

Digital

Transformation of European
Industry and Enterprises

A **report** of the
Strategic Policy Forum
on Digital Entrepreneurship



A Forum established by DG
Internal Market, Industry,
Entrepreneurship and SMEs



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Foreword

Sir Robert Peel became the British Prime Minister in 1841. He accepted that Britain was destined to become an industrial nation: he thought that one “might on moral and social grounds prefer cornfields to cotton factories [but] our lot is cast and we cannot recede”⁰. Europe’s leaders might think something similar today about our digital future and I would agree. The Forum’s stance has been to think hard about what Europe can do to take maximum advantage from the opportunities presented by a new wave of digital technologies and to see how that advantage can be used to create good jobs (not in cotton mills), bring economic benefit and help create a better society.

It has been my privilege and pleasure to lead the work of the Strategic Policy Forum on Digital Entrepreneurship. There’s probably a recipe for successful stakeholder groups. This one definitely had the right ingredients; excellent leadership from supportive and enthusiastic Vice-Presidents, committed high-level engagement from the Commission with diligent, high-quality support from them at a working level; excellent staff support from our consultants, EY and last, but by no means least, hard-working and committed members of both the Forum and the Member States Board.

The task ahead of us is to discuss and improve the ideas in the report and then work hard to get these ideas implemented. I hope you like the report and will help us ensure it translates to actions and benefits.

John Higgins



John Higgins

President of the Strategic Policy Forum
Director General DIGITALEUROPE

THE BENEFITS FOR EUROPE OF DIGITAL TRANSFORMATION

ENORMOUS GROWTH POTENTIAL

Companies making use of a newly available set of accelerating technologies are performing **10x better** 10 times better than their peers

THE POTENTIAL FROM THE CREATION OF THE DIGITAL SINGLE MARKET

+6% of GDP from a fully realised DSM

+3.8m The DSM could create 3.8m jobs and reduce the cost of public administration by 15-20%

400,000 to **1.5 million** new jobs

Number of new jobs the EU could create in the internet economy

unexploited potential

THE TRANSFORMATIVE POWER OF DIGITAL

Digital technologies are fundamentally **changing** the way people live, work, communicate and play

Big data technology and services are expected to grow worldwide to **USD 16.9 billion** in 2015 at a compound **annual growth rate of 40%**. Companies using that data become **5-6% more productive**.

EU BUSINESSES ARE LAGGING BEHIND

! EU businesses are **missing out** on the chance to grow by not taking full advantage of digital technologies

Small European businesses are slow to change

only **14%** of SMEs use the internet as a **sales channel**



41% **non digital** 41% of EU companies still haven't adopted any of the new advanced digital technologies



Jobs destroyed and created



54% of the **workforce** affected

Technological advances could threaten **54% of our workforce** across EU28 over the coming decades

In France, the internet destroyed 500,000 jobs in the last 15 years but also created **1.2 million** new ones

In Germany, SMEs could create 670,000 new jobs by using technology effectively

2.6 new jobs were created for every job destroyed



DIGITALISATION OF INDUSTRY



European manufacturing can achieve growth from **15%** to **20%** by 2030 if digitalised



Revenue coming from digital technologies in creative industries will grow from **47%** in 2013 to **57%** in 2015



90% of all interactions in healthcare in the UK are face-to-face – a 1% reduction would save up to £200 m



E-learning market will grow by a factor of 15 over the next 10 years and reach **30%** of the total education market

Executive Summary

In February 2014, the European Commission established an expert group – the Strategic Policy Forum on Digital Entrepreneurship (the Forum) - supported by a Member States Board (MSB). The Forum focused on what we see as the biggest digital opportunity for Europe; the transformation of our existing industry and enterprises. Three-quarters of the value of the digital economy will come from increased productivity, competitiveness and therefore job-creating ability of Europe's existing industry and enterprises, including social enterprises¹. We were keen to ensure that our recommendations would accelerate the development of new technology-rich businesses, enterprises and public services too.

Nobody can be under any illusion that Europe needs more jobs, especially for its young people. It's no panacea, but the transformational opportunities that a second wave of advanced digital technologies presents can be a significant part of the solution. This second wave includes advanced mobile communication, social media, cloud, big data analytics, smart devices, connected objects and sensors. Organisations are using these technologies to scale up at unimaginable rates and performing 10 times better than their peers. This is the biggest transformation in business the world has seen in over a century². The report describes the untapped potential – it really is enormous. They can add social value and increase democratic participation too.

European businesses are not transforming quickly enough. Despite the obvious benefits, European businesses, especially smaller ones, are slow to change. The Forum has examined why this is and, while recognising variations across business sectors and the Member States, diagnosed problems in leadership, trust, skills & support and policy & regulation. The report explains our findings and makes thirteen recommendations covering these four areas.

Leadership and collaboration

Successful digital transformation isn't bolted on to an existing business. It must be an integral part of change in business processes, organisational structures, the workforce and perhaps even the culture. Leaders of such change need confidence and know-how. There are not enough societal signals that digital transformation is important and to be encouraged. In fact the vast majority of the political dialogue in Europe focuses on the negative aspects and the risks.

People learn from their peers. That's why business networks are increasingly valuable in times of change. Many new networks have been established for young innovative companies and there are many long-standing networks for existing businesses too. But to a large extent they exist in parallel and there has been limited opportunity for cross-fertilisation of ideas between these two worlds of old and new businesses. This is a missed opportunity; existing businesses are a rich source of business for the new innovative companies and the two different types of companies have a lot to learn from each other.

Effort has been focused and money spent on many hundreds of different initiatives across Europe to support digital initiatives but little common learning has been extracted and not much value derived from potential synergies. The support that the smart city movement could bring has been underexploited.

Trust

So much has been said about the risks of fraud, theft and spying on personal data that it's a wonder anybody in Europe remains online – yet they do – and in increasing numbers. The Forum has diagnosed a different but related concern that appears to be a brake on businesses undertaking the digital transformation journey. It's the concern about loss of revenues and control if the commercial opportunity moves from the business itself to some other organisation that controls the data platform the business is planning to use.

Skills and support

Lack of financial and practical support for digital transformation from public authorities and others has two distinct effects on Europe's progress. It has the practical effect of making digital transformation harder for the business leader and secondly sends a strong signal to the community that it's not important, not a priority for Europe.

If, despite this and the many other hurdles, we are successful in encouraging more business leaders to make the change then we will increase the demand even further for digital leadership, skills already in very short supply in Europe. We will also add to the demand for specialist skills in short supply too; big data analysts and cyber security specialists to name but two.

Policy and regulation

The Commission has made completion of the Digital Single Market one of its highest priorities. That is excellent news. The Forum predicts, however, that this will only increase the challenges that policy makers are already facing; identifying and dealing with existing policies and regulation whose benefits are outweighed by the barriers they create to digital transformation; coping with the stresses and strains that new paradigms like the digitally-enabled sharing economy are having on the existing order; and knowing whether new proposed regulations are properly designed to cope with the digital European future.

Recommendations













The table on the next page sets out thirteen recommendations for political and business leaders designed to address the problems we have diagnosed in these four areas. We look forward to discussing, improving and then helping implement these recommendations; we're confident they can help Europe deal with the jobs and growth imperative. The report brings these issues to life with examples from four sectors; manufacturing, creative industries, health and education. Although all sectors of the economy and society are impacted by advanced digital technologies, exploring these four in some depth has allowed the forum to further develop and test our ideas.



Europe and its companies cannot afford to miss the opportunities offered by a fast growing digital economy. For this to happen, we need a strong Digital Single Market to overcome the fragmentation of the internal market and divergent national regimes. It is time to unlock the growth that this economy could generate. This is a clear priority for the European Commission.

Elżbieta Bieńkowska
Commissioner Internal Market, Industry, Entrepreneurship and SMEs - DG GROWTH

Figure 1: Summary of the policy recommendations and problems, challenges and risks addressed

OUR RECOMMENDATIONS	THE PROBLEMS, CHALLENGES, AND RISKS ADDRESSED
Leadership and collaboration	
1. Demonstrate inspirational political leadership; set national digital transformation targets	 Crisis of confidence Insufficient business and political leadership Doubt and fear of the risks among business leaders
2. Establish new centres of digital transformation excellence 3. Establish a pan-European network of such centres and from the shared experience develop a European blueprint	 Failure to maximise the benefits of, and share best practice arising from over 1000 separate European initiatives
Build trust	
4. Establish a dialogue between European businesses and technology platform providers	 Insufficient trust in European industry’s ability to retain commercial ownership of its industrial and commercial data
5. Reinforce high quality, available, and accessible cross sector standards	 Potential for many competing and fragmented standards for industrial data
Better and more skills and support	
6. Re-focus funds and programmes to better support digital transformation	 Insufficient practical support and incentive for digital transformation
7. Promote the importance of digital leadership	 Inadequate digital leadership in transforming organisations
8. Make digital part of the educational mainstream	 Supply of digital leaders worsens
9. Increase the supply of new, highly specialised skills	 Supply of specialist skills worsens
Make better policy, rules and regulations	
10. Establish a permanent observatory to catalogue policy and regulatory impacts on digital transformation	 Planned and current laws and regulations inadvertently hold back digital transformation and the realisation of the benefits
11. Put politicians, regulators and officials through digital boot camps	 Politicians, regulators and officials make poor laws because they have an insufficient understanding of digital technologies and trends
12. Examine new policy through a digital lens: the digital test	 Politicians and their officials make laws that inadvertently hamper digital transformation and the realisation of the benefits
13. Harness the power of e-procurement	 Failure to capitalise on the incentive for digital transformation that e-procurement would provide



Introduction

01

Background to the Forum

In February 2014, the European Commission established the Strategic Policy Forum on Digital Entrepreneurship (the Forum) comprising leaders from business, academia, international organisations, civil society and the public sector. The Forum's work was supported by a Member States Board (MSB) of officials leading digital transformation programmes and policy, nationally and locally. The Forum has particularly appreciated the opportunity to "road-test" our ideas with the MSB, has incorporated a number of their very useful contributions and refined our proposals as a result. A full list of members of the Forum and the MSB can be found at the end of this document. The Forum met physically in Brussels four times in 2014, commissioned extensive desk research, held many workshops and worked together virtually and physically in smaller groups throughout the year.

This document sets out the Forum's vision and plan to accelerate the digital transformation of Europe.



The Strategic Policy Forum on Digital Entrepreneurship

A clear focus on digital transformation of existing industry and enterprises

The Forum has developed a vision, and publishes this plan to accelerate the digital transformation of European industry, and enterprises in all sectors of the economy, and create new business opportunities in Europe. It also provides a place to hold a continuing, informed dialogue about this transformation. The Forum decided to focus initially on digital transformation of existing industry and enterprises for two main reasons: first, because this is where the biggest opportunities are for Europe - three-quarters of the value of the digital economy for Europe is in the potential for increased productivity, competitiveness and therefore job-creating ability of Europe's existing industry and enterprises; secondly, a deeper and more disruptive wave of digital technologies is already beginning to impact Europe and we need to be ready to take full advantage of it. Enterprises such as social businesses are an important source of employment and many harness digital technologies to support new types of business model to deliver both economic and social value. According to the European Commission, in May 2014, the EU's social economy employed more than 11 million workers, representing 4.5% of the active EU population and 10% of EU GDP. A quarter of new enterprise start-ups every year are social enterprises³. Subsequent references in this report to businesses generally includes these enterprises too.

Although we explicitly focus on digital transformation of Europe's businesses, because that's where the main opportunity lies, our plan will also bring about better use of this second wave of digital technologies in critically important public services such as health and education. Our recommendations also support the development of new technology-rich businesses, enterprises and public service models that are only possible because of this new wave of digital technologies.

Big Data

The benefits arising from the ability to gather and analyse the vast amount of data available today, often referred to as Big Data or Big Data Analytics, deserve special examination. Big data analytics and the hyper-connected environments promised by the Internet of Things are combining to empower data-driven management, reshape processes and produce even more significant benefits; wearable sensors that monitor your health, smart meters that track your energy as you use it, and cars that automatically re-plot routes to avoid traffic jams, lowering CO2 emissions. We already see many new social opportunities; from crime reduction to healthcare improvement to better environmental protection, new business models and indeed whole new businesses that depend on this new capability. This data is gathered from, among other things, social media, internet-enabled devices such as smart phones and tablets, machine and sensors, video and voice recordings. It's estimated that every single minute, the world generates 1.7 million billion bytes of data – that's equivalent to more than six megabytes of data for each person every day. Businesses that build their decision-making processes on knowledge they've gleaned from data become 5-6% more productive⁶. Big data technology and services are expected to grow worldwide to USD 16.9 billion in 2015 at a compound annual growth rate of 40% – about seven times that of the information and communications technology (ICT) market overall⁷.

Open data

11 EU Member States are in the top 20 countries in the world according to the recently published Open Data Barometer⁸. Open data is data that is made available by government, businesses and individuals for anyone to access, use and share. Open data helps government to make public services more efficient; drives innovation and economic growth by revealing opportunities for businesses and start-ups to build new services and offers citizens insights into how government works, improving public trust and boosting political engagement. This second wave of digital technologies will allow Europe to realise the full benefits of open data.

Enormous growth potential

Organisations are emerging that are able to scale up at unimaginable rates. Billed as "Exponential Organizations" in a recent publication, these companies are making use of this second wave of advanced accelerating technologies, and by doing so, are performing 10 times better than their peers. This is the biggest transformation in business the world has seen in over a century⁹. Over a short period of time, digital technologies have moved from simply allowing businesses to do what they've always done, but more efficiently and effectively, to enabling businesses to completely

change not only what they are doing, but also the business models they use to create value.

The untapped potential here really is enormous. It's estimated that European SMEs grow two to three times faster when they embrace digital technologies¹⁰. A recent study in France showed that the most digitally mature companies have experienced growth 6 times higher than the least mature ones. By accelerating their digital transformation, French companies can double their revenue growth rates¹¹. Despite economic development fluctuations, the impact and importance of the digitalisation process in Sweden has increased in the economy. New calculations by Growth Policy Analysis indicate that between the years 2006–2013 the ICT contribution to the Swedish economy has grown larger. During the same period the ICT-sector and the ICT-investments in the entire Swedish economy contributed 42 per cent to total productivity growth¹².

Even just engaging with customers online seems to create growth: figures have shown that SMEs from many countries, such as Germany and France, that have engaged actively with consumers on the internet have experienced sales growth rates that are up to 22 percentage points higher over three years than those companies with low or no internet presence¹³. So, by not taking full advantage of digital technologies, EU businesses are missing out on the chance to grow, as well as to create jobs: it's estimated that by mirroring the equivalent performance of the USA or the best-performing EU countries, the EU could create 400,000 to 1.5 million new jobs in the internet economy¹⁴.

Adding social value

Social value as well as economic value derives from these advanced digital technologies. Digital is becoming an increasingly relevant tool for social entrepreneurs, who use technology-driven solutions to solve problems in key areas such as the health and well-being of an ageing population, through assisted-living and health-monitoring solutions; the education and employability of young people by creating new ways to access to education resources, or new, technology-enabled marketplaces for job-hunters); and environmental sustainability through smart meters for reducing energy consumption, innovative and sustainable production systems to improve resource use and increase recycling.

Finally, some of the most visible effects have been the new ways in which people can interact with each other; this is opening new forms of political and civic action, helping people reconnect with decision-makers and building much greater levels of democratic participation.

1.2 EU businesses are lagging behind

Slow and uneven progress

Despite the obvious benefits we spell out above, small European businesses are slow to change. While 47% of EU citizens shop online, a mere 14% of SMEs use the internet as a sales channel¹⁵. The use of this second wave of digital technologies is even slower; over 41% of EU companies still haven't adopted any of a set of four advanced technologies (mobile, social media, cloud computing and big data), while a tiny 1.7% make full use of all four¹⁶. These figures mask considerable variation across the EU; while 26.8% in the UK are yet to adopt these four technologies, in Italy the number is a worryingly high 52.3%.

Progress is uneven across sectors and company size: the smaller the company, the lower the use of the latest digital technologies. Fewer than 7% of European SMEs have adopted big data solutions to improve their business processes, and the situation is only slightly better when it comes to using other technologies. Of EU companies of between 10 and 250 employees, 28.5% use social media technologies, and only 25.7% use cloud solutions, even though cloud services are an ideal way for SMEs to access digital technologies without a capital outlay. Even when they do use such services it's often limited to basic solutions, such as email and storage capacity on demand¹⁷.

It's undeniable that EU businesses need to transform to compete, grow and create jobs. It's also clear that Europe's small businesses are lagging behind. We need to understand why this might be.

Jobs destroyed and created

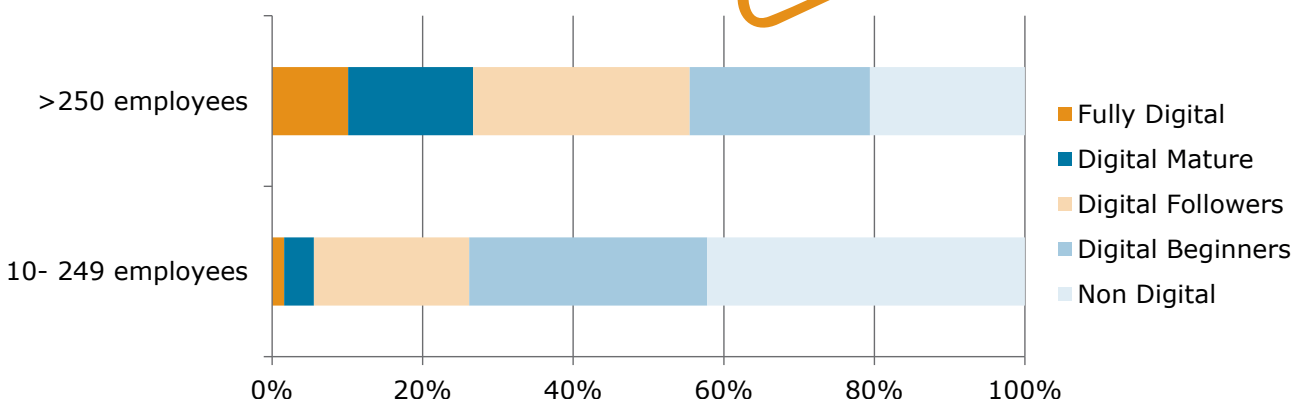
In France, a detailed analysis of its economy showed that while the internet had destroyed 500,000 jobs over the last 15 years, it had also created 1.2 million new ones – that's 2.4 jobs for every job lost¹⁸. Growth brings employment – in Germany alone, it's projected that SMEs could create 670,000 new jobs by using technology effectively¹⁹. A global McKinsey survey of SMEs showed that 2.6 new jobs were created by the internet economy for every job destroyed²⁰. While digital transformation will create these new, specialised jobs, it will result in job losses too. On average, technological advances could threaten 54% of our workforce across EU28 over the coming decades, with projections suggesting that northern EU countries will be less affected than their neighbours²¹. It won't just be blue-collar jobs that disappear, either. This latest second wave of the digital revolution makes it possible to automate tasks that, until recently, only people could do – because they required some thinking, or the ability to react to unexpected events. Computers and networks can now carry out these



The industry is looking at ways to make robots work more closely with human beings, so that they can actually collaborate. 300,000 to 500,000 jobs have been created due to the use of robots.

Dr. Per-Vegard Nerseeth
Group Vice-President and
Head of Robotics for ABB

Digital adaption rates by company size, 2012



Source: IDC European Vertical Markets Survey 2012

sophisticated tasks as well as those needed in low-skilled or manual work segments, putting knowledge-intensive jobs under threat for the first time. In France, for example, 3 million jobs could be lost by 2025, including ones in administrative, legal business or supervisory functions that have historically belonged to the middle classes²². Then there are the potential job losses (and the impact on the economy overall) from businesses failing because they do not keep up with the pace of change.

Challenges of change

Innovating and transforming isn't easy; embracing digital technologies means adapting processes, organisational structures and workforces to the digital world, and moving away from business as usual means taking risks and implementing new tools quickly and at scale. These are challenges that not all companies, especially the smallest ones, can successfully overcome. Many feel more comfortable with the status quo and will need a confidence boost to set out on the path to digital transformation. They need to be persuaded that the benefits of change outweigh the risks. The support and incentives to change, especially for smaller organisations, are inadequate to overcome the inherent inertia.

New skills and support needed

The new jobs created require very different skill sets from the ones destroyed. Digital is profoundly changing the labour market and the skills people need to do their jobs well; and adapting the workforce to deal with the risks and opportunities resulting from new technologies is still a key challenge. There are not enough people with the necessary digital leadership skills and competences in leadership positions in organisations. In parallel, the need is exploding for new, highly specialised skills, such as for big data analytics, cyber-security and cloud computing. The Forum is pleased to see that many Member States are focussing heavily on equipping workers with the skills they will need to be part of the workforce of a digitally transformed economy and society. Such initiatives need to become broader and deeper.



In business, it is not the strongest or the most intelligent that will survive, but the one who manages the change.

Maxence Cupper
CEO of ID weaver



It's not about technology, it's about business model innovation.

Jelle Van de Velde
General Manager of Cartamundi digital

Fears and concerns

Lack of trust in this new world is a very real concern. Consumers worry about theft and on-line fraud, and about mis-use of personal data too. While some business people see the opportunity that massive amounts of new data can bring, e.g. the eCAB mobile app in Brussels, which is an application created by a local taxi company to request, ride and pay via your mobile phone²³, others worry about loss of revenues if, for example, some other organisation that controls the data platform they are using, can gain economic advantage from "their" data.

Digital Single Market

The European Parliamentary Research Service's latest briefing on the connected Digital Single Market (DSM) notes that the European Single Market has more consumers than the US. It reports Commission findings that completing the DSM could create 3.8m jobs and reduce the cost of public administration by 15-20%²⁴. An assessment by the European Added Value Unit of the European Parliament shows potential long term gains of a fully realised DSM to be as much as 6% of GDP. The Forum supports the Commission's priorities to: a) step up the focus on the challenge of moving from 28 national markets to a single market, and b) encourage the creation of the necessary European digital infrastructure. However we recognise the difficulties. Policy makers and regulators will need a better understanding of these new technologies and their implications. They need guidelines for making rules that are fit for the digital age and they need better mechanisms to help decide what policies hinder or support digital transformation and which are the best policy instruments or tools to use to achieve each desired outcome. The evidence in the Swedish report referred to earlier concludes that ICT reaches far beyond matters close to the state, such as telecoms infrastructure and public procurement, and highlights the need to accommodate ICT in other relevant policies e.g. industrial policy, innovation policy, trade policy and research policy.

Our plan recognises these challenges and proposes actions to help overcome them.

1.3 Opportunities and challenges in different sectors

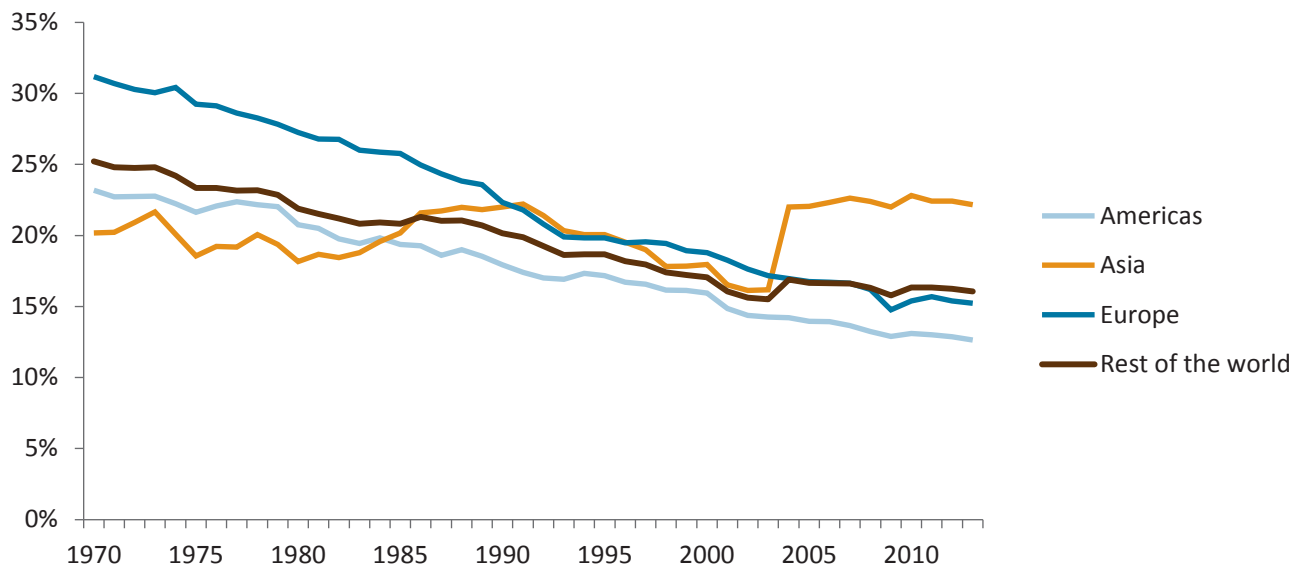
The next section sets out some of the opportunities and challenges of this second wave of digital technologies in some specific sectors. Although we recognise that all sectors will be affected, the Forum chose to focus on four sectors where the effects are both particularly relevant and serve as good examples; manufacturing, healthcare, creative industries and education. We also observe that these technologies accelerate the opportunities for synergies to occur when sectors meet; for example when creative industries and manufacturing professionals work together.

Digital technologies in manufacturing and related services



Manufacturing is one of the social and economic engines of Europe, accounting for 15% of value added (compared to 12% in the US) and playing a key role in driving research, innovation, productivity, job creation and exports. Manufacturing and services are two sides of the same coin. Although some argue that services may eventually replace manufacturing, this is unlikely as the two sectors are closely intertwined. Manufacturing creates value in the service sector (e.g. product-related services such as maintenance, business-related services such as accounting, or restaurants, hotels, etc.). 40% of jobs in the European manufacturing sector are service-related, and on average, services make up about a quarter of all inputs bought by EU industry. On the flipside, new services, e.g. in the cloud economy, are changing manufacturing and adding more value in the sector²⁵.

Share of manufacturing in value added



Source

<http://unstats.un.org/unsd/snaama/dnllist.asp>

Manufacturing generates 80% of the EU's innovations and 80% of its exports – yet the sector has lost many jobs over the last decade. And, with manufacturing in emerging markets growing at a rapid rate, Europe is facing tough competition. With the ghost of de-industrialization raising concerns around the EU, the European Commission has recognised the need for manufacturing to thrive.

According to a report by Roland Berger, European manufacturing can achieve growth from 15% to 20% (sector's share of GDP) by 2030 and by taking into account the value-added services generated by the fourth industrial revolution, widely known as Industry 4.0²⁶. The term encapsulates the dramatic changes digital technologies can bring to the world of manufacturing, and the opportunities they offer to innovate and increase output. Digital creates new production technologies, new materials and new ways of storing, processing and sharing data, and new relationships with supplier networks and customers. And it affects all processes. New manufacturing devices, such as 3D printers, are speeding up product development cycles and making new collaboration processes possible by supporting rapid prototyping and customisation, with fewer errors and enabling a faster time to market. Data gathered from customers allows manufacturers to create tailored products, while crowd-sourcing platforms engage customers as inventors or co-producers.

Plants are increasingly becoming “digital factories”. Production processes will use fully automated systems, complete with interconnected machines and devices that can communicate with each other and autonomously perform work processes along the value chain. Even the products they produce will be able to communicate with the machines and send information.

Finally, digitalisation is creating opportunities for more services-based and customer-oriented business models. In the design and production phase, manufacturers can integrate customer preferences rapidly into the manufacturing process, define increasingly sophisticated strategies for monitoring and managing how they acquire and keep customers and how satisfied those customers are.

IDC estimates on the impact of data-driven technologies in manufacturing

IDC research shows that by systematically using insights from their quality management processes, manufacturers can dramatically reduce costs, especially the cost of scrapping or reworking products: IDC estimates indicate that if the top 100 European manufacturers could get scrap and rework to zero, they'd save €160 billion. And by using advanced analytics to replace preventive maintenance systems with predictive ones, the IDC estimates that, on average, each manufacturing company could cut total equipment downtime by 50% and increase production by 20%. Operations would also benefit from advanced data gathering and analysis: if just the top 100 European manufacturers could improve production efficiency by 10%, the whole industry would theoretically gain from a consolidated €265 billion.

Finally, data-driven supply chains would have a positive effect on the current sales and operations planning (S&OP) processes of European manufacturers: by applying advanced S&OP digital tools, manufacturers could benefit from double-digit (and even triple-digit) percentage improvements to a series of fundamental supply-chain metrics, including the time it takes to respond to unforeseen events affecting orders (300% improvement); deliver orders (approximately 120% improvement), and get products to market (approximately 70% improvement).

Source:
IDC Manufacturing Insights, 2014.



Improving the quality of care: digital technologies in healthcare



The health sector faces big challenges; the European population is ageing and growing numbers have to live with chronic diseases. At the same time public finances are under pressure everywhere. Digital transformation can help enable better patient care at a lower cost.

At an individual level, patient electronic health records (EHR) make it easier to predict and anticipate patients' needs; by using the data collected from innovations like portable devices for monitoring patients' health, providers can deliver more personalised services and improve the quality of care. By mining and analysing clinical databases, healthcare analytics can help researchers and healthcare providers make analytics-based diagnoses and decisions.

Meanwhile, at a group level, healthcare providers can use health mapping and profiling to study health conditions across population groups, look for geographical and temporal trends and use that information to monitor and prevent diseases – especially contagious ones. These new opportunities offer significant benefits for society and go hand in hand with innovative businesses opportunities.

Digital technologies don't just help to prevent and cure illnesses: they can make healthcare systems more efficient, sustainable and effective, too. In the UK, for example, where 90% of all interactions in healthcare are face-to-face, the NHS has estimated that a 1% reduction in these interactions could save up to £200 million²⁷. And in 2005, a RAND Corporation study projected that rapidly

adopting health information technology would save the United States more than \$81 billion annually over a 20-year period.

The 2013 RAND analysis showed that the savings hadn't been achieved so far, in part because spending on health IT hadn't yet reached the levels needed, and because of the very low adoption rates of electronic health records. Only 27% of US hospitals are currently using these records. What's more, despite the many benefits, few healthcare providers use digital technologies for preventing, diagnosing and personalising the treatment of diseases in the US, and even fewer in Europe. This may be partly due to issues around the quality and usability of data collected through electronic medical and personal records. The IT systems that currently lead the market can't (or don't) talk to each other, meaning that clinical software isn't yet interoperable. As a result, hospitals and healthcare providers can't exchange and use each other's data, and information stored in the electronic records is useless if the patient seeks out-of-network care. The user interfaces in the different systems aren't similar enough, either, making it difficult for a clinician to move from one system to another without extensive retraining²⁸.

There is an increasing focus on improving well-being, not least because increasing preventive spend can lead to better health outcomes. Digital technologies such as mobile health apps are already making an impact and the choice and effectiveness of them is constantly increasing.

Digital technologies open up regulatory issues in the health area as well. As internet communication allows certain health related activities, such as analytics or tele radiology, to be developed outside the traditional health premises (even from home in some case, or in a different city), important issues appear regarding the terms of recognition of foreign professionals (even within the EU) working online from abroad in the health sector. And what for some health professionals and businesses is considered a threat, for others in other countries represents a big opportunity.

Finally, the healthcare sector deals with sensitive personal data, so it's critical to make sure that the data is properly protected and still find ways of allowing healthcare professionals fast access to the data when it's in the patient's best interests. To realise the full benefits of digitalisation the sector must overcome the issues around data, understand the potential of digital to clinical technology and make the shift from using digital technologies as administrative tools to delivering patient-centric and personalised healthcare.



A clearer picture of their customers: digital in the creative industries



The fast spread of digital technologies is disrupting the environment in which creative industries operate, shifting their customers' expectations and transforming the way these businesses work and make money. In a 2013 survey by EY, media & entertainment (M&E) companies anticipated that their revenue from digital technologies (mainly mobile, social, cloud and big data analytics) would grow from 47% in 2013 to 57% in 2015, making it their main source of revenue²⁹.

Advances in smart mobility, social media, cloud computing and, in particular, big data analytics are allowing creative industries to get far more detailed and nuanced insights into their customers' behaviour and preferences. Very large amounts of data are being generated automatically by, among others, social media, records from online shopping, sensors and connected objects. This data is a key tool for connecting with users, audiences or clients, changing market strategies and creating new business models, based on offering an improved range of services (such as location-based services, personalised media and targeted services that use smart data and predictive analytics).

For those creating, producing and distributing content online, digital technologies open the access to new audiences and new formats.

Innovative and participative online platforms are also emerging, which allow creative businesses to be much closer to consumers and citizens, and in some cases to make them co-participants in the creative process. By using these technologies, companies can offer the personalised, anywhere, always-on content that media customers now demand, and refine their existing product and service offerings.

To grow and use the opportunities digital opens up, creative businesses will need to continue to respond to rapid shifts in customer demand and changes in technology. That means being more agile, and taking more risks. We identified a number of pre-requisites for the creative industries to fully benefit from digital technologies:

- ✓ high-speed (fixed and mobile) broadband.
- ✓ industry leaders, especially in SMEs, need a better knowledge of finance, especially financing options.
- ✓ harmonised rules and fiscal regimes across Member States to encourage the launch of EU-wide offers.
- ✓ availability of better online payment systems, in particular mobile and micro payment systems
- ✓ skills to deal with the profoundly changes in the way companies produce and distribute creative content³⁰.



Opening up new ways to learn: digital in education



Digital technologies are dramatically changing the education sector and offering new ways to provide education and training. The rise of innovative business models and services, in areas such as life-long learning, e-learning, learning apps and gamification³¹, are offering new opportunities for organisations to reach their customers. The sector is beginning to take advantage of MOOCs (online courses aimed at unlimited participation and open access via the web), mass customisation and the fact that, education is becoming a global market. Digital technologies mean that education providers can offer more personalised, easily accessible and tailored products and services.

The market in this sector is also growing very fast, thanks to an increasing awareness of the importance of skills and competences in making people more employable. IBIS Capital and Edxus Group estimated in 2013 that the e-learning market would grow by a factor of fifteen in the next ten years, becoming 30% of the total education market³².



To make the most of the opportunities digital offers, the sector needs to rethink its business models, reconsider its relationships with its main stakeholders (students, faculty and administrators), and understand the potential of technology to transform what it does. It also needs to form strong partnerships with business to build digital learning into classrooms and curricula.

But education institutions are facing challenges. The sector moves slowly, and is resistant to changing its content, systems and methods, which prevents digital technologies from spreading rapidly.



Education and digital development are fundamental for EU businesses. I was glad to be part of the Strategic Policy Forum and bring in my experience as the CEO and Founder of a SME. The conclusions are exhaustive and accurate and will help SMEs to fully grasp the opportunities offered by digital technologies.

Filippo Berto, CEO Berto Salotti



A **plan** for digital transformation in the EU

02

We have explained why the digital transformation of its businesses, and in particular its smaller businesses, should be a high priority for the EU. There are very big benefits that can be realised and we are falling behind badly. Actions aimed at accelerating the digital transformation of our existing European businesses will also encourage the creation and growth of new businesses and help important public services benefit from advanced digital technologies too. We also discussed why businesses and the European people who lead them might be struggling with this challenge.

The EU must choose how to act

The question is, how should the EU respond? Should it be King Canute-like, and attempt to hold the tide back? Should it build defensive walls and barriers to try and protect the status quo? Or should it equip its people with the skills and resources to ride this wave, and deal with the challenges that such big changes bring? The Forum is clear: Europe needs to act positively and decisively to realise the benefits of digital transformation.

The Forum believes that the EU needs to take action now. We recognise and welcome the importance being given by President Juncker and his team to digital. The appointment of a Vice-President working in alignment with many other Commissioners to focus on the completion of a connected Digital Single Market is particularly valuable. Action at a European level makes sense. Europe has the scale and demonstrates the political ambition to address this challenge. This plan also calls for industry, social partners, academia, and policy makers at national and local levels to act on the issues in their own particular spheres of influence.

Recommendations and assumptions

The Forum's recommendations set out below start from the assumption that the new Commission will continue to focus on what we think are the basic pre-requisites for a successful digital transformation: a digital infrastructure that is fit for purpose throughout the EU and a Digital Single Market with harmonised regulation in important areas such as the protection of personal data, consumer protection, contract law, copyright and tax. This is essential if we are to provide our digitally transformed European businesses with access to the large European market they will need to be even more globally competitive.

Our recommendations build on top of these important underpinnings.

In this section we set out a broad and ambitious plan to help EU businesses master this second wave of technologies and help Europe reap the benefits more quickly. We have also described how some of the actions we've proposed apply to the specific sectors we discussed earlier in the report.

Overview of the recommendations

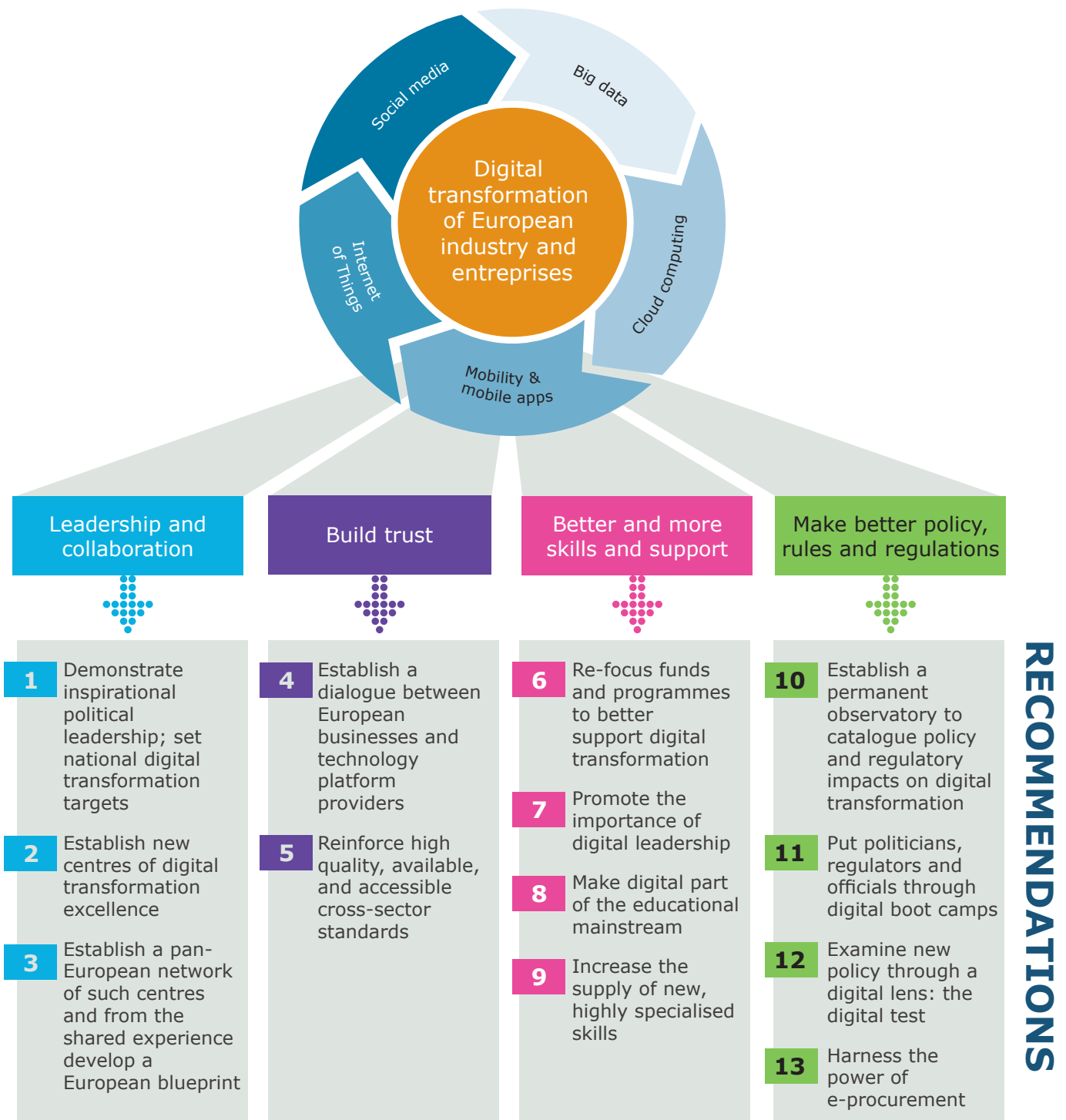


Figure 2: Plan for digital transformation in the EU

2.1 Leadership and collaboration

RECOMMENDATION 1

Demonstrate inspirational political leadership; set national digital transformation targets

Creating confident leaders

Any kind of major change needs confident and competent leadership. For European business leaders to start down the path to transform digitally, they need first to understand the potential gains from embracing these changes and what they stand to lose by not doing so. Secondly, they need to have the confidence that they can deliver the benefits of this change and mitigate any risks: they need to believe in their new operating model and be confident they can master the skills they'll need. A big source of that confidence will come from political leadership.

Political leaders at European, Member State and local level should inspire confidence in others by making digital transformation a political, economic and social priority. They should have the courage to set targets for, monitor, and publish the progress of digital transformation nationally and locally. The European Commission should produce an annual scoreboard comparing both absolute results but also rates of progress across the EU. Industry leaders at European, national and sector level should also play their part in ensuring that digital is high up their sector's agenda.

RECOMMENDATION 2

Establish new centres of digital transformation excellence

Digital transformation centres – old meets new - in smart cities

Physical or virtual digital transformation centres or clusters should be established in cities and regions throughout Europe for existing businesses and new digital businesses to collaborate profitably and learn from each other. With visible political and industry sponsorship, the centres would bring leaders of businesses that could be digitally transformed, together with successful digital transformers and leaders of new innovative, tech-rich businesses. These centres, which could take different forms and build on what's already in place in different places, should focus on producing confident and competent leaders who become enthusiasts, able and willing to digitally transform their businesses. Business leadership will be vital. Leaders need to be willing to become role models and talk about the doubts they overcame and the digital transformation journey they undertook.

Cities and especially cities which are, or are becoming, smart cities, will probably be the natural homes for these new centres; more than 70% of Europeans live in cities and they deliver over 85% of GDP³³. What's more, they've produced many of our smartest digital initiatives, and are likely to feel the effects of digital innovations the most.

Where this has been done, for example in Dublin, it has been very successful. It has also led to successful collaborations between old and new, digital businesses. Large firms have access to an extended pool of knowledge, resources and ideas, 'traditional' firms see first-hand how innovative companies have used digital technologies, and smaller and newly created businesses have the opportunity to commercialise new ideas and expand their markets.

RECOMMENDATION 3

Establish a pan-European network of such centres and from the shared experience develop a European blueprint

Mutually beneficial open innovation models

It can lead towards more open ways of innovating too. Large companies can build joint innovation processes, with the involvement of start-ups, SMEs, social enterprises and specialised providers, and create open innovation environments to help develop their technology. Patents from large companies can be shared with start-ups and SMEs for mutual benefit.

Actively encourage sector and social enterprises to participate

Sector associations, chambers of commerce and social partners should be encouraged to join these centres and learn how to lead digital transformations within their own communities.



A globally excellent pan-European network

A pan-European network of the centres should be established. The network should be used to develop best practice and provide intelligence that could be used to produce a living blueprint. The network should be supported by an online platform accessible to network members throughout Europe. There are over 1000 initiatives across the EU that deal with some aspect of digital transformation. The lessons learned from these initiatives are not being shared enough and should be used to further develop this living blueprint, a guide to digital transformation centres and more, that Member States and local leaders could use to ensure their own local digital transformation support is best-of-breed. The blueprint should be available online and include guidance on how to:

- ✓ assess the status of local digital transformation; engage necessary participants from policy makers to businesses, sector representatives, social partners and third sector
- ✓ connect digital start-ups with traditional companies, and large companies with small
- ✓ open data to stimulate innovation and entrepreneurship
- ✓ find information on:
 - ◇ accessing initiatives and instruments that fund digital transformation
 - ◇ strategies and actions taken by other cities in the EU and worldwide
 - ◇ insights, best practices and lessons learnt
- ✓ use a toolbox to create a local digital transformation action plan
- ✓ develop effective governance models

The blueprint should also give practical guidance on how to encourage local business and entrepreneurs to take an active development role, through challenges, competitions and reverse pitches; for example traditional and innovative start-ups, social enterprises and businesses from different sectors could be invited to provide digitally based solutions to the most pressing urban challenges. If we joined these pockets of digital excellence together, we'd have a network that would be the envy of our competitors in the USA, Japan or India.

Talking digital: how Dublin created a truly collaborative Masterplan

The Irish city of Dublin took matters of creating a digital strategy into its own hands – and the Dublin Digital Masterplan was born.

Dublin's ambition was bold: to become one of the world's leading smart, innovative and intelligent cities. And the way the team behind Digital Dublin approached the development of the plan was all of those things.

First, they recognised that they'd need strong political leadership to develop a clear vision and roadmap for how the city can shape its digital future – and to push it through.

But they also recognised that they'd need to collaborate with lots of other groups to make this work. So they developed an innovative governance framework, sometimes known as a quadruple helix, to make sure that governments, businesses, higher education institutions as well as citizens worked together to develop and roll out the plan.

This approach taught them a major lesson: that while the local authorities could create the ecosystem, it would take industry to bring forward and sustain the projects.

Some of the outputs of this collaboration were a Digital City Team – to identify ideas and projects for trial, provide technical support and look for new collaboration opportunities – and a Business Accelerator Team, to support high-tech start-ups, digital business expansion and innovative businesses.

It also fostered innovation by bringing together existing businesses and digital start-ups so each could support and learn from the other. And there was a strong focus on encouraging research and development, entrepreneurship and business growth, as well as the stimulus to develop data (open and big) and to expand the city's infrastructure.

You can read more about the plan at <http://digitaldublin.ie/>



Digital is having a transformational impact on every aspect of our World. No one is immune. Even for those individuals and organisations who 'opt out' their lives, and businesses

are fundamentally impacted by digital in the products, services and communications they consume. I strongly support the approach taken by the Strategic Policy Forum in developing this report. Europe needs to grasp the opportunity digital offers head on. Sitting back will mean that future technologies and content will be defined for us and may well place Europe at a distinct disadvantage as European business is forced to apply approaches better suited to other environments.

In Ireland we have seen at first-hand how traditional small business can be activated into action. Ireland has implemented an innovative policy of providing incentives for small business to Trade Online. Results from our programme demonstrate that embracing digital facilitates traditional business reimagining its future with much higher expectations of revenue growth, job creation and exports.

Working, as I do, in digital policy making in Ireland, I have direct experience of the value of providing a digital perspective and insights to the process of policy formation and implementation. With access to the right knowledge and experience, National Governments and the European Commission will have a much better chance of making the disruptive and innovative policies necessary for success in an increasingly digital world, now and in the future.

Stephen Brennan,

Chief Digital Advisor for the Irish Government

2.2 Build trust

RECOMMENDATION 4

Establish a dialogue between European businesses and technology platform providers

Consumer trust and value chain trust

Trust needs to be built in two separate but related areas. First, European citizens need to be able to trust that their personal data will be safe, their privacy protected and their digital property kept secure from theft and fraudulent use. This must remain a high priority with the Commission and Member States. Secondly, businesses beginning the transformation journey need to trust that they can make fair, equitable and profitable arrangements with the data platform providers with whom they must increasingly work. European businesses need to be confident that the platform providers can be responsible partners.

Trust between businesses and data platform providers

Providers of digital platforms, which can store, manage and extract value from industrial data, are becoming an increasingly important part of the value chain. The Forum understands that some industries fear that their business intelligence and knowledge will move from the original business, e.g. the manufacturer, to those digital platforms. It doesn't help that there's a lack of clarity and understanding about ownership of this industrial data, how it can and cannot be used, and by whom. The complexity of this issue will increase even more dramatically with the Internet of Things, as different business players in the value chain are claiming rights in the data produced. This appears to mainly depend on the contracts negotiated between companies and digital platforms providers. This could put some businesses – especially SMEs and social enterprises – in a weak position, because they have little power in such contract negotiations.

Meaningful dialogue is essential

There are many examples of trust being built when concerns in value chains are understood and addressed by the participants. The European Cloud Partnership³⁴ gave rise to a code of conduct, service level agreement templates, lists of certification schemes and so on. Other examples are quality marks, like www.trustmark.org.uk, which lists over 30 schemes designed to improve trust in UK suppliers in specific sectors. The 2014 Edelman Trust Barometer report notes [talking about the Technology Industry] "Realizing the trust opportunity in engagement, integrity and purpose can help companies side-step the trust pitfalls so many other companies have weathered." In the context of industry 4.0 or smart factories, we note that fora to facilitate such dialogues have been established in a number of Member States including Belgium, Germany and France. We recommend that the Commission investigates these dialogue mechanisms further and expands their coverage and use in order to cope with the challenges of the current data-driven economy.



RECOMMENDATION 5

Reinforce high quality, available, and accessible cross-sector standards

Strong cross industry standards

Part of the answer is to ensure adequate competition and a level playing field among platform providers, and that requires good standards for communication protocols, data formats and interfaces that enable and support interoperability and ease the ability to switch between platforms. There would be real benefit if European businesses from different sectors improved their collaboration and participated in the appropriate, globally-influential, standard setting organisations to ensure that the emerging standards are sector independent rather than ending up, for example, with different standards in the transport and manufacturing sectors.

Standards in healthcare



Open standards in Healthcare

A significant barrier to digital transformation in the healthcare sector is the lack of common standards for healthcare data. To be able to use the information stored in medical records, all systems need to collect and understand data in the same way.

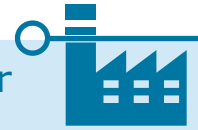
Work is underway to do this by creating a common set of standards at European and international level, but it needs to happen more quickly. The quality of the data needs to improve, too, if it's to be valuable.



Today data is THE raw material of the global economy - and, in contrast to other raw materials, the volume of data is continuously increasing.

Prof. Dr. Siegfried Russwurm
Chief Technology Officer and Member of the Managing Board of Siemens AG

The need for interoperability in the manufacturing sector



Need for interoperability in the manufacturing sector

In the manufacturing sector, the Internet of Things is reshaping processes and products: smart machines and objects communicate with the main 'players' (such as humans, intelligent machinery and robots) in the business and along the value chain, sending information, responding to changes and adjusting processes in real time.

This industrial revolution is leading to smart, automatized, more efficient and responsive to change production process, and to new models for the management of the value chain, with smart logistics systems able to supply, produce and distribute products and optimise all stages (e.g. by reacting to changes in the availability of human resources or raw materials, to changes in the demand for goods, etc.).

These developments are blurring the traditional industry boundaries and creating a set of complex interrelations.

Smart manufacturing will depend on communication with other sectors such as energy distribution (smart grids) and transport management (Intelligent Transport Systems).

The IoT is extending to all sectors of the economy, such as manufacturing, but also transport, logistics, and energy. Quoting a recent speech of Jeremy Rifkin, "the Communication Internet is converging with a digitalized renewable Energy Internet and a digitalized Logistics and Transportation Internet, creating a super Internet of Things (IoT) platform for a Third Industrial Revolution that is going to fundamentally alter the global economy in the first half of the 21st century".³⁵

Already, 14 billion sensors are attached to resource flows, warehouses, road systems, factory production lines, the electricity transmission grid, offices, homes, etc. By 2030, it is estimated there will be more than 100 trillion sensors connecting the human and natural environment in a global distributed intelligent network.

It is clear how the rise of these hyper-connected environments will bring several challenges in terms of interoperability. This means the need for standard communication protocols, data formats and interfaces to be able to connect to the network and "talk" to other digital devices. And they need to do this not just within the business but, as manufacturing, energy and transport and logistics converge, interoperability will be crucial across countries and sectors (for example, smart cars demanding seamless communications between the automotive industry, smart grids and the telecom sector; or smart buildings using intelligent devices from different sectors).

2.3 Better and more skills and support

RECOMMENDATION 6

Re-focus funds and programmes to better support digital transformation

Better support will encourage faster transformation

Businesses can be encouraged to transform and undertake that transformation sooner if they can access funding and resources from the main financial and non-financial instruments in Europe. While there are already many funds and instruments to help start-ups and businesses to develop, there are almost none focused specifically on helping existing companies to digitally transform, either through funding or by creating a demand.

Making more funds available for digital transformation would be ideal, but in the short term more could be done to expand the criteria used for existing funds and programmes. Specifically the application and eligibility criteria of financial instruments and programmes provided by COSME, the European Investment Bank (including the newly set up European Fund for Strategic Investments), the European Investment Fund or Horizon 2020 should include digital as a key objective of funded projects. This would make digital part of all projects in key investment areas such as transport/infrastructure, energy, education, innovation/R&D, environment sustainability, etc. Additionally, funds and programmes should be specifically oriented towards the promotion of digitalisation. It should be made easier for digital entrepreneurs to be internationally mobile, by tailoring programmes such as Erasmus+ or Erasmus for Young Entrepreneurs. These exchange schemes could offer them the opportunity to build relationships, learn about markets and consumers in the EU, and find partners across borders.

The Member States should earmark European structural and investment funds (ESIF) for investing in projects, products or services that help SMEs to make the transition to digital more quickly, or for offering targeted support for digital companies which want to go global. Member States should also streamline and build upon existing programmes to match digitally skilled people with SMEs in need of those skills. One example is the Youth Guarantee scheme³⁶, which exists to make sure that people under 25 receive a good-quality offer for a job, apprenticeship or traineeship.

RECOMMENDATION 7

Promote the importance of digital leadership

Appoint Chief Digital Officers

Digital transformation impacts all parts of a business, and all interactions with stakeholders. So organisations will increasingly need people who can develop and roll out an integrated digital strategy for the entire business. Digital transformation needs digital and business skills to collide. That means they'll need business leaders who combine an excellent understanding of the organisation and its sector, with the acumen to use digital technologies to achieve business objectives, and the ability to influence and transform the organisation. They need to be able to:

- ✓ lead staff from across all areas of the business;
- ✓ develop business and operating models that are innovative and strategic;
- ✓ understand how to make the most of new digital technologies and trends;
- ✓ see changes before they happen, and keep their business one step ahead;
- ✓ influence stakeholders across functional or geographical boundaries³⁷.

Some organisations have already created professional digital roles, such as the Chief Digital Officer (CDO) or the Chief Commercial Digital Officer (CCDO). More need to do this – all transforming businesses will need digital leaders.

Businesses should make digital leadership a priority in their organisations. Business across all sectors, including SMEs, should create roles and appoint people dedicated to digital transformation, who can define and roll out digital strategies and digital business models.

The European Commission and Member States can lead by example

Member States and the European Commission can be exemplars. By appointing and publicising the appointment of Chief Digital Officers in their own organisations they could demonstrate leadership and encourage other organisations to follow that lead.

RECOMMENDATION 8

Make digital part of the educational mainstream

Demand for digital leaders will outstrip supply

If we are successful in encouraging businesses to transform and appoint digital leaders, either full-time or part-time in their organisations, it will inevitably add more pressure to the already fraught situation where demand for digital skills – leadership and other – far outstrips supply. Unsurprisingly, according to Empirica and IDC projections of economic activity and labour market trends, the demand for these skills will be greatest in roles that involve management and business analysis³⁸. Our training and educational institutions need to produce people with the right digital leadership skills and digital entrepreneurial mind-sets.

General management training and education must include more digital know-how

Digital leadership skills content should be developed and built into all general management training and educational programmes for business leaders and senior public officials. A dialogue should be established with representatives of higher, further and continuous professional development training institutions to consider how this can best be achieved.

RECOMMENDATION 9

Increase the supply of new, highly specialised skills

Growing demand for specialised digital skills

The need is growing for new, highly specialised skills, such as for big data analysts, cyber-security specialists and coders/programmers³⁹. According to the US Bureau of Labor Statistics, the number of computer programmer jobs in the US is expected to grow by 30% from 2010 to 2020⁴⁰. As a guide to the likely skills demand, the European Commission expects the market for big data to grow by 40% each year, reaching USD 16.9 billion worldwide in 2015⁴¹. Big data analytics skills are particularly (and increasingly) sought-after in the labour market. In the UK alone, the number of big data analysts working in larger firms is expected to increase by more than 240% over the next five years⁴². Another recent study in Ireland pointed out that, under a high growth scenario, demand from businesses expanding, as well as replacing people, could result in 21,000 job vacancies for big data analysts in the run-up to 2020⁴³. The Commission should step up the focus on measures to fill the skills gaps in these increasingly important digital professional skills. A sectorial approach is also indispensable to ensure that all sectors (especially traditional industries) develop a coherent and efficient transition to the digital economy.



Europe will only establish a global leadership position in the Digital Economy if we build the next generation of highly skilled IT talents and entrepreneurs. However, Europe might face a serious gap of skilled IT specialists and business economists that can exploit the opportunities of big data, cloud and other digital technologies. Therefore, promoting IT startups and IT graduates should be a focus area for Europe.

Ann Rosenberg
Head of Global University Alliances, SAP

Digital leadership in the healthcare sector



We can see that the role of Chief Digital Officer is gaining ground as more conventional companies invest in enterprise-wide digital transformation and try to compete with companies born in the digital age. This isn't currently happening in healthcare, where the role of Chief Digital Officer is still very rare. But things may be about to change. Breakthrough and innovative digital technologies are forcing healthcare institutions to start seeing data analytics, digitally enabled business models and data-driven services as integral parts of a hospital's strategy. The EC and its Member States promote the role of Chief Digital Officer in hospitals. To support this, the EC and its Member States should promote the role of Chief Digital Officer within the healthcare sector generally.

The EC should create a Digital Health Academy – an online source of training and continuous development for health professionals. Healthcare institutions will only truly benefit from the opportunities digital technologies offer if healthcare professionals know how to use them. The European Digital Health Academy would give doctors, nurses, and other healthcare professionals access to clinically focused materials that teach them the basic skills they need to benefit from digital trends. The Academy would also provide a global, long-term coaching program and a trusted peer-to-peer network to improve the quality of care.

To make this a success, national and regional authorities, universities and higher education institutions would also need to work together to define and roll out curricula and courses for improving digital awareness and skills among healthcare professionals.

Digital leadership in the education sector



To prepare youngsters for the digital world we need teachers with the necessary digital skills. Raising the digital competence level of EU teachers will be essential if we are to get good results from the investment in teaching e-skills. Member States should support projects aimed at improving training courses for teachers so they can teach digital skills to their pupils.

Member States should earmark European structural and investment funds (and notably the European Social Fund) to support projects aimed at providing training courses for primary, secondary and higher education teachers, e.g. through the design and implementation of pan-European curriculum development guidelines as well as new flexible online training opportunities. These would update their competences and modernise their teaching methods to reflect mainstream digital teaching/learning and make them "digitally literate".



2.4 Make better policy, rules and regulations

RECOMMENDATION 10

Establish a permanent observatory to catalogue policy and regulatory impacts on digital transformation

Unintended consequences

In January 2015 an entrepreneur added a comment to a blog from NESTA. She said she had to withdraw from sale in Europe two mobile phone apps that complemented her yoga and therapy service. The reason was what she called the VAT MESS. It was a (presumably unintended) consequence of the changes in VAT rules introduced in January 2015. The stories of legislation and regulation designed for one purpose having unintended consequences in another are manifold. This is particularly true when laws designed for the analogue world – perhaps in a particular sector such as medical devices or in the sharing economy - create unforeseen, unintended barriers to digital transformation.

An observatory and an online platform

The Forum proposes that the European Commission establishes a permanent observatory to scan current and proposed EU and national legislation for anything that puts unnecessary barriers in the way of businesses transforming using digital technologies. Of course, the end conclusion of such a scan and examination might well be that the policy or regulation is indeed needed for good reasons. The observatory can also act as the repository of ideas as to where improvements or additions to the regulatory environment could positively aid the transformation. This observatory should draw together experts at EU and Member State level, as well as from industry and academia, and gather input from all the relevant stakeholders. The observatory should work horizontally and vertically; as well as general cases, the observatory should highlight policy and regulation in specific sectors, for example the healthcare and education sectors.

An online platform should be set up to allow anyone to post suggestions on policy and regulation that does or could impact digital transformation. This will help to identify the obstacles that businesses, sector associations and consumers are encountering with specific pieces of EU or national legislation, the complexity of the regulatory framework, or the diversity of existing national rules. The observatory's experts will be able to map continuously the obstacles businesses are facing, and to crowd-source potential solutions. Recommendations could be made to revise the current legislative framework, or introduce new legislative instruments by including the results and the related proposals in the European Commission Annual Work Programmes.

Fit with REFIT

Its work should also feed into the European Commission's Regulatory Fitness and Performance programme (REFIT), a rolling programme designed to create a clear, stable and predictable regulatory framework that supports growth and jobs. Under the REFIT, the Commission is screening all EU legislation on an ongoing and systematic basis to identify and correct burdens, inconsistencies and ineffective measures.

RECOMMENDATION 11

Put politicians, regulators and officials through digital boot camps

The sharing economy increasingly tests Europe's regulatory framework

Justpark is an online service that matches drivers who want a parking space with available spaces, typically on the driveway of a house (it started life called parkatmyhouse.com). Soon after it was established, homeowners were threatened with hefty fines and taxes by local authorities who determined that homeowners were in effect acting as businesses. This stopped the start-up, offering what was ostensibly a useful service, dead in its tracks. It's clear that policy makers and regulators are going to have to grapple more and more with the opportunities and challenges of a sharing economy increasingly enabled by the second wave of digital technologies.

Equipping policy makers and regulators for the task

In its report "Making Policy Better" the UK's independent Institute for Government argues that the skills of policy teams [in Whitehall] should be developed⁴⁴. They note that modern policy making depends on a blend of the political and the technocratic and they observe that simply understanding the present [system] is not enough. Policy makers will need to move from creating fixed designs for policies and start creating designs that are flexible enough so others can adapt them to changing circumstances. The Forum believes that policy makers' future skills must include a better appreciation of the possibilities and effects of digital technologies, that the technocratic capability that the report refers to must include digital, and that the changing circumstances policy makers will have to anticipate will be heavily shaped by the digital transformations that Europe's businesses and public services must undergo.

Our recommendation is that attendance at digital boot camps should become part of the continuous professional development for all politicians, regulators and staff involved in designing policy and regulation. Boot camps should be made available at a European level and MEPs and Commissioners should be encouraged to attend. National and local boot camps should be part of the mix too.

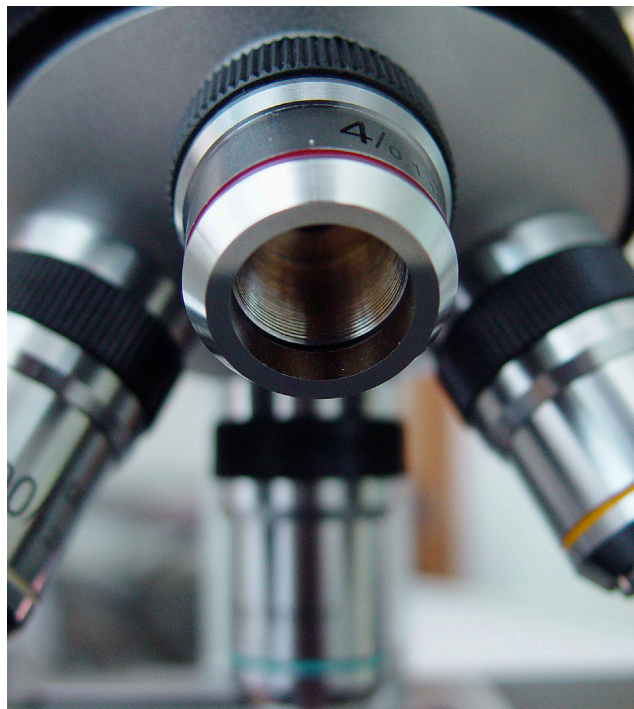
We believe this recommendation fits well with the best practices of smart and innovative approaches to making policy and regulation.

RECOMMENDATION 12

Examine new policy through a digital lens: the digital test

Digital boot camps will give politicians and policy makers a much better understanding of digital transformation and help them make better policy. In support of this the Forum proposes that the European Commission introduces a "digital test" into the EC Impact Assessment (IA) Guidelines. The guidelines, which are currently being revised, are designed to "sense-check" potential legislation at an early stage of the policy cycle, when new proposals are being developed.

Much like the SMEs test, the digital test will give legislators a framework for assessing the extent to which a proposal has negative or positive impacts on digital transformation – by changing the way they operate, for example, or how competitive they are. They'll need to do this for the medium- and long-term impacts, as well as the short-term ones. If the negatives outweigh the positives, the legislators should then decide whether to cancel or change the proposal. As a key part of the IA process, the EC should continuously ask stakeholders including the business community to contribute their opinions and ideas. This action should be part of the EC's overall strategy of removing regulatory burdens and simplifying the regulatory framework for businesses, workers and citizens so that EU regulation can create growth and jobs.⁴⁵





Policy making and healthcare

Many regulatory and other barriers still prevent healthcare professionals from using digital technologies. These include limitations in the way third parties can use medical records, in those health related activities which can be performed online, and therefore from another country within the EU, and in how people can analyse data or use it to follow up with patients.

The opposite should be the case: regulators should stimulate the use of digital technologies in the medical field – not only to improve medical care, but to make it possible to make much-needed savings.



RECOMMENDATION 13

Harness the power of e-procurement

According to estimates, the EU public sector buys more than more than €2.4 trillion worth of goods and services through public procurement⁴⁶. Opening these tenders up to more businesses, and across EU borders, would bring big benefits: European companies – especially SMEs – would be able to expand their client base and their business; by taking advantages of the cross-border bidding, the same companies would also be able to fully benefit from the digital single market; and, if public administrations consistently used e-procurement to buy goods and services, it would gradually encourage European companies to digitally transform. Seen from this perspective, e-procurement (as part of wider e-government strategies) is a key way for governments to boost digital business. But despite these clear advantages, in 2011, only 10% of public procurement in the EU used e-procurement (although that was 13% more than in 2010)⁴⁷. Why?

Cross-border procurement still presents several obstacles:

- ✓ contracting authorities use lots of different e-procurement platforms and service models;
- ✓ the platforms often aren't user-friendly;
- ✓ trying to access and learn how to use them is often particularly time-consuming and inefficient, especially for people trying to do so from another Member State;
- ✓ Language barriers, and lack of information about the opportunities opened abroad (i.e. lack of knowledge on e-Procurement platforms in other MS, limited access to tenders, etc.)⁴⁸.

Although several efforts were undertaken by the European Commission to improve cross-border tendering, they have not fully solved the problem.

To achieve this, Member States should remove barriers to cross-border tendering by making sure that contracting authorities at national, regional and local level adopt platforms for e-procurement that:

- ✓ adopt existing (and upcoming) standards for harmonising tender contents and processes.
- ✓ create interoperable eTendering platforms that work across the EU and that use single access points to connect buyers with sellers.

We recognise that finding a way to create this "interoperability" between countries that all use different public procurement platforms is a tough technical nut to crack. But we believe that the potential gains outweigh the losses of not trying.

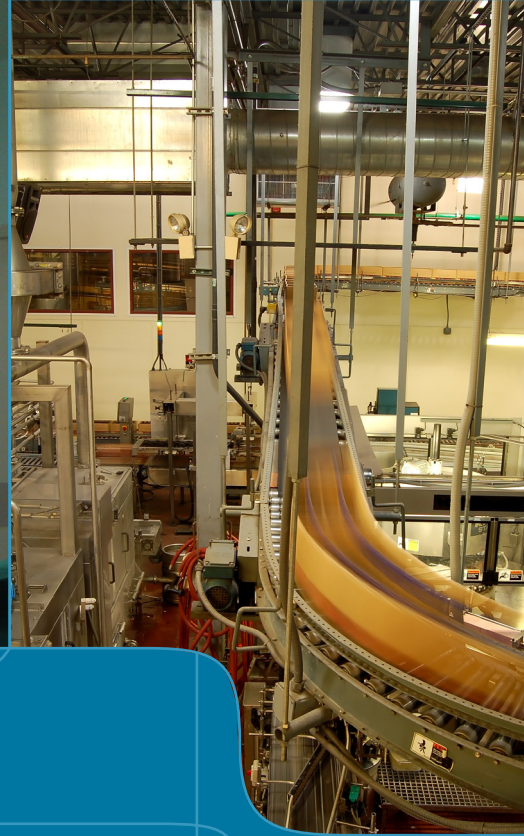
Next steps

The Forum is very pleased to publish this report and now plans to:

✓ Present the content of the report widely and build momentum behind the proposals.

✓ Continue the dialogue with all stakeholders who can improve, take forward or support the implementation of our proposals.

✓ Continue to seek new inputs and ideas that would help further Europe's digital transformation.



Annexes

3.1 The Strategic Policy Forum

3.1.1 The President and Vice Presidents of the Strategic Policy Forum



John Higgins
President of the Forum

DIGITALEUROPE
Director General



Irène Braam
Vice President of the Forum

Bertelsmann
VP of Government Relations, Head of the Brussels Office



António Murta
Vice President of the Forum

PATHENA
Managing Partner and Co-Founder

3.1.2 The Members of the Strategic Policy Forum



Filippo Addarii
The Young Foundation
Head of EuropeLab and Director of International Strategy



Antoine Aubert
Google
Director, European Public Policy



Filippo Berto
Berto Salotti
CEO and Founder



Paul Browne
Enterprise Ireland
Manager – Belgium, Netherlands and Luxembourg



Nicholas Davis
World Economic Forum
Director and Head of Europe



Franc J. Dorfer
Eierfabrik
Managing Director, Partner



Daniela Florea
Geo-strategies
CEO



Bartłomiej Gola
SpeedUp Venture Capital Group
CEO



Blaž Golob
GoForeSight (GFS) Institute
Director



Sandy Grom
Department for Business, Innovation and Skills (BIS)
Assistant Director – Online Economy



Ignasi Guardans
CUMEDIAE asbl
Chairman and Founder



Fernando Herrero
Madrid Emprende
Head of Economic Promotion Service



Alain Heureux
The Egg Brussels
CEO



Patrick Hoffstetter
Renault
Chief Digital Officer



Caroline Jenner
JA-YE Europe (Junior Achievement – Young Enterprise)
 CEO



Sylvia Leal Martin
IE Business School
 Academic Director of ICT and innovation



Javier Lopez Calvet
Carrefour
 CFO, Belgium



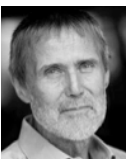
Colin Mason
University of Glasgow
 Professor of Entrepreneurship at Adam Smith Business School



Hanne Melin
 eBay Inc.
 Head of eBay Inc. Public Policy Lab EMEA



Ann Mettler
European Political Strategy Centre
 Head of the EPSC



Jeremy Millard
Danish Technological Institute
 Chief Policy Advisor



Jan Muehlfeit
Microsoft
 Chairman Europe



Veronika Pistyur
Bridge Budapest
 CEO



Axel Pols
EITO (European IT Observatory)
 Chairman, EITO Task Force and Managing Director BITKOM Research



Taylor Reynolds
OECD
 Head of the Information Economy Unit



Eduardo Salido Cornejo
Telefónica Digital
 Public Affairs and Policy Manager



Rinse Tamsma
SAP
 Vice-President Global Sales Business One



Mihkel Tikk
Estonian Information System's Authority
 Head of Department of State Portal



Carla Van Steenberghe
Materialise
 Chief Legal Counsel



Stijn Vander Plaetse
Telenet
 Vice-President Product & Marketing



Reinhilde Veugelers
KULEUVEN – Faculty of Economics and Business
 Senior Fellow at Bruegel and Professor at KULEUVEN



Laurent Zibell
IndustriALL
 Policy Advisor



Fabian Zuleeg
European Policy Centre
 Chief Executive

3.1.3 European Commission representatives



Pedro Ortùn
Director Service Industries

DG Internal Market, Industry, Entrepreneurship and SMEs



Michel Catinat
Head of Unit Key Enabling Technologies and Digital Economy

DG Internal Market, Industry, Entrepreneurship and SMEs



Iordana Eleftheriadou
Policy Coordinator for Digital Transformation

DG Internal Market, Industry, Entrepreneurship and SMEs

Also the Directorates General for Communications Networks, Content & Technology (DG CNECT), for Education and Culture (DG EAC), for Employment, Social Affairs and Inclusion (DG EMPL), for Regional Policy (DG REGIO) and the Joint Research Centre (JRC) participated in the work of the Forum.”

3.1.4 Member States Board representatives

Country	Name	Organisation
Austria	Gerhard Laga	Austrian Economic Chamber
Belgium	Bernard De Potter André Blavier	Agentschap Ondernemen Agence Wallonne des Télécommunications (AWT)
Bulgaria	Evgeny Angelov Anna Marie Vilamovska	Presidency of the Republic of Bulgaria
Croatia	Monika Sujur	Croatian Agency for SMEs, Innovations and Investments (HAMAG-BICRO)
Cyprus	Nikos Ioannou	Ministry of Energy, Commerce, Industry and Tourism
Czech Republic	Jacub Jaros	Ministry of Industry and Trade
Denmark	Louise Marianne Lempel Niels May Vibholt	Danish Business Authority
Estonia	Mikk Vainik	Estonian Information System's Authority
Finland	Sirpa Aitalo Antti Eskola	Ministry of Employment and Economy
France	Pascal Dagrass	Ministry of Economy and Industry
Germany	Alexander Tettenborn	BMW
Greece	Vasileios Gongolidis Ilias Kastritis	General Secretariat for Research & Technology Gen. Secretariat of Telecom & Post / MA OP "Digital Convergence"
Hungary	László Korányi	National Innovation Office of Hungary
Ireland	Stephen Brennan	Irish Government Department of Communications, Energy & Natural Resources
Italy	Stefano Van der Byl	Agenzia per l'Italia Digitale Innovazione Tecnologica
Latvia	Martins Jansons	Ministry of Economics
Lithuania	Dovydas Varkulevicius Evaldas Smauksta	Enterprise Lithuania Communication Regulatory Authority
Luxembourg	Laurent Solazzi	Ministry of Economics (Directorate General SME and Entrepreneurship)
Malta	Karl Herrera	Malta Enterprise
Netherlands	Paula de Winter	Ministry of Economic Affairs (SME & ICT Policy department)
Poland	Stanislaw Dyrda	The National Centre for Research and Development
Portugal	Miguel Pinto Luz	DNA Cascais
Romania	Mihai Barbulescu	ERNIEC Agency/RoEduNet (Romanian Education Network)
Slovakia	Boris Miskovic	Ministerstvo Financií
Slovenia	Jurji Dolzan	Ministry of Education, Science and Sport
Spain	Emilio Garcia Fernando Herrero	Ministry of Industry, Energy and Tourism Madrid Emprrende
Sweden	Hakan Hillefors Juha Alskog	Ministry of Enterprise, Energy and Communications
UK	Sandy Grom	Department for Business, Innovation and Skills (BIS)

3.1.5 The mandate of the Strategic Policy Forum

The aim of the Strategic Policy Forum is:

- ✓ To reinforce the dialogue among businesses, science, civil society and politics with the aim of shaping an ambitious EU vision, a short and long-term strategy on Digital entrepreneurship and concrete actions to its implementation;
- ✓ To discuss and advise the Commission on policy issues and actions to support business transformation and offer European SMEs new opportunities and a leading place in the modern digital economy;
- ✓ To promote the development of the Digital Entrepreneurship policies by Member States at national, regional and city level, by improving awareness on relevant policy initiatives and public-private partnerships in the EU and main international partners.

Tasks of the Strategic Policy Forum

The Strategic Policy Forum is expected to advise the Commission on shaping a European strategic vision, a short and long-term strategy and a European Roadmap with concrete policy recommendations to fuel Digital Entrepreneurship in Europe.

The Forum will have a mandate for two years, which might be extended, if need be.

The Forum is expected to deliver a mid-term report by February 2015, setting the state of play of digital entrepreneurship in Europe, identifying key challenges and stumbling blocks, shaping an EU vision, a strategy and a roadmap with recommendations for concrete actions (both short and longer-term actions) by the Commission, Member States and private stakeholders. A final report is expected by January 2016.

The priority areas identified so far, to be covered by the Forum's work, include:

- ✓ Identifying new business opportunities for jobs and growth: the focus will be on how digital tools enable the development of new start-ups in all sectors of the economy, as well as the transformation and growth of existing companies (both SMEs and corporates), including social enterprises and organisations.
- ✓ Removing the barriers: the focus will be on removing the most significant barriers, at all levels, spanning education, skills and entrepreneurial culture, technology, regulatory issues, taxation, access to finance, etc.

- ✓ Raising commitment and actions among the key stakeholders: these include the public sector, as policy maker, as well as driver and enabler of digital entrepreneurship (e.g. through open government data, public procurement, etc.), private stakeholders and public-private partnerships, in support of EU Digital Entrepreneurship policy.

The Forum will assist the Commission in empowering discussion with Member States/regions and private stakeholders. It is expected to play an instrumental role in triggering necessary actions to support the successful implementation of the Roadmap.

Organisation and working methods

Composition

The members are appointed by the Commission, identified among key actors in the digital entrepreneurship field. The following key organisations are represented: (1) Industry representatives, including digital entrepreneurs, traditional industries (pioneers in the digital transformation of their business), technology service providers to digital entrepreneurs and relevant associations; (2) Non-Industry/Private organisations supporting and monitoring digital entrepreneurship, including NGOs, universities, research organisations, intellectual property experts, equity firms, etc. and (3) Public authorities, particularly active in the area of digital entrepreneurship. The European Commission sought to achieve a balanced overall composition, based on broad representation and expertise of the members while keeping the size of the Strategic Policy Forum to a manageable level.

The Strategic Policy Forum is composed of one representative nominated by its organisation. Only in exceptional cases, the representative can be replaced by another member of its organisation; prior approval by the Chair will be requested. The Strategic Forum will ensure that the positions of all the different stakeholders are duly taken into account and work towards a consensus around a supportive environment for digital entrepreneurs. The Strategic Policy Forum is an expert group within the meaning of the Communication from the President to the Commission [C(2010) 7649 final]. The names of the member organisations are published in the Register of Commission expert groups, as well as the names of the individuals representing their organisation in the Strategic Policy Forum.

Organisation of the work

The Strategic Policy Forum will hold its meetings in Brussels. Three meetings are anticipated within 2014 and two in 2015 but the Group will meet more frequently if necessary.

The meetings will be chaired by the European Commission, Mr Pedro Ortún, Director for Service Industries in the Directorate General for Enterprise and Industry, European Commission. The Strategic Forum will be managed by a Board, composed of the President and the Vice Presidents, appointed among its members. The President and the Vice Presidents will be selected at the first meeting of the Forum by its members.

Commission officials from different services with an interest in the proceedings will be invited to attend the meetings of the Forum or the working groups. The Commission may invite occasionally other experts or observers with specific competence on a subject of the agenda, to participate in the Forum's deliberations.

The Commission staff and a technical assistance team will provide the secretariat and logistical support as appropriate.

The Working Groups

Working groups could be set-up on specific themes in support to the Strategic Policy Forum activities. They will be managed by a Vice President (VP) and composed of members of the Strategic Policy Forum. The VPs will steer the work of each working group and ensure its proper functioning.

During the first meeting of the Strategic Policy Forum, it was agreed that two Working Groups will be formed:

- ✓ **Working Group "New business opportunities for growth and jobs"** – This group will look to identify all relevant opportunities for growth and jobs empowered by digital technologies. It is expected to provide a sound rationale for "WHY" this is an issue where policy intervention would be necessary and beneficial and "WHAT" needs to be done by key stakeholders to boost digitally empowered entrepreneurship in Europe;

- ✓ **Working Group "Removing existing barriers"** – This group will seek to identify the most inhibiting barriers to starting and growing new digital enterprises, as well as to the digital transformation of existing business, at all levels (educational, technological, regulatory, taxation, etc.). It is expected to respond to "WHAT" needs to be done to unleash the digital entrepreneurial potential in Europe and "HOW" to remove existing barriers and adopt more proactive policy measures to unleash the opportunities envisaged above.

Both Working Groups will work along two strands: i) the digital opportunities for the development of new start-ups in all sectors of the economy; and ii) the opportunities for growth for existing enterprises in both manufacturing and services sectors.

According to the content of each thematic group, experts will be invited to participate in the working group discussions. The working groups may launch consultations of the relevant European stakeholders through for example the organisation of workshops.

Each working group is expected to deliver reports to feed the discussions and the mid and final reports of the Strategic Forum.

Taking into account the importance of Member States in the deployment of the European Digital Entrepreneurship Roadmap, the Commission intends to organise policy workshops with the Member States. The aim is to keep the Member States informed on the work of the Strategic Policy Forum and to allow for interaction and exchange of views on the strategic visions and implementation of the Digital Entrepreneurship Roadmap. Some members of the Strategic Forum may be invited to participate in these policy workshops, depending on the themes of the agenda. Other Commission services will be invited to participate to the debate according to the agenda.

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