.7%	3.2%	5.2%	2.4%	9.6%	4.3%	3.8%	2.8%	3.9%	0.0%	3.3%	1.9%	4.8%	3.2%	3.8%	3.9%	6.1%	3.8%	5.2%
Transport & distribution	**9.5%**	**10.7%**	**11.1%**	**13.0%**	**7.7%**	**12.8%**	**11.5%**	**10.6%**	**10.7%**	**7.6%**	**10.5%**	**11.3%**	**12.2%**	**11.3%**	**16.2%**	**15.2%**	**9.9%**	**10.7%**	**9.6%**	**9.4%**	**11.1%**	**12.4%**	**11.8%**	**6.9%**	**9.7%**	**10.2%**	**10.7%**
Distribution	3.4%	3.6%	4.1%	5.2%	2.0%	4.4%	2.9%	2.0%	2.9%	2.4%	2.9%	2.5%	4.8%	3.7%	3.8%	5.1%	2.9%	0.0%	1.8%	2.7%	4.9%	3.9%	2.6%	2.1%	4.8%	3.5%	2.9%
Transportation and logistics	6.1%	7.1%	7.0%	7.8%	5.7%	8.4%	8.6%	8.5%	7.8%	5.2%	7.6%	8.7%	7.3%	7.6%	12.4%	10.1%	7.0%	10.7%	7.8%	6.7%	6.2%	8.5%	9.3%	4.8%	4.9%	6.8%	7.8%

Source: Deloitte, based on Clusterobeservatory.eu (2011)

Business function classification

Figure 22 – Business function classification based on value chain framework of Michael Porter



Definitions:

- **Inbound logistics**: receiving, storing, and inventory control.
- **Production**: all value-creating activities that transform the inputs into the final product.
- **Outbound logistics**: activities required to get the finished product to the customers: warehousing, order fulfilment, transportation and distribution management.
- **Marketing & Sales**: activities associated with getting the buyer to purchase the product including channel selection, advertising, promotion selling, pricing, retail management, etc.
- **Customer services**: activities that maintain and enhance the product's value, including customer support, repair services, spare parts management, etc.
- **Firm infrastructure**: includes general management, legal, finance, accounting, public affairs, IT infrastructure, etc.
- **HR**: activities associated with recruiting, development (training), retention and compensation.
- **Research & Development:** innovation - includes technology development to support the value chain activities, process automation, design, redesign, etc.
- **Procurement**: procurement of raw materials, servicing, spare parts, buildings, machines, etc.

Digitisation Index

The Industry Digitisation Index is derived from Eurostat and its 2011–15 information society benchmarking framework. Amongst other elements, the program captures data on how many companies (of the total number of companies with 10 or more employees) use or have deployed various elements of digital infrastructure, tools, platforms, and management capabilities and policies.

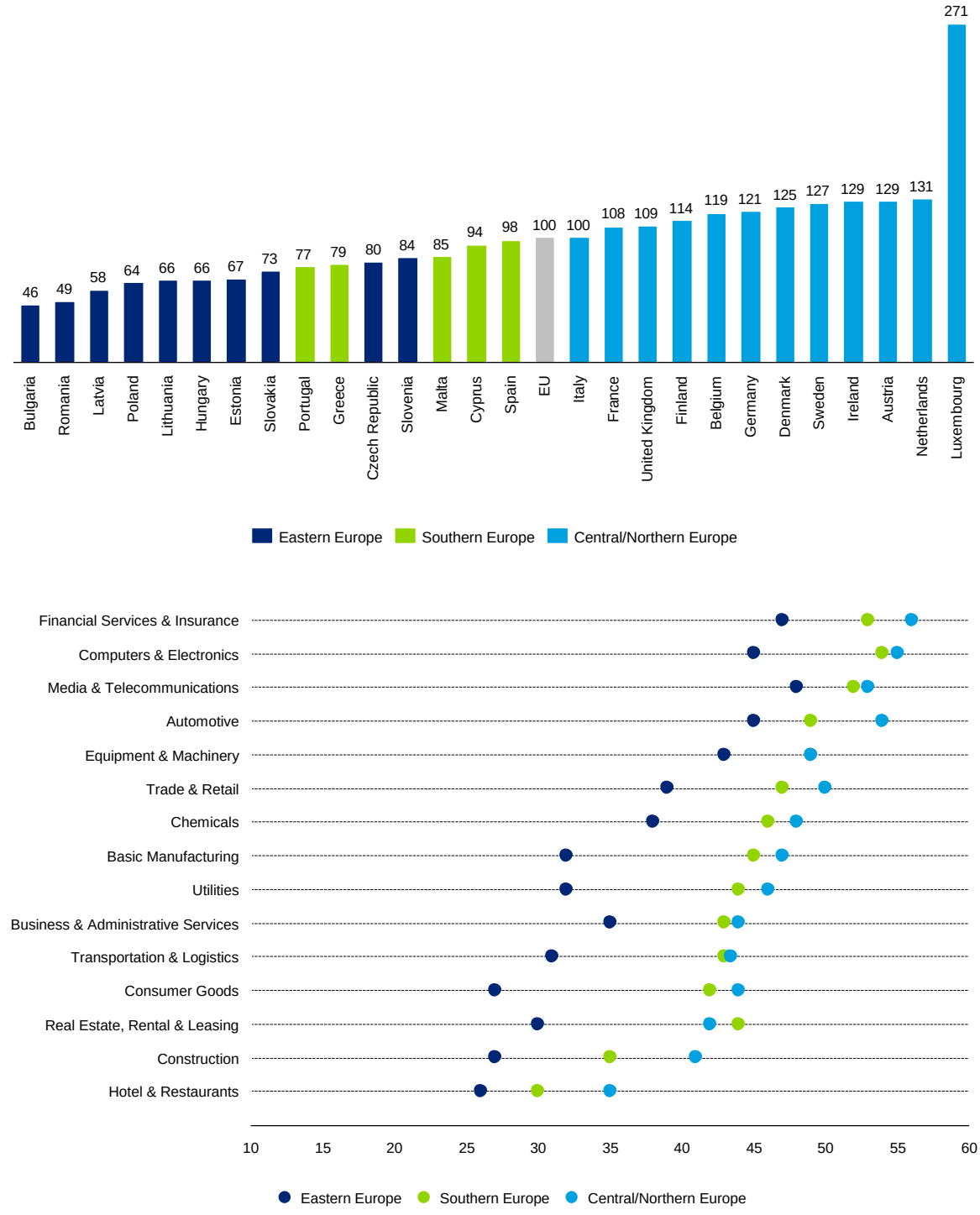
In creating this index, Booz & Company divided the data into four separate factors, each of which is defined by several sub-factors and components.

1. **Digital input**: the extent of digital processes in the procurement stage of the business, including data points regarding the use of computer networks as well as electronic transmissions suitable for automatic order processing;
2. **Digital processing**: the degree to which processes are integrated, both internally and with external partners. The internal integration sub-factors include data points regarding the existence and use of digital technologies such as enterprise resource planning and customer relationship management, as well as data points regarding the use and purpose of internal information sharing with different organisational functions like accounting, inventory management, and production and services management. External integration comprises such activities as electronic data interchange, including the electronic transmission of data with business partners, public authorities, and financial institutions, as well as activities like supply chain management, which includes the use of electronic data transmissions to and from business partners both upstream and downstream;
3. **Digital output**: the importance of digital processes in the sales function, including the use of computer networks as well as electronic transmission of data suitable for automatic sales processing;
4. **Infrastructure**: the sophistication of the underlying IT technology, focusing on the presence and use of computers and computer networks (wired and wireless) as well as the presence and type of connection to the Internet.

The overall index has been constructed by aggregating the results of the data collected for each factor within each industry.

GDP per capita

Figure 23 – GDP per capita in PPS versus digitisation index



Source: Booz & Company (2011). Measuring Industry Digitisation - Leaders and Laggards in the Digital Economy & Eurostat (2011); Deloitte analysis

Benchmarking analysis

Please *double click* on the Figure below to access the benchmarking report, identifying and assessing digital and entrepreneurial policies and schemes across five countries, regions or cities.