



INSTITUTE *for*
STRATEGIC DIALOGUE

Europe's Got Talent

Learning, Creating
and Growing in our
Digital World

ALICE GARTLAND

Supported by



**Vodafone Institute
for Society
and Communications**

About the Project

The report was commissioned by the Vodafone Institute for Society and Communications as part of the Vodafone Digitising Europe Summit, that brings together business leaders, political decision makers, academics, innovators, entrepreneurs and young people, to discuss how to best harness the power of digital technology and foster an integrated voice that can meet the challenges that our digital future presents.

In preparing the report we gathered views from a variety of innovators and change-makers from across education, business and policy in Europe. The interviewees are listed in Appendix 1. The report also incorporates some insights from the *Vodafone Institute for Society and Communications: Talking about a Revolution – Europe's Young Generation on Their Opportunities in a Digitised World* (Survey conducted by YouGov), along with findings of an extensive literature review.

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1. Introduction

Innovations in digital and mobile technology make a significant contribution to Europe's economic growth. They are also transforming Europe's economic base and rapidly changing the way we live and work. For example, digital technology has the potential to increase productivity and efficiency, enabling us to connect and get work done faster than ever before, but can also blur the lines between our home and working lives.

Whilst digital technology presents many opportunities, it also creates significant challenges for individuals, communities and business. In particular there is a skills gap – new skills are needed but they are in short supply. The European Commission estimates that 900,000 ICT jobs could go unfulfilled by 2020, due to a lack of skilled personnel to fill those roles.¹ Yet at the same time there are currently 5.6 million young people unemployed across Europe.

We are at a turning point. Business leaders, political decision makers, academics, entrepreneurs and young people, need to work together across the generational divide, to create an integrated strategy that empowers young people and enhances their employment and development opportunities in our digital world.

To do that, we need: a fresh mindset; new skills; new partnerships and forms of integration, supported by a strong policy and technological infrastructure.

Only then can Europe compete with its rivals and secure its position as an innovator at the forefront of the global economic development trajectory.

1.1 The start of a conversation

Europe's Got Talent, is an action-orientated report, which identifies the key gear changes we need across education, the workplace and business to respond to Europe's future economic environment, drive growth and create employment opportunities for young people in our digitised world.

The challenges and opportunities of the digital economy are many and varied. The report is not a comprehensive survey of the digital landscape of every country in Europe. Rather, it provides a snapshot of our digital environment, setting the scene for further discussion and investigation of its complex dynamics.

In so doing, the report identifies innovations that are bridging the gaps between digital change and opportunities for young people. Those innovations are by their very nature emblematic, but are selected as examples to help guide us forward.

The report also gives recommendations for change that will drive how young people learn, create, grow and ultimately prosper in our digital world.

1.2 Living in a revolution

As Brynjolfsson and McAfee describe in *The Second Machine Age. Work, Progress and Prosperity in a time of Brilliant Technologies*, digital technology brings with it a bounty of opportunity, but also wrenching change.²

“Technological progress is going to leave behind some people, perhaps even a lot of people, as it races ahead ... there's never been a better time to be a worker with special skills or the right education, because these people can use technology to create and capture value. However, there's never been a worse time to be a worker with only 'ordinary' skills and abilities to offer, because computers, robots, and other digital technologies are acquiring these skills and abilities at an extraordinary rate.”³

However, we curate our future: individuals, communities, educational institutions, governments and business have a choice about how we integrate

technology into our world. As Stian Westlake at Innovation Charity Nesta points out, “Technology is not destiny.”⁴

Industrial upheaval is also not new; many times before societies have transformed and adapted to new economic realities, whether during the Industrial Revolution of the nineteenth century or the era of mass production at the beginning of the twentieth.

Yet again we find ourselves at a turning point, making the shift from an old to a new economy. Young people are driving that change and we need to work across generational divides to develop a strategy for a sustainable technological future.

So where do we begin? The starting point is Europe's youth.

1.3 Pragmatic optimism

The *Vodafone Institute for Society and Communications: Talking about a Revolution – Europe's Young Generation on their Opportunities in a Digitised World* (Survey conducted by YouGov) incorporates new data from focus groups with young people in Germany, the UK, Spain, the Netherlands, Italy and the Czech Republic. It highlights the fact that young people are embracing these changes and most instinctively understand the opportunities they bring. The survey states:

*“The young generation does not experience the digital revolution as a sudden, challenging event that is changing their lives at this moment in time. They are digital natives who have been growing up with this continuous process of digitization and development of new technologies. For them it is part of normality and everyday life and to some extent they have been learning to use digital equipment just as children learn to walk or talk.”*⁵

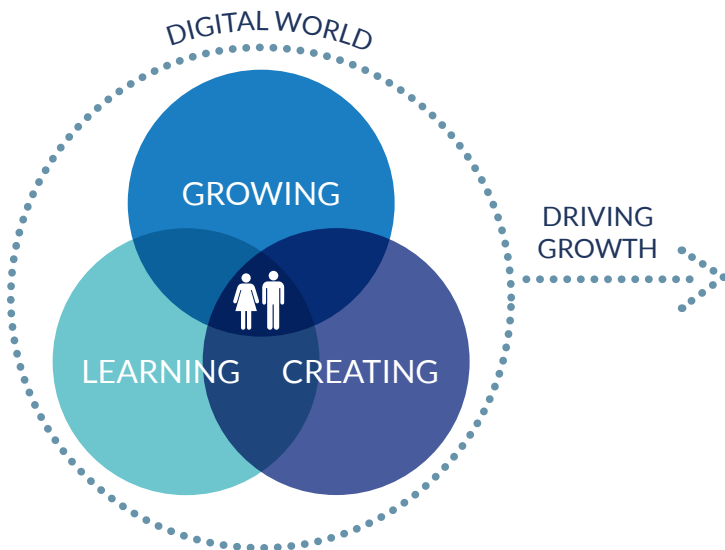
And whilst the young generation anticipates that the digital revolution will cause huge changes to the job market, the majority does not see that as a personal threat.

As the survey states, they believe that, *“Staying open-minded for change and keeping up with the pace of technical developments and necessary skills will keep their professional futures safe.”*⁶

It is this mind-frame of ‘pragmatic optimism’, which helps them cope with their concerns about the challenges that our economic landscape presents and provides all of us with a starting point to our road map for a digital Europe.

1.4 About the report

The report focuses on three key pillars of the digital economy: Learning – education and lifelong development; Creating – the workplace of the future; and Growing – business and entrepreneurship.

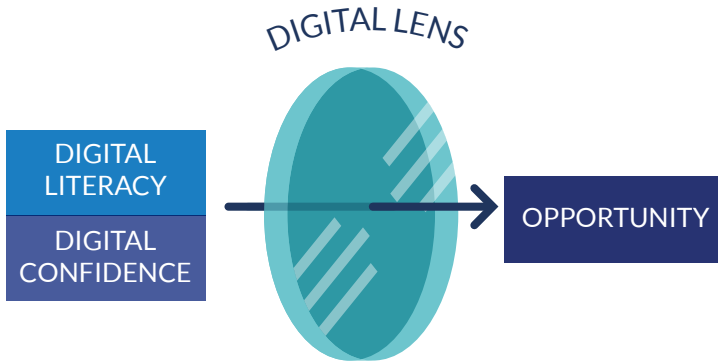


Learning

Learning is open and lifelong and education is the building block of any economy, but this is especially true for the digital economy. New skills are needed but they are in short supply. There are three major challenges.

Firstly, we don't have the outlook that we need. That is, a digital lens to provide the perspective we need to see the opportunity in our digital world. Digital literacy and confidence is the prerequisite of that new perspective; we all need to have some basic skills and understanding to be able to harness the

opportunities of a digital Europe. At the same time, we need to understand and be able to assert our rights and obligations as digital citizens.



- Governments, the telecommunications industry and educational institutions need to work together to create an ICT Basics package that ensures: i) everyone achieves a level of digital literacy and confidence; ii) everyone has access to the equipment and technology they need to assert their skills; and (iii) everyone is aware of their rights and obligations as digital citizens.
- National governments, umbrella teaching bodies, and institutions of the EU should support ICT as the means of education by developing mechanisms for teachers to share know-how on using technology in their lessons, such as the online catalogue of mobile content that has been tested and used by teachers on the mSchools programme.
- National governments should introduce digital literacy as a Key Performance Indicator (KPI) for public educational institutions.⁷
- Educational institutions should be prioritised when it comes to high speed broadband connectivity in order to unfold the full potential of digital education. This will rely on partnership between national governments and the telecoms industry.
- Schools and universities should establish professional structures and expertise for ICT support and management. This might require additional centralized support from national governments to achieve economies of scale.

- National governments should make ICT training a compulsory part of the continuing professional development for teachers.
- National, regional and local governments should look to partner with private sector bodies delivering educational technology, to put in place mechanisms whereby input from teachers and learners can be integrated into new product development. For example, the mSchools ‘mLab’, which acts as a broker between schools and industry to help match schools with new innovations and helps prepare industry to pilot innovations.
- Government and education bodies should develop products and services that help young people to understand the possibilities within ICT careers. For example, this might take the form of an online catalogue for young people with examples and case studies that demonstrate how ICT careers link back to formal curriculum in schools.

The second challenge is that we need to develop new skills to help us participate and prosper in the digital world. That includes basic and more advanced computer skills, but young people also need the business, social and life skills to transition into the work place.

Key to that is work experience and vocational training. Bridging the gap between education and employment requires employers and educational institutions to work together to link learning to employability.

- There are many ways in which employers, young people and educational institutions can work together to bridge the various skills gap and improve employability, such as encouraging industry input on course design and content; rewarding academic credits for time spent completing work experience; incorporating skill based learning into the curriculum;⁸ and promoting innovation hubs within educational institutions, supported by industry.
- Experience shows that young people respond especially well to personal contact with people working within industry. Schools, the private sector and educational charities should collaborate to create initiatives that promote these links, such as Founders4Schools, which brings entrepreneurs into schools to raise awareness of the career possibilities

of entrepreneurship and digital technology; and the Estonian IT College where industry representatives come in to work with students and helps create pathways for the students' careers on graduation.

Thirdly, we need to create the mechanisms by which if you have the right partnerships you can translate that new outlook and skills into the workplace.

Educational institutions, business and the workplace must integrate and share both knowledge and best practice in order to align with each other and continuously to adapt our educational curriculum, skills development and learning strategies with the needs of our digital society.

We also need to help open the eyes of students to the employment opportunities that their digital future presents. The IT sector is growing and there are jobs that need to be filled. The development of advanced computer skills, like coding, can provide an alternative to the traditional university path and provide a gateway to new and rewarding careers. Including in the entrepreneurial startup sector.

And whilst not everyone has to be a computer programmer, the logic of digital technology shapes our living environment, the way we interact, and informs business models and the way we work. We all need to be able to engage and function in this new world.

We need new forms of collaboration and partnership to bridge generational divides; and match employers and young people to make the most of the potential and promise of digital technology.

- Digital technology can significantly improve access to careers information and matching between employers and potential employees. Public and private sector funders need to invest in products to meet these needs, as exemplified by the Unifrog app that matches learners with courses and Intern Avenue that matches young people with employment opportunities. These currently operate at a national level, but digital technology has the potential to expand such initiatives across Europe, with a role for the private sector and multinational bodies, such as the EU.
- Educational institutions, industry and government should work together to find ways of reducing the financial barriers to further education. As the McKinsey report, *Education to Employment: Getting Europe's Youth*

into Work,⁹ recommended, this might include: governments and private financial institutions offering low-interest loans for students pursuing courses that have a strong employment record; or exploring initiatives that allow young people to pay for part of their education or training in the form of services. Employers can also play a role by promising jobs to young people (following a rigorous recruitment process) and then funding their training programme to prepare them for these jobs.¹⁰

Creating

What happens in the workplace will determine our ability to unlock the potential of digital technology.

In doing this, we face three key challenges.

Firstly, we need to reconfigure hierarchies; meaning new entrants to the workforce have very different expectations to their senior managers. Traditional career models no longer fit the majority of the new workforce and career paths are more fluid and less linear. That's a big shift away from the traditional career ladder most senior managers have climbed, yet they are overseeing this transformation and are required to leapfrog traditional hierarchies to connect with young people and transform their organisations.

- Given the pace and scale of change, continuous learning and development needs to be the new norm for all organisations in the digital economy. This must be supported and promoted at the highest levels by leaders.
- Diversity has become increasingly important. For example, studies have shown that women are especially well attuned to the needs of the younger generation,¹¹ making them effective leaders for organisations that need to rethink traditional hierarchies in order to harness the talent of those who might be younger, but possess skills lacking further up the organisational ladder. Businesses must continue to develop strategies that promote more women to leadership roles.

Second, we need to apply the digital lens, harnessing the full potential of digital technology while guarding against the worst of its excesses in terms of its impact on employees. The workplace is a hub for

collaboration to drive growth and innovation in the digital world. Human beings and their relationships are at its heart and underpin the potential and promise of digital technology. The challenge is to make the most of the digital opportunity, whilst at the same time achieving a balance between technology and humanity.

- Business leaders need to continue to invest in IT infrastructure that will allow them to deliver the flexibility needed in the digital economy, such as supplying employees with reliable remote access technology for flexible working.

Thirdly, we need to apply a new logic of interaction and integration within the workplace. For example social media is perceived by many people as a distraction from work, however social media platforms are changing the way that people view collaboration and interaction and their logic is no longer separate from the workplace.¹² And in recruitment digital technology facilitates a more efficient matching process between individuals and the work place. A good example is provided by Intern Avenue.

- Business leaders need to rethink approaches to the use of technology in the workplace by staff and put in place guidelines and practices around its acceptable use that is realistic of staff needs. By identifying examples of best practice and overtly supporting new methods of working, they will help foster a culture of trust that empowers employees to take control over their working practices. This should extend to the use of social networking; businesses should harness this new methodology to build trust and collaboration into the work place.
- Organisations should use the recruitment process as an opportunity for learning and development – for both themselves and for their potential recruits, as advocated by Rajeeb Dey, Founder of Enternships.

Growing

Entrepreneurship is an engine of growth and job creation. In the digital economy tech startups are at the forefront of this growth. Although not

a silver bullet to completely solve the economic challenges that Europe faces, startups are a rich source of innovation and new business practice. We need to transform and develop our policy and digital infrastructure to unlock that potential across the digital economy to create new linkages between startups, SMEs and big business and foster a culture that drives creativity and growth.

To drive entrepreneurship and growth we face three challenges. Firstly, we need to support, unlock and integrate entrepreneurial mentality and business capability across the economy.

- The *Vodafone Institute for Society and Communications: Talking about a Revolution – Europe's Young Generation on their Opportunities in a Digitised World* (Survey conducted by YouGov) highlights that young people need more support in developing life skills. National governments and public education bodies should incorporate business skills, basic accountancy and entrepreneurship into personal and social education courses across the education system.
- Experience shows that young people respond especially well to personal contact with people working within industry. Schools, the private sector and educational charities should collaborate to create initiatives that promote these links, such as Founders4Schools, which brings entrepreneurs into schools to raise awareness of the career possibilities of entrepreneurship and digital technology; and the Estonian IT College where industry representatives come in to work with students and helps create pathways for the students' careers on graduation.

Secondly, we need to develop an infrastructure and culture that supports investment and scalability in the startup ecosystem.

- National governments should review fiscal systems to ensure tax policies reduce financial risk and incentivise investment, (for example, innovations like the UK's SEIS scheme investment).
- Governments should spearhead an initiative to create a database of experts accessible (for a charge) to investors to provide input to their investment decisions, and act as a pool of information on startup successes and failures, says Tim de Vere, Angel Investor.¹³

- As suggested in the *Entrepreneurship 2020 Action Plan. Reigniting the entrepreneurial spirit in Europe*, bankruptcy laws should be reviewed to allow, “second chances for honest bankrupts.”¹⁴

And thirdly, we need to promote partnerships, integration and consolidation in the digital economy.

- National governments should develop specific regulation to help early stage startups so their regulatory burden in terms of general company law is not the same as larger businesses. As the example of employee stock options in Germany shows, making it easier to offer employee stock options will help to recruit and reward talent.
- Educational institutions, big business and SMEs need to come together locally and regionally to provide employment solutions and work experience opportunities for young people. For example the link between upmysport and Bristol University.

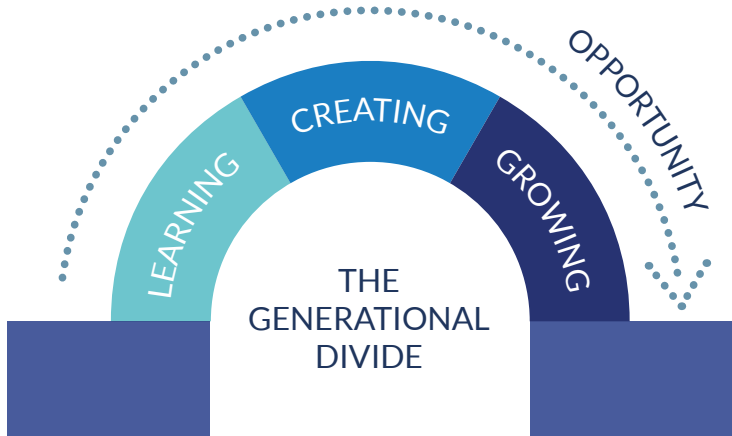
All these transformations have to be supported by a strong operational environment. We need to develop and invest in our policy, digital and legislative infrastructure to support the digital economy and provide incentives for growth, whilst also promoting integrity and inspiring trust in our digital world.

We cannot disregard our legacy infrastructure, but we do need a fresh start.

- Governments must support open government initiatives to drive best practice in knowledge sharing and promote integrity and trust in data management.
- National governments should establish national and regional legislative development on data privacy and business regulation and create bridging mechanisms to support internationalisation, working where necessary with multilateral bodies.
- National governments and multilateral bodies should support the development of Intellectual Property infrastructure geared towards innovation, such as the development of the European Unified Patent Court and streamline the IP dispute process to lessen the financial burden on SMEs.

- In light of the disruptive impact that new digital technology companies, such as Uber, can have, governments should work with startups and established businesses to help them to understand and prepare for further change. National legislatures will need to have the requisite digital literacy and confidence to do that.
- National and multilateral bodies should promote the consolidation of the mobile telecommunications market to drive the changes and investment needed to support business growth.

Each generation has entered the digital world at a different stage of life, resulting in different skill sets, priorities and attitudes. Strong leadership is needed to embed these new practices and culture that bridge the generational divide and drive learning, creativity and growth.



Only then can digital natives and digital immigrants (those not born into the digital world, but adopting it into their lives later in life) come together to build the integrated voice that we need to underpin a coherent digital future.

This is the challenge of our age. Welcome to its turning point.

2. Learning Education and Lifelong Development

The education system is where problems are rooted, but where solutions are also found. To engage with and prosper in the digital economy we all need to be equipped with a different set of skills. However, our education system is not prepared for:

- 1 Cultivating the new outlook that we need;
- 2 Developing the skills to enable us to participate and prosper in the digital world; or
- 3 The mechanics by which, if you have the right partnerships, you can translate the new outlook and skills into the workplace.

Learning is open and lifelong: it reaches beyond the traditional borders of educational institutions. It enables individuals, communities and organisations to bridge the gaps of the digital economy, innovate and grow.

Our educational infrastructure is the foundation of the digital economy, and the digital economy demands a holistic approach to learning.

Educational institutions, businesses and workplaces must integrate and share both knowledge and best practice in order to align with each other and continuously to adapt our educational curriculum, skills development and learning strategies with the needs of our digital society.

“We can’t magically travel to our digital future, but we can help young people build it.”

Nick Harrison, Chief Operating Officer,
Founders4Schools

2.1 A Digital Lens

Whilst not everyone wants or needs to grow up to be a computer programmer, the logic of digital technology shapes our living environment and informs business models¹⁵ and the way we work.

“We need to teach (young) people to see the world through a digital lens,” says Sinead MacManus, CEO and Co-Founder of Fluency,¹⁶ in order to provide the perspective they need to see opportunity in our digital world. That can be fostered and developed in schools, universities, workplaces and beyond.

Digital literacy and confidence

Digital literacy is a prerequisite to this perspective, and ensures individuals are equipped with the capability to live and work in our digital world.

Digital literacy requires access to technology, technical skills, creativity and cultural understanding in order to communicate effectively across a range of media.

In an era defined by an abundance of information, the ability to search, select and critically consume data is key.¹⁷ That critical thinking requires digital confidence, meaning:

- 1 Confidence in our capability and skill to use technology; and
- 2 Confidence in the security and safety of the digital system, meaning that we can be confident in the validity of the information we select and that personal information that we input into the system is also protected.

Vodafone Institute for Society and Communications: Talking about a Revolution – Europe’s Young Generation on Their Opportunities in a Digitised

World (Survey conducted by YouGov) found that ICT training is “sporadic” across the education system¹⁸ and whilst digital natives may have an innate digital confidence, that does not extend across the generations to their teachers or more widely.

Our digital world is characterised by a rapid and ever expanding amount of information. According to EMC's *Digital Universe Study*¹⁹ the digital universe is expected to grow from 4.4 trillion gigabytes in 2013 to 44 trillion gigabytes in 2020. However, while about 40 percent of the information in the digital universe in 2013 required some type of data protection, less than 20 percent had these protections.²⁰

In the learning environment, especially with young students, enabling students to browse information freely while communicating with one another safely is a big challenge.²¹ Teachers also play a critical role in helping to transform all that information into knowledge. Overall, to cultivate a digital lens across the learning landscape requires strong leadership that appreciates the opportunities that digital technology presents. Only then will teachers and learners be empowered to act on these opportunities, and contribute to a cultural paradigm for engagement with our digital world.

RECOMMENDATION

Governments, the telecommunications industry and education institutions need to work together to create an ICT Basics package that ensures: i) everyone achieves a level of digital literacy and confidence; ii) everyone has access to the equipment and technology they need to assert their skills; and (iii) everyone is aware of their rights and obligations as digital citizens.

ICT as the means of education²²

In *Decoding Learning: The proof, promise and potential of digital education*, innovation charity *Nesta*, describes how in general students inhabit “a rich digital environment,” but one which is “insufficiently utilised to support learning.”²³

Digital technology offers the potential to support and expand the dialogue between teachers and learners, providing a framework for learning with others (e.g. enabling learners working at a distance to collaborate), supporting learning through enquiry, practice and assessment, and enabling the learning experience to happen across different settings.

However, A recent study made up of 190,000 responses from 27 European countries highlighted that 20 percent of secondary-level students have never (or almost never) used a computer in their school lesson and IT training for teachers is inadequate.²⁴ In the *Vodafone Institute for Society and Communications: Talking about a Revolution – Europe’s Young Generation on Their Opportunities in a Digitised World* (Survey conducted by YouGov), only 8 percent of young people interviewed in the UK, think that schools provide ‘very good’ ICT teaching.

Overall respondents in the survey showed a strong belief that schools and universities need to use ICT more often in general, not just in specific courses, in order to improve learning of technical skills.²⁵ Across the UK, Germany, the Netherlands, Spain, Italy and Czech Republic, it was in the top three recommendations for what schools and universities need to do to improve learning of ICT. For example, 43 percent of young people in Germany and 42 percent of young people in Spain supported this.²⁶

ICT is not a separate subject or something to be used in isolation; it is the means of education and a conduit for learning that can interlink resources, information and talent and drive innovation.

INNOVATION

Solar Stormwatch, is an online platform created by the Royal Observatory in Greenwich to track solar storms with the potential, ultimately, to help develop a space weather forecast.²⁷ To do that, they need to gather and analyse as much data as possible. That means they need to reach out to students to contribute to the project, asking them to help identify solar storms. By tracking explosions on the sun across space to earth, learners help to “give astronauts an early warning if dangerous solar radiation is headed their way.”

Through this collaboration, learners get to connect with scientific experts, learn about solar science and develop the skills of storm spotting from online videos and other information, enabling them to make their own new scientific discoveries and contribute to the development of the project.²⁸ There are also lesson plans for teachers and an online forum where they can share experiences and ideas for using the materials.

RECOMMENDATIONS

- National governments, umbrella teaching bodies, and institutions of the EU should support ICT as the means of education by developing mechanisms for teachers to share know-how on using technology in their lessons, such as the online catalogue of mobile content that has been tested and used by teachers on the mSchools programme.
- National governments should introduce digital literacy as a Key Performance Indicator (KPI) for public educational institutions.²⁹
- Educational institutions should be prioritised when it comes to high speed broadband connectivity in order to unfold the full potential of digital education. This will rely on partnership between national governments and the telecoms industry.
- Schools and universities should establish professional structures and expertise for ICT support and management. This might require additional centralized support from national governments to achieve economies of scale.

Generational divide

Whilst there is a patchwork of ICT training across the education system, the biggest gap that needs to be bridged is the generation gap.

Each generation has entered the digital world at a different stage of life. Young people were born into the digital world; they are digital natives, and

digital technology is an intuitive part of everyday life for them. Their teachers, however, are invariably digital immigrants, for whom digital technology is not intuitive.

Students may well know more about digital technology than their teachers, yet ICT training for teachers is rarely compulsory and is often left to individuals to up-skill independently.³⁰ These imbalances can hinder the adequate interaction of teachers and learners when using digital technology.³¹

INNOVATION

Primo is a game, which introduces children aged 3–7 to the logic of computer programming.³² The aim of the game is to guide a robot called ‘Cubetto’ to his destination by creating instruction sequences using colourful instruction blocks.

Whilst helping to build the foundations of a digital lens in young learners, Primo also crosses the generational divide. Initial workshops are provided to teachers and learners so that without any prior knowledge of programming, teachers can teach the basics of programming. Ongoing support is provided through an online Primo community to enable teachers to share insights on curricula and activities.

RECOMMENDATION

National governments should make ICT training a compulsory part of the continuing professional development for teachers.

Teachers curate the learning experience. They manage learning resources (making assessments of cost effectiveness and application), and are fundamental to integrating and implementing digital tools effectively.

There needs to be more collaboration between the innovators of educational technology, teachers and industry, so that ideas can be tested before they are taken to market, and to ensure products are better tailored to teachers’ needs, and ultimately learners.³³

INNOVATION

The **mSchools** programme, is a mobile education initiative launched in 2012 by Mobile World Capital Barcelona, in partnership with Generalitat de Catalunya, Ajuntament de Barcelona and GSMA.³⁴

Its aim is to promote the use of mobile technology in education to support new ways of teaching and learning and improve the employability of young people.

The project promotes the development of digital literacy at the same time as promoting collaboration with industry to help tailor educational technology to the needs of teachers and learners.

For example, the 'mLab' initiative, which acts as a broker between schools and industry, helps match schools with new innovations that industry wants to test out in a real setting. It helps prepare industry to pilot innovations effectively and facilitates feedback into product development from teachers and students.

The project also includes a computer science elective for Catalan High Schools focused on app design and prototype development. The course also provides mentoring from industry experts, helping to demonstrate the potential of digital technology in careers and opportunities of entrepreneurship to young learners.

As a result of these different initiatives the mSchools programme has started to create an online catalogue of mobile content that teachers can use in their classes. The materials featured have all been tested and used by teachers in the region, helping to ensure quality and relevance.

RECOMMENDATION

National, regional and local governments should look to partner with private sector bodies delivering educational technology, to put in place mechanisms whereby input from teachers and learners can be integrated into new product development. For example, the mSchools 'mLab', which acts as a broker between schools and industry to help match schools with new innovations and helps prepare industry to pilot innovations.

The skills we need

In general there is a gap between education and the workplace. So what are the skills that young people need to bridge that gap, and where do the opportunities lie?

Young people need a portfolio of skills to prosper in the digital economy, both soft 'life' skills and business knowledge. Beyond digital literacy, more advanced technological expertise offers new and increasing employment opportunities for young people. The IT industry is growing faster than other sectors, yet at present young people are not aware of the opportunities that are available and do not have the skills to take advantage of them. In the digital sector in 2012, the number of vacancies was over three times the total number of ICT students graduating that year. In *European Jobs and Skills: A Comprehensive Review 2014*, Dolphin et al found that, "Over one third of German, a quarter of Swedish and over ten percent of British employers had difficulties filling vacant positions in 2013," citing a lack of technical competencies as a primary concern.³⁵

Developing the right skill set for those roles is challenging.

In *Model Workers: How Leading Companies Are Recruiting And Managing Their Data Talent*, Nesta describe the 'perfect' data analyst (in the eyes of companies) as: having strong core analytical and computing skills, having strong awareness of business issues, being highly creative and curious, being able to transform analytical insights into compelling business proposition, and being a strong team-player.³⁶

Perhaps unsurprisingly, the perfect data analyst is “elusive.”³⁷

A combination of hard and soft skills are needed: numeracy and problem solving (that build the digital lens in the education system), matched with strong communication abilities that can translate those skills into the workplace. That learning process is continuous and needs to be incorporated into the continuing professional development of the existing workforce.

Filling the ICT skills gap is not just about skills, though; it is also about perception. The *Vodafone Institute for Society and Communications: Talking about a Revolution – Europe's Young Generation on Their Opportunities in a Digitised World* (Survey conducted by YouGov), identified that although young people perceive digital literacy as a requirement of their working lives, the benefits of a career in ICT are not always visible to them.³⁸

RECOMMENDATION

Government and education bodies should develop products and services that help young people to understand the possibilities within ICT careers. For example, this might take the form of an online catalogue for young people with examples and case studies that demonstrate how ICT careers link back to formal curriculum in schools.

Computer code

Computer code is the language of the digital economy.

Of course, not everyone needs or wants to grow up to be a computer programmer, but computer code informs the logic of our world. Computational thinking and problem solving engages with the digital world and provides transferable skills to other disciplines.

INNOVATION

App Camps in Germany provides coding workshops for young people to work with computer programmers to create their own apps.³⁹ In the process young people gain an understanding of computer coding, but also learn about teamwork and develop their self-confidence, as they have to present their ideas and collaborate with one another to bring them into fruition. The program is now expanding to partner with schools and other educational institutions.⁴⁰

Computer code is part of the digital lens, and is also a direct gateway to employment opportunities.

INNOVATION

The National College for Digital Skills will be the UK's first further education college dedicated to teaching students the higher level digital skills they need (including computer code) to progress into computing related employment. This requires working in collaboration with industry to tailor the curriculum to overcome the digital skills gap. This will involve industry-designed projects, linked to the formal curriculum.

The college hopes to provide a strong vocational alternative to university, helping to foster a parity of esteem between vocational and university qualifications, and to be a beacon of best practice for higher-level digital learning that other education institutions can partner with and learn from.

The National College for Digital Skills will open in 2015, and its focus will be post-18 education and tech-focused Higher-Level Apprenticeships and Foundation Degrees. Start-up support for aspiring entrepreneurs will also be offered.

The first campus will open in London. The college's aim is that within five years 40 percent of its students will be girls (to address the gender imbalance in the digital sector) and 50 percent of its students will have been on Free School Meals (an indicator of challenging circumstances).

How we learn: continuous and open learning

The shape of learning and its relationships are changing. The growth of Massive Open Online Courses (MOOCs) is illustrative of the power of digital technology to improve access to training.

MOOCs, though celebrated for developing the reach, scale, efficiency and democratisation of learning, are challenged over their dropout rates, their disruptive impact on the education sector⁴¹ and their quality.⁴²

Although MOOCs are an evolving product, they are part of a building enthusiasm for open, lifelong and demand-driven online learning, enabling individuals to embrace independent learning and take responsibility for their own skill development throughout their lives.

Structure

Digital learning is a shift away from traditional classroom and course structures, online competence-based education enables students to up-skill by selecting modules based on skill competencies that are easily demonstrable to employers: "This person can apply financial principles to solve business problems; this person can write memos by evaluating seemingly unrelated pieces of information."⁴³

Digital technology also provides the opportunity to make the learning experience personal, through regular feedback that can be used to tailor the learning experience to an individual's needs.

2.2 Partnerships

Linking education, the workplace and business to inform the development of curricula is essential. Just as teachers need to provide input on the development of educational technology, so industry can help inform course content and delivery.

However, The McKinsey report, *Education to Employment: Getting Europe's Youth into Work* brings into focus a mismatch.⁴⁴ The report found that employers, education providers and young people operate in 'parallel universes' and that in Europe 74 percent of education providers are confident that their graduates are prepared for work, but only 38 percent of youth and 35 percent of employers agree.⁴⁵

Across the countries in the *Vodafone Institute for Society and Communications: Talking about a Revolution – Europe's Young Generation on Their Opportunities in a Digitised World* (Survey conducted by YouGov) young people felt very strongly that schools, universities and employers need to work more closely together. For example, in Italy 90 percent of respondents agreed that schools, universities and employers need to work together more closely⁴⁶ and in the Czech Republic that rate was also 90 percent.⁴⁷

Education to employment

The education to employment gap raises many of the questions about our digital future that young people, educational institutions, businesses and policy makers are grappling with, in particular, the lack of alignment between them.

The McKinsey report, *Education to Employment: Getting Europe's Youth into Work*,⁴⁸ found that young people face three significant hurdles on the education to employment path: enrolling in post-secondary education (the biggest barrier being cost); developing the right skill sets for the workplace (including soft skills like oral communication and work ethic); and finding a suitable job due to lack of career support services.⁴⁹

Work experience is an important part of making the transition from education to employment. However, work experience is not a regular part of young peoples' education experience.⁵⁰ In the *Vodafone Institute for Society and Communications: Talking about a Revolution – Europe's Young Generation on Their Opportunities in a Digitised World* (Survey conducted by YouGov), making internships obligatory in education was one of the top three recommendations for change that young people from Italy, the Czech Republic, the Netherlands and Spain said they would make to the education and employment system.⁵¹

Whilst the value of work experience is in general recognised, vocational qualifications are yet to have parity of esteem with traditional academic paths, even where they may be more geared towards bridging the gap from education to employment.

INNOVATION

Unifrog is an app, which helps match students with university courses and apprenticeships.⁵²

It does this by using labour market information and comparing different factors such as the distance from home of the course or apprenticeship, the social life offered, the likely salary on qualification, and likely employment destinations on graduation.

Whilst providing access to a centralised pool of information it also helps students make informed choices about their next steps. It also enables teachers to meet their obligations to provide career advice.

INNOVATION

The **Estonian IT College** campus has a series of 'labs', which have offices where industry representatives are present during the course of each week. These labs are not fully integrated into the formal university curriculum, but provide a relaxed place for students to innovate alongside industry experts.

Linnar Viik, IT Scientist and member of the board of the IT College, describes how the "Drone Lab" is an example of a "practical product that also requires an academic framework for development," so bringing these two perspectives together to innovate makes sense.

Twice a year the lab holds an innovation competition where students who are working with drones pitch their ideas in front of academics and business professionals.

The three best ideas have a small ‘angel fund’ available to them, which they can use to further commercialise and develop their ideas. That means that they get both access to funding and business mentoring. By being open to industry and embracing industry engagement in the labs, the university builds links with businesses and helps build pathways for the students’ careers on graduation.

RECOMMENDATIONS

- There are many ways in which employers, young people and educational institutions can work together to bridge the various skills gap and improve employability, such as encouraging industry input on course design and content; rewarding academic credits for time spent completing work experience; incorporating skill based learning into the curriculum;⁵³ and promoting innovation hubs within educational institutions, supported by industry.
- Experience shows that young people respond especially well to personal contact with people working within industry. Schools, the private sector and educational charities should collaborate to create initiatives that promote these links, such as Founders4Schools, which brings entrepreneurs into schools to raise awareness of the career possibilities of entrepreneurship and digital technology; and the Estonian IT College where industry representatives come in to work with students and helps create pathways for the students’ careers on graduation.
- Digital technology can significantly improve access to careers information and matching between employers and potential employees. Public and private sector funders need to invest in products to meet these needs, as exemplified by the Unifrog app that matches learners with courses and Intern Avenue that matches young people with employment opportunities. These currently operate at a national level, but digital technology has the potential to expand such initiatives across Europe, with a role for the private sector and multinational bodies, such as the EU.

- Educational institutions, industry and government should work together to find ways of reducing the financial barriers to further education. As the McKinsey report, *Education to Employment: Getting Europe's Youth into Work*,⁵⁴ recommended, this might include: governments and private financial institutions offering low-interest loans for students pursuing courses that have a strong employment record; or exploring initiatives that allow young people to pay for part of their education or training in the form of services. Employers can also play a role by promising jobs to young people (following a rigorous recruitment process) and then funding their training programme to prepare them for these jobs.⁵⁵

All those initiatives require a wider context that supports this integration and enables successful innovations to flourish.

“It’s important to instil a sense in young people that they need to make the most of the opportunities available to them. Yes, there’s competition but also for the determined spirit there are ways to get through those challenges. Digital technology will only take you so far... What’s blocking us are the boundaries of human imagination.”

Dupsy Abiola, Founder, Intern Avenue

3. Creating – The Workplace of the Future

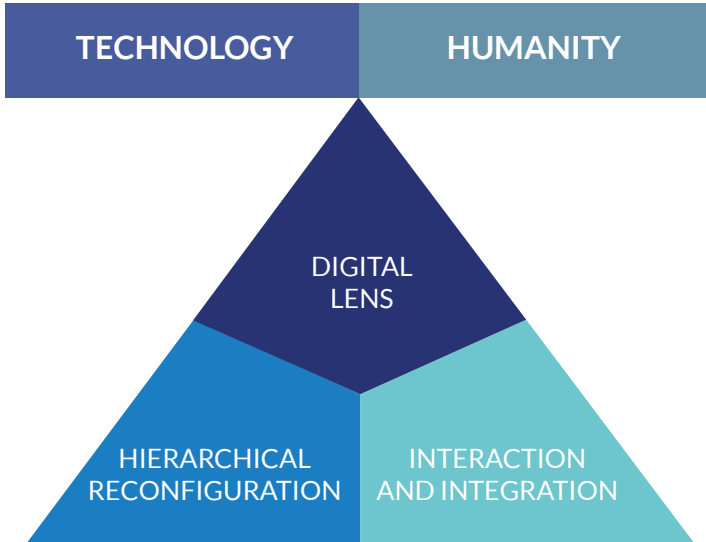
The workplace is a hub for collaboration to drive growth and innovation in the digital world. Human beings and their relationships are at its heart; for business owners, attracting and keeping the right talent is key. But digital technology is changing the expectations of the workforce, re-shaping working practices, career paths and the way we interact.

Digital technology's potential to increase productivity, efficiency and harmony (enabling us to connect and get work done faster than ever before) can also blur the lines between our homes and working lives. On the one hand there is more flexibility and choice in the way we work; on the other, it is creating a never-ending work-day.

The workplace is in transition and making the most of digital opportunities requires:

- 1 Hierarchical reconfiguration;
- 2 Applying the digital lense; and
- 3 The new logic of interaction and integration.

And all, whilst achieving a balance between technology and humanity.



3.1 Reconfiguring hierarchies

Talent

In *Future Work: Changing organizational culture for the new world of work*, Alison Maitland and Peter Thomson point out that there are “tectonic shifts taking place in the composition of the workforce, and in attitudes in wider society.”⁵⁶ Employers need to respond in order to recruit and retain the talent that they need; and workplace structures need to align with the changing nature of the workforce.

Expectations

The financial crisis is also a crisis of business management practices and there is a shift happening: people are not looking solely for financial reward from their working lives.⁵⁷ The integration of digital natives into the workforce is driving change.

Digital natives are tech savvy, unafraid of the process of digitisation and come to the workplace with very different expectations. In particular, they give greater emphasis to the need for flexibility and work-life balance in their

careers.⁵⁸ However, this does not replace their desire for long-term security.⁵⁹ And according to Maitland and Thomson, the younger generation, “will be asking more searching questions about why we work the way we do.”⁶⁰

Organisational infrastructure and culture needs to engage young people: day-to-day the workplace needs to manage the generational mix, matching the knowledge and skills of baby boomers with the digital perspective and technological aptitude of the younger workforce.

Different ways of working require investment in technological infrastructure, learning and development. They also require a change in mindset.

Traditional career models no longer fit the majority of the new workforce. Career paths are more fluid and less linear, with greater movement across sectors and the emergence of the portfolio career.

Entrants to the workforce will have a much higher number of employers over the course of their lives.⁶¹ They will also be defined by their skills and professional networks rather than a single career label. That’s a big shift away from the traditional career ladder most senior managers have climbed, yet these managers are overseeing this transformation and are being required to leapfrog traditional hierarchies to connect with young people and transform their organisations.

Maitland and Thomson describe how many companies are not ready for the cultural changes that will take place as younger workers move into leadership roles.⁶² They refer to the Odgers Berndtson and Cass Business School’s survey of senior executives of global companies, ‘*After the Baby-Boomers: The New Generation of Leadership*’, where 68 percent of respondents thought that companies rely too heavily on male baby boomer CEOs⁶³ and only 41 percent thought their organisations were ready for the coming demographic change.⁶⁴ In this way, social and cross-cultural intelligence are likely to be the most important skills for management of human dynamics even in the most technologically advanced working context.

RECOMMENDATIONS

- Given the pace and scale of change, continuous learning and development needs to be the new norm for all organisations in the digital economy. This must be supported and promoted at the highest levels by leaders.
- Diversity has become increasingly important. For example, studies have shown that women are especially well attuned to the needs of the younger generation,⁶⁵ making them effective leaders for organisations that need to rethink traditional hierarchies in order to harness the talent of those who might be younger, but possess skills lacking further up the organisational ladder. Businesses must continue to develop strategies that promote more women to leadership roles.

3.2 Applying the digital lens

Digital technology brings with it the promise of higher productivity and new work practices. However, that has yet to be fully realised.⁶⁶

Workplace infrastructure

Digital technology can reduce operational overheads:⁶⁷ remote working and virtual workplaces allow for work around the clock, cut commuting and enable businesses to take advantage of harder-to-find skill sets. For example, crowd sourcing changes the way work is organised, research is undertaken and tasks are allocated. It is a driver of innovation, enabling organisations to reach out to a variety of minds, often outside their traditional industry parameters, in order to find solutions to the problems that they face.⁶⁸

Technical infrastructure and training also support new ways of working.⁶⁹ It's not a case of one-size fits all, but of matching the potential of technology with business needs.

Trust

Maitland and Thomson argue flexible working should not be seen as a ‘cosmetic adjustment’ or ‘employee benefit’ but rather a business initiative to increase competitiveness and improve the bottom line.⁷⁰ Remote working has been shown to improve productivity and lower attrition rates,⁷¹ despite an assumption that remote workers ‘will not work as hard as office based workers’.⁷²

That does not mean that everyone everywhere should or needs to work from home all of the time. In fact, young people whose social lives are more connected to the work place may not want to work from home as much.⁷³

Remote working may also suit some sectors and tasks more effectively than others,⁷⁴ but what is clear is that flexible working demands that employees are given greater autonomy over how they get their work done, and fundamental to that is trust.

This is part of a shift in perspective: acknowledging that people can be more productive when you let them have control over their working patterns.⁷⁵ In fact, research by Behavioural Economist Armin Falk has shown empirically, that where principals induce trust this leads to higher performance and payoffs.⁷⁶

In this way, people can also be rewarded for their productivity, ideas and output, rather than simply the time it takes them to complete a task.

Virgin’s recent announcement that they will be trialling an unlimited leave policy, allowing employees to make decisions about when and for how long they take time off, is one example. It was driven by the idea that technology has facilitated flexible working practices and holiday policy should catch up. Writing on the Virgin blog Sir Richard Branson described how the new policy trusts that employees are only going to take leave when, “they feel a hundred per cent comfortable that they and their team are up to date on every project and that their absence will not in any way damage the business – or, for that matter, their careers!”⁷⁷

INNOVATION

Flexible working, trust and innovation

Red Gate⁷⁸ is a small technology company. Founded 15 years ago, it has grown from a zero to £28m turnover. The average age of employees is 33.

Red Gate allow their employees to have complete autonomy and promote an open feedback culture. For example, they have flexible working hours and no rules about browsing the web or personal emails. They empower and trust them to develop working patterns around their individual productivity; if they're not good at working first thing in the morning, they can start the working day later.

There is also an emphasis on innovation. Each quarter they run a 'Down tools week' for their technical teams, which means employees stop their normal work and pitch new project ideas for to colleagues. Making mistakes is also embraced as an inevitable part of the innovation process and a sign of a healthy organisation.⁷⁹

As Brian Tufnell, a Project Manager at Red Gate says, "You're trusted to get on and do the best work you can. So as a Project Manager I don't get told how to run a project or which methodologies to use: I get a lot of freedom to try new techniques. The process is pretty light here – the general premise is that if it's not adding value then why bother doing it? We take a pragmatic approach to most things, which helps us to focus on getting the right stuff done."

RECOMMENDATION

Business leaders need to continue to invest in IT infrastructure that will allow them to deliver the flexibility needed in the digital economy, such as supplying employees with reliable remote access technology for flexible working.

The progressive working environment offers the potential for greater autonomy and a balancing of work and family life. However, it is the highly skilled workers that are most likely to be able to capitalise on that opportunity. The risk is that those in the middle will become squeezed and low skilled workers will be pushed further to the edge as more tasks become automated and competition for jobs increases.

It is learning and resources that will determine how well integrated people can be into the digital world, and the workplace is no exception.

Balance

“It’s easy to get enthusiastic about the impact of new technologies but we cannot ignore other human needs.”

Allan Päll, Secretary General at the European Youth Forum

The same technology that keeps us connected to friends and family can keep us connected to work. Flexible working practices can blur the lines between our personal and working lives. Setting their parameters is challenging. In the *Vodafone Institute for Society and Communications: Talking about a Revolution – Europe’s Young Generation on Their Opportunities in a Digitised World* (Survey conducted by YouGov), young people share some of these concerns. For example, in the Czech Republic 74 percent of respondents think they might be too dependent on digital technology.⁸⁰

Digital technology can be at once liberating and constraining, allowing more control over one’s working life but with the potential to overrun it and have significant physical and psychological impact.⁸¹

One in three people are overwhelmed by technology and social media and email overload can be a significant source of stress, particularly with the increased connectivity brought about by smartphones.⁸²

The overuse of digital technology also means less direct human interaction. The displacement of in-person interaction by digital technology has been found negatively to impact the development of social skills in young people.⁸³

In the *Vodafone Institute for Society and Communications: Talking about a Revolution – Europe's Young Generation on Their Opportunities in a Digitised World* (Survey conducted by YouGov), 77 percent of respondents in the Czech Republic worry about communication becoming more superficial.⁸⁴

3.3 A new logic of interaction and integration

Whilst social media is perceived by many people as a distraction from work, social media platforms are changing the way that people view collaboration and interaction and their logic is no longer separate from the workplace.⁸⁵

Social technology, such as crowdsourcing, brand development and providing access to consumer insights, is not only changing how organisations interact with their external environment, but also how organisations interact through their internal networks: it enables them to collate information and know-how.

The McKinsey report, *Social Economy: Unlocking value and productivity through social technologies*, identifies that high-skill knowledge workers spend 19 percent of their average workweek searching for and gathering information⁸⁶ and improved communication and collaboration through social technologies could raise the productivity of knowledge workers by 20 to 25 percent.⁸⁷

RECOMMENDATION

Business leaders need to rethink approaches to the use of technology in the workplace by staff and put in place guidelines and practices around its acceptable use that is realistic of staff needs. By identifying examples of best practice and overtly supporting new methods of working, they will help foster a culture of trust that empowers employees to take control over their working practices. This should extend to the use of social networking; businesses should harness this new methodology to build trust and collaboration into the work place.

Recruitment

Digital technology facilitates a more efficient matching process between individuals and the work place.

For example GigWalk, Freelancer and TaskRabbit, are facilitating the relationship between freelancers and employers, allowing individuals to post their skills, and project managers to locate them, including location-aware features to map local talent.

Digital technology also matches the interface of education to employment.

Intern Avenue is an interactive platform that matches students, graduates and MBAs with employers. It removes the burden of repetitive job postings and the application process for employers, whilst increasing market visibility for both employers and candidates. “In so doing, the platform is able to structure data, making it produce reliable, predictable results,” says founder Dupsy Abiola.⁸⁸

Rajeeb Dey, founder of Enternships, advocates a “learning-based approach to recruitment,” encouraging companies to open up their learning and development know-how to prospective candidates so that they can understand and appreciate the skills that companies are looking for. That means employers take a more active role in educating their workforce and candidates can make a proper evaluation of whether they are a good match with an employment opportunity.⁸⁹

Companies should not be afraid to open up their know-how to help inform potential candidates of the kind of skills and knowledge that will fit their workplace.

In turn, candidates can use those materials to develop their skills to better fit employers’ needs and make more discerning choices about where they apply for jobs. Both candidates and employers should thereby find a better match.

It also supports companies building their brands and reputations.

That integrated approach can also promote learning between companies and individuals across their supply chains, linking big business to SMEs and helping to create greater understanding and efficiencies across their business.

RECOMMENDATION

Organisations should use the recruitment process as an opportunity for learning and development – for both themselves and for their potential recruits, as advocated by Rajeeb Dey, Founder of Enternships.

4. Growing – Business and Entrepreneurship

Entrepreneurship is an engine for growth⁹⁰ and job creation⁹¹ and in the digital economy tech startups are its home. Although not a silver bullet to completely solve the economic challenges that Europe faces, as well as creating jobs⁹² startups are a rich source of innovation and new business practice that will drive growth and help unlock the potential of the digital age.

To drive entrepreneurship and growth and develop the business ecosystem with a policy and digital infrastructure, we need to:

- 1 Support, unlock and integrate entrepreneurial mentality and business capability across the economy;
- 2 Develop an infrastructure and culture that supports investment and scalability in the startup ecosystem;
- 3 Promote partnerships, integration and consolidation in the digital economy.

4.1 Unlocking innovation and entrepreneurship: linking startups, SMEs and big business in the digital world

Europe's got talent; we need to unlock it.

Entrepreneurship creates new companies and jobs, opens up new markets and nurtures new skills and capabilities.⁹³ Small and Medium-sized Enterprises (SMEs), are the most important source for new employment in Europe, creating more than four million jobs per year.⁹⁴ However, the European Commission has found that nearly three-quarters of Europeans consider it too difficult to start their own business because of administrative complexities⁹⁵ and the European Commission's *Entrepreneurship 2020 Action Plan* points out that when enterprises are founded, "they grow more slowly in the EU than in the USA or emerging countries and fewer of them join the ranks of the world's largest firms."⁹⁶

In general there is a need for legislation that better takes into account the needs and special characteristics of small businesses. The European Commission's *Entrepreneurship 2020 Action Plan* describes how present weakness in legislative infrastructure is also a driver and a reflection of a wider culture in Europe "that does not recognize or reward entrepreneurial endeavours enough."⁹⁷

Startups are a distinct category of small business. Tech startups in particular work in a fast-changing environment, and require specific support to help them grow. Whilst they may tend to grow and fail faster than other businesses, they can also scale rapidly. In practice that means higher rewards but also higher risk.⁹⁸

Startups are at the coal-face of the digital economy and SMEs are the lifeblood of the EU, accounting for 98.8 percent of all businesses; IT plays a critical part in the future competitiveness of both.⁹⁹

SMEs may lack dedicated resources and IT budgets (like startups), but their limited legacy infrastructure means they have to incorporate new technology into their businesses; startup innovations in digital technology and business practice can help SMEs grow.

In his article '*Why Corporations and Startups Are Working Together*', Jason Grill, Co-Founder of Sock 1010 writes that for big business, collaboration

with startups can provide access to “spark of innovation” that bigger organisations may lack: startups embody “a 21st century mindset of speed and product innovation” that larger companies can learn from.¹⁰⁰

SMEs and big businesses can be customers for startups, helping to scale up their business. Startups with investment from, or a commercial agreement with, a large corporate will be looked at favourably by other investors.

4.2 The start: building the startup ecosystem

Entrepreneurship, which is regarded as an engine for growth in the United States, has not been cultivated in a systemic way in Europe. Creating more startups requires policy change that will drive a change in mindset.¹⁰¹

For example: the *Startup Manifesto for Entrepreneurship and Innovation to Power Growth in the EU*, points out that “in the US, many students start their business before they even graduate – 20 percent of the students at Caltech, Stanford and Berkeley. This gives students a taste of what it’s like to start and operate a business while remaining in a structured, supportive environment that acts as a ‘safety net’ in case their plans fail.”¹⁰²

In the *Vodafone Institute for Society and Communications: Talking about a Revolution – Europe’s Young Generation on Their Opportunities in a Digitised World* (Survey conducted by YouGov), young people show enthusiasm for starting their own business. For example in Italy 80 percent of respondents would in general love to start their own business and 44 percent would like to start a business in the area of ICT.¹⁰³ In Spain 78 percent of respondents would like to start their own business and 52 percent would like to start a business in ICT;¹⁰⁴ and in the Netherlands 63 percent would like to start their own business, although only 27 percent would like to start their business in ICT.¹⁰⁵ However in the UK that figure drops to 58 percent regarding starting a business in general and only 15 percent when it comes to starting a business in ICT.¹⁰⁶

Respondents also identify a number of barriers to starting a business. For example in Spain lack of work experience and funding were cited,¹⁰⁷ and in Italy strong regulation was identified as one barrier.¹⁰⁸ And underlying that there is also a need for an education system that takes requirements of economic and real life tasks more into account.¹⁰⁹

“We have the talent,” says Philipp S. Krüger, Visiting Fellow, Digital Economy Project at Stiftung Neue Verantwortung. “But is that talent incentivised enough to choose the digital economy over the traditional? No.”¹¹⁰

INNOVATION

Founders4Schools¹¹¹ was born out of the initiative ‘Silicon Valley Comes to the UK’¹¹² that links UK schools with entrepreneurs in the US.

Through the programme, teachers arrange for founders of successful, growing businesses to visit their schools to give talks to students about their journeys. These talks cover topics such as what they studied when they were in secondary school; how STEM¹¹³ subjects can relate to tech enterprises and the possibilities of careers with digital technology; what motivated them to set up their businesses; and why they would recommend entrepreneurship as a career choice.

The programme develops awareness of the career possibilities of entrepreneurship and digital technology. It is about “opening young people’s eyes to the jobs of tomorrow, not necessarily the jobs of the past,” says Nick Harrison, Chief Operating Officer of Founders4Schools.¹¹⁴

The project includes running an app competition whereby children submit their ideas for an app. The best ones are developed into prototypes by university students and the winners will go to Silicon Valley.

The pilot programmes run in 2011–12 reached over 2,450 students. 96 percent of students felt inspired by the speakers and 54 percent wanted to find out more about business planning or technology skills after attending one of the events.

RECOMMENDATIONS

- The *Vodafone Institute for Society and Communications: Talking about a Revolution – Europe's Young Generation on Their Opportunities in a Digitised World* (Survey conducted by YouGov) highlights that young people need more support in developing life skills. National governments and public education bodies should incorporate business skills, basic accountancy and entrepreneurship into personal and social education courses across the education system.
- Experience shows that young people respond especially well to personal contact with people working within industry. Schools, the private sector and educational charities should collaborate to create initiatives that promote these links, such as Founders4Schools, which brings entrepreneurs into schools to raise awareness of the career possibilities of entrepreneurship and digital technology; and the Estonian IT College where industry representatives come in to work with students and helps create pathways for the students' careers on graduation.

As we saw in the Learning chapter, greater collaboration between educational institutions and industry, such as through innovations like the National College for Digital Skills in the UK and the hubs at the Estonian IT College, will all help to commercialise ideas before students have graduated and expose them to the skills and mindsets that workplaces need.

Overall, financial barriers are considered one of the highest rated challenges for web entrepreneurs.¹¹⁵

Entrepreneurs and investors need an ecosystem that reduces perceived and actual risk and enables investment and business development.

Improving access to capital and mentoring

Accelerators and hubs

Accelerators are business incubators, which provide seed funding, mentoring and training to participants who are usually selected in an open application process. They are particularly helpful for young or inexperienced entrepreneurs, or those wanting to build a network and contacts in the technology and investment community and get some initial funding to test out an idea.

In his article, *'It's getting crowded: with roughly 100 startup accelerators across Europe, how many are enough?'* Robin Wauters, Co-founder and Editor in Chief of European Technology Industry blog, [Tech.eu](#) describes how, "After 'graduating', startups are supposed to have used the capital, mentorship and feedback to gradually evolve into a viable business, or at least to a point where the team is able to convince more deep-pocketed investors to make a bet on them."¹¹⁶

Examples include: Startup Wise Guys (Estonia),¹¹⁷ Rockstart (The Netherlands),¹¹⁸ OpenFund (Greece),¹¹⁹ Nexstars (France),¹²⁰ and Blackforest Accelerator (Germany).¹²¹

Accelerator programs are mainly found in large cities and technology hubs. Some large companies have their own accelerator programmes (e.g. Wayra, operated by Telefonica and BBC Labs). European Technology industry blog, [Tech.eu](#) estimates that there are 94 organisations working as startup accelerators across Europe.¹²²

Greater integration is needed. The European Commission's Startup Europe Accelerator Assembly was set up to support that process with the aim of connecting accelerators with policymakers, and strengthening the environment for web entrepreneurs in Europe.¹²³

Hubs also provide affordable office space where entrepreneurs can work alongside each other and investors to share know-how and resources, but like accelerator programmes, there is a patchwork of coverage across Europe.

Crowd funding

Crowd funding platforms, such as seedrs.com and crowdcube.com, are growing in popularity and acceptance, enabling entrepreneurs to raise money from a wide range of individuals. More bespoke crowdfunding platforms are also starting to develop, for example, venturefounders.com¹²⁴ that can connect companies to those seeking advice as well as cash.

Venture Capital

There has been a decline of venture capital in the EU since 2008,¹²⁵ and in general VC investors are hesitant to invest in high-risk companies because of a lack of experience in financing young businesses. They are also unable to offer the knowledge and support network that startups need.

Angel Investors

Angel investors are individuals who will provide financial backing, often alongside mentoring and business expertise and industry networks, to support business development.

It is the combination of know-how, mentoring and capital that an angel investor can offer that makes them a particularly attractive source of funding.

But attracting investment is tough, and in general more could be done to support investors and help reduce the perceived and actual risks of investment. Firstly, investors and startups need to communicate regularly prior to and during the course of the investment, but broader infrastructure is needed to help share knowledge about the process too.

INNOVATION

Investment incentives: The Seed Enterprise Investment Scheme

The SEIS was introduced in the UK in 2012 and is focused on encouraging investments in small young enterprises, by providing tax breaks and reducing risk for investors.

Investors can invest as much as £100,00 per tax year. In return, the government provides upfront income tax relief of up to the value of 50 percent of the money invested (thereby reducing an investor's risk by half). If the company succeeds, investors are exempt from capital gains tax on the profits from the sale of their shares.

If the company fails, investors may be able to offset their losses against their income tax.

This takes the “sting” out of an investment¹²⁶ for the investor and is credited with having supported and facilitated angel investment in the UK.¹²⁷

RECOMMENDATIONS

- National governments should review fiscal systems to ensure tax policies reduce financial risk and incentivise investment, (for example, innovations like the UK's SEIS scheme investment).
- Governments should spearhead an initiative to create a database of experts accessible (for a charge) to investors to provide input to their investment decisions, and act as a pool of information on startup successes and failures, says Tim de Vere Green, Angel Investor.¹²⁸

The fear of failure

Many would-be entrepreneurs do not start a company because of their fear of the consequences of business failure.¹²⁹ However, failure is a part of entrepreneurship; is pervasive in the digital world; is part of the innovation process; and characterises the trial and error of the computer programming process. The growth of startups in the US is credited in part to the country's entrepreneurial culture and Nick Harrison, Chief Operating Officer, Founders4Schools, refers to a mindset that “failure is success in progress.”¹³⁰

As well as creating greater awareness of the opportunities and potential of an entrepreneurial career path within the education system¹³¹ and providing opportunities for students to pursue their business ideas within the relative safety of educational institutions, legislation can foster an entrepreneurial culture and mitigate this fear. For example, the European Commission's Entrepreneurship 2020 Action Plan identified that 96 percent of bankruptcies are ‘honest failures’ due to a string of late payments or other objective problems, rather than fraud. However entrepreneurs are “treated under many

bankruptcy laws as if they were fraudulent, having to go through complex, time consuming procedures before they can be discharged.” It may be enough to deter them from pursuing a second venture. However ‘second starters’ are “more successful and survive longer than average start-ups and they grow faster and employ more workers.”¹³²

Bankruptcy laws must protect creditors’ interests but at the same time keep viable businesses alive and create an environment that supports the entrepreneur to take the risks of a new business. Bankruptcy can be part of the learning experience of the entrepreneur.¹³³

RECOMMENDATION

As suggested in the *Entrepreneurship 2020 Action Plan. Reigniting the entrepreneurial spirit in Europe*, bankruptcy laws should be reviewed to allow, “second chances for honest bankrupts.”¹³⁴

4.3 Scaling up: partnerships, integration and consolidation

Attracting and rewarding talent

Startups need a flexible and highly skilled workforce. They may struggle to attract the right talent as they cannot offer the higher salaries that bigger businesses can offer, particularly in their earlier stages of development.

Employee stock options can compensate for that, and help directly link the success of the startup to an employee’s productivity.

However, not all countries’ tax systems support that. For example, in Germany employees pay income tax on the value of their shares as soon as they receive them (if the company has been privately valued), placing financial strain on employees and making stock options less attractive.¹³⁵

The *Startup Manifesto for Entrepreneurship and Innovation to Power Growth in the EU* also points out that in Europe individuals often have to pay income tax on their share options, and the manifesto recommends that shares offered by companies in Europe be taxed as capital gains not ordinary income,

in order to make them better incentives to attract talent.¹³⁶ More broadly the manifesto argues that Europe needs to make it easier for highly skilled talent to start companies and make it easier to hire talent from both inside and outside the EU.¹³⁷

INNOVATION

Collaboration between educational institutions, big businesses and startups can help provide access to the talent small businesses need and create employment opportunities for young people.

The founders of an early stage startup, **upmysport**,¹³⁸ were also alumni of Bristol University. The university's careers service established an initiative to support current students and recent graduates to get paid work experience as a means of helping them transition into employment. Using their alumni network, the university linked up with this early stage startup that was looking for flexible and cost effective support to help build their business.

The careers service introduced George, a recent graduate who had been unable to find employment but could not afford an unpaid internship, to the startup. George's work experience was funded by Santander (as part of a wider programme to support SMEs, that includes funding for internships). George went on to become a full time employee of the startup.

RECOMMENDATIONS

- National governments should develop specific regulation to help early stage startups so their regulatory burden in terms of general company law is not the same as larger businesses. As the example of employee stock options in Germany shows, making it easier to offer employee stock options will help to recruit and reward talent.
- Educational institutions, big business and SMEs need to come together locally and regionally to provide employment solutions and work experience opportunities for young people. For example the link between upmysport and Bristol University.

Access to data and regulation

Many startups develop their business models around access to data.¹³⁹

The European Commission estimates that open data initiatives could result in €40 billion in growth per year and the creation of thousands of jobs.¹⁴⁰ The British government has released over 8,000 datasets free of charge. Official estimates are that the release of those datasets resulted in €16 billion of economic growth in 2011.¹⁴¹

Governments play a critical role in the collection and provision of data. Initiatives like the Open Government Partnership¹⁴² are helping support open government, which is critical for the sustainable development of the digital economy.

Digital infrastructure

Access to and use of data also needs to be supported by a robust infrastructure that has the capacity to transport large volumes of data at high speeds.¹⁴³

The greater the quality of available digital infrastructure, the more possibilities there are for businesses to grow – for example, to engage the workforce remotely.¹⁴⁴ Additionally, it's no longer just about connecting people and products, but also machine to machine communication and beyond: the 'internet of things', which presents many opportunities for development and efficiencies.

That infrastructure also underpins economic growth: the European Commission estimates that “a 10 percent increase in broadband penetration increases GDP by 1–1.5 percent.”¹⁴⁵

However, according to research conducted by GSMA, Europe is the only region in the world where the telecoms industry hasn't returned to growth since the recession. Europe is already late to roll out the next generation of mobile broadband networks (relative to the US and parts of Asia)¹⁴⁶ and has lower levels of investment in fibre and new fixed infrastructure than many other regions.¹⁴⁷

According to GSMA, average data connection speeds in the US are 75 percent faster than those in Europe, and by 2017 will be twice as fast.¹⁴⁸ Mobile investment in the US has also outpaced that in Europe, with capital expenditure in the US growing by 70 percent since 2007 while declining in the EU, and the gap continues to widen.¹⁴⁹

The characteristics of the digital communications market in Europe need to be re-orientated to support that investment. In particular, in order to meet consumer and business needs for faster connection speeds and greater capacity, we need spectrum reform, allowing for spectrum ownership, trading and harmonised spectrum allocation, co-ordinated at the European level.¹⁵⁰

In addition, the joint statement by GSMA and European telecoms operators in Europe presented at Digital Venice 2014, included reference to the need for “a new interpretation and application of merger regulation and guidelines, to reflect the rapidly changing environment characterised by strong growth and data consumption and new sources of internet based competition,” to allow consolidation of the telecoms market along with relevant safeguarding measures.¹⁵¹

Legal framework

Data, ideas, our minds and outputs are our assets and commodities. We need legal frameworks that support them, but the current legal landscape is not fit for purpose in our digital world.

Mark Deem, a partner and TMT specialist in the international law firm Edwards Wildman Palmer UK LLP says that “lawyers are playing catch up... Law and regulation can only ever be reactive given the speed of developments in the digital world.”¹⁵² For example, new companies such as the smart phone app Uber that ‘connects riders to drivers’ are disrupting the traditional economy. In June 2014, London taxi and mini cab drivers took to the streets in protest at what they believe is a company operating in the gaps of technological and business regulation and the threat that poses to their industry.¹⁵³ As Reshma Sohoni, Partner at Seedcamp describes, “The existing laws weren’t clear enough to avoid such a dispute: how could they be? They were written before companies like Uber existed!”¹⁵⁴

Intellectual property

Intellectual property law is critical to the success of SMEs and the legal infrastructure recognises that their innovation and creativity is what is driving the economy. However, SMEs do not have large budgets for IP protection and more needs to be done to support them. The speed of technological development also demands quicker legislative change, and more forward

thinking in judicial interpretations is needed. The pace of change can be frustrating.

Patents are the key tool for protecting innovations and a new European Unified Patent Court is planned, alongside a new single patent right that can be enforced and protected across EU states. However, that is unlikely to become a reality until at least 2016.¹⁵⁵

Data

“Companies are increasingly recognising data as a critical asset; they are being told that strategic deployment, analysis and aggregation of that asset is fundamental to create new products, to deliver new efficiencies and to harness all important growth in this climate,” says Mark Deem.¹⁵⁶ Many startups are data-centric businesses. The collection, processing and transfer of data across international borders is essential.

But within that opportunity are responsibilities. “That data may involve personal, sensitive personal or commercially critical information, which has to be safeguarded appropriately.”¹⁵⁷

However, data and technology legislation is out of date and not in tune with the current landscape. The European Data Protection Directive will seek to streamline divergent national laws, and the hope is that it will be on the statute books during 2015.

Creating a legal framework for our digital future is a difficult balancing act. Without a legal framework, there is a risk of things getting out of control, but legislation also needs to avoid pulling things back and undoing the good.

A framework for moving data between countries and across regions is yet to be streamlined. Although there are regimes developing, such as the US-EU Safe Harbor Framework, there are still no worldwide protocols.

“Businesses no longer feel constrained by territorial boundaries, and the internet does not respect any such territorial delineations,” says Deem.¹⁵⁸ To have a scalable business and to ensure global competitiveness, businesses need an effective trans-border legal framework.

There is an explosion in the volume and variety of data: unless we can ensure veracity no stakeholder can be certain that it is valid.

We’re not democratic in our access to information and data so immediately there are barriers and imperfections to the data that exists. There

is no check that the data is put together in a scientific way, yet companies are harnessing a lot of information assuming that it is.¹⁵⁹

RECOMMENDATIONS

- Governments must support open government initiatives to drive best practice in knowledge sharing and promote integrity and trust in data management.
- National governments should establish national and regional legislative development on data privacy and business regulation and create bridging mechanisms to support internationalisation, working where necessary with multilateral bodies.
- National governments and multilateral bodies should support the development of Intellectual Property infrastructure geared towards innovation, such as the development of the European Unified Patent Court and streamline the IP dispute process to lessen the financial burden on SMEs.
- In light of the disruptive impact that new digital technology companies, such as Uber, can have, governments should work with startups and established businesses to help them to understand and prepare for further change. National legislatures will need to have the requisite digital literacy and confidence to do that.
- National and multilateral bodies should promote the consolidation of the mobile telecommunications market to drive the changes and investment needed to support business growth.

Appendix – Interviews

Dupsy Abiola	Founder, Intern Avenue
Anne Bouverot	Director GSMA
Nicola Broom	Co-Founder, upmysport
Mark Deem	Partner, Edwards Wildman Palmer UK LLP
Rajeeb Dey	Founder, Enternships
Mischa Dohler	Head, Centre for Telecom Research, Chair Professor, King's College London, Fellow & Distinguished Lecturer, IEEE Board of Directors, Worldsensing, Editor-in-Chief, ETT
Lisa Felton	Head of Consumer Policy and Content Standards, Vodafone Group
Albert Forn	Associate Director, MobileWorldCapital, GSMA Ltd

Wolfgang Gründinger	Spokesperson of the Foundation for Intergenerational Justice
Hana Gawlasova	Partner, Kinstellar
Nick Harrison	Chief Operating Officer, Founders4Schools
Oonagh Harpur	Senior Advisor to Trustees and Executive, Global eHealth Foundation
Alex Kelly	Founder, Unifrog
Matthew Kirk	Group External Affairs Director, Vodafone Group
Anne Knüppel	Educational Scientist, App Camps
Philipp S. Krüger	Visiting Fellow, Digital Economy Project at Stiftung Neue Verantwortung
Jon Luckhurst	Partner, Development Group International
Sinead MacManus	CEO and Co-Founder of Fluency
Baroness Morgan of Huyton	Chair of the House of Lords Select Committee on Digital Skills
Allan Páll	Secretary General at the European Youth Forum
Gracia Catalina Piñero	Director, Minerva Programme, Spain
Arty Rajendra	Partner, Rouse
John Roberts	CEO, Edapt and ed-tech entrepreneur
Ben Scott	Programme Director, European Digital Agenda, Stiftung Neue Verantwortung
Mark Smith	Co-Founder, The National College for Digital Skills
Reshma Sohoni	Partner, Seedcamp
Lucy Stonehill	Founder, Bridge U
Richard Taylor	Edtech Investor
Kevin Tao	President, Huawei, West European Region
Tim de Vere Green	Angel Investor
Linnar Viik	IT Scientist and Member of the Board of the Estonian IT College, Entrepreneur and Business Adviser

Endnotes

1. See <http://ec.europa.eu/digital-agenda/en/grand-coalition-digital-jobs>
2. Brynjolfsson and McAfee, (2014) *The Second Machine Age. Work, Progress and Prosperity in a time of Brilliant Technologies*. Norton.
3. Brynjolfsson and McAfee, (2014) *The Second Machine Age. Work, Progress and Prosperity in a time of Brilliant Technologies*. Norton. p. 11.
4. Stian Westlake, ed. (2014) *Our Work Here is Done. Visions of a Robot Economy*, Edited by Stian Westlake, Nesta. p. 10.
5. *Vodafone Institute for Society and Communications: Talking about a Revolution – Europe's Young Generation on Their Opportunities in a Digitised World* (Survey conducted by YouGov): Qualitative results based on 6 focus groups in D, UK, ES, NNL, IT and CZ. September 2014. p. 25.
6. *Vodafone European Youth Survey*: Qualitative results based on 6 focus groups in D, UK, ES, NNL, IT and CZ. September 2014. p. 26.
7. Mischa Dohler Head, Centre for Telecom Research, Chair Professor, King's College London, Fellow & Distinguished Lecturer, IEEE Board of Directors, Worldsensing, Editor-in-Chief, ETT. Interview 30 October 2014.
8. Linnar Viik, IT Scientist from Estonia, Founder of IT college in Estonia: Interview 9 October 2014.
9. Mourshed, Mona; Patel, Jigar; Sudar, Katrin (January 2014) *Education to Employment: Getting Europe's Youth into Work*. McKinsey & Company.
10. Mourshed, Mona; Patel, Jigar; Sudar, Katrin (January 2014) *Education to Employment: Getting Europe's Youth into Work*. McKinsey & Company. p. 13.
11. Maitland, Alison and Thomson, Peter (2014) *Future Work. Changing organizational culture for the new world of work*. Palgrave Macmillan. p. 13.
12. RSA Animate. Coplin, Dave *Re-Imagining Work Shifts in the Digital Revolution* See www.youtube.com/watch?v=G11t6XAlce0

13. Tim de Vere Green, Angel Investor. Interview 30 October 2014.
14. *Entrepreneurship 2020 Action Plan. Reigniting the entrepreneurial spirit in Europe*. Brussels, 9.1.2013 COM (2012) 795 Final. p. 17.
15. See www.i-cio.com/management/insight/item/the-digital-imperative-disrupt-or-be-disrupted
16. Sinead MacManus, CEO and Co-Founder of Fluency. Interview 1 October 2014.
17. *Formation of Digital Competence of Future Teachers of Elementary School*. Kushnir, Nataliya & Manzhula, Anna in V. Ermolayev et al. (eds): ICTERI 2012, CCIS 347, pp. 230–243, 2013. p. 232.
18. *Vodafone European Youth Survey*: Qualitative results based on 6 focus groups in D, UK, ES, NNL, IT and CZ. September 2014. p. 31.
19. The Digital Universe of Opportunities: Big Data and the Increasing Value of the Internet of Things. EMC April 2014, with research and analysis from IDC. See www.emc.com/leadership/digital-universe/2014iview/executive-summary.htm
20. The Digital Universe of Opportunities: Big Data and the Increasing Value of the Internet of Things. EMC April 2014, with research and analysis from IDC. See www.emc.com/leadership/digital-universe/2014iview/executive-summary.htm
21. Luckin, Rosemary; Bligh, Brett; Manches, Andrew; Ainsworth, Shaaron; Cook, Charles & Noss, Richard (2012) *Decoding Learning: The proof, promise and potential of digital education*. Nesta p. 58.
22. Matthew Kirk, Head of External Affairs, Vodafone. Interview 22 October 2014.
23. *Decoding Learning* p. 6.
24. See http://europa.eu/rapid/press-release_IP-13-341_en.htm, cited in: *Startup Manifesto for Entrepreneurship and Innovation to Power Growth in the EU*. 2013 p. 3.
25. *Vodafone European Youth Survey*: Qualitative results based on 6 focus groups in D, UK, ES, NNL, IT and CZ. September 2014. p. 30.
26. *Vodafone European Youth Survey*: Quantitative results – Germany pdf, p. 7; Spain pdf, p. 7
27. See www.solarstormwatch.com
28. *Decoding Learning* p. 18.
29. Mischa Dohler, Head, Centre for Telecom Research; Chair Professor, King's College London; Fellow & Distinguished Lecturer, IEEE; Board of Directors, Worldsensing; Editor-in-Chief, ETT. Interview 30 October 2014.
30. See http://europa.eu/rapid/press-release_IP-13-341_en.htm
31. *Formation of Digital Competence* p. 231.
32. www.primo.io/about
33. *Decoding Learning* p. 62.
34. See <http://mobileworldcapital.com/en/page/67>
35. Dolphin, T. et al (2014) 'European Jobs and Skills: A Comprehensive Review 2014', *IPPR*. p. 86.
36. *Model workers. How leading companies are recruiting and managing their data talent*, Nesta 2013 p. 18.
37. *Model workers. How leading companies are recruiting and managing their data talent*, Nesta 2013 p. 40.
38. *Vodafone European Youth Survey*: Qualitative results based on 6 focus groups in D, UK, ES, NNL, IT and CZ. September 2014 p. 30.
39. See <http://appcamps.de>
40. Anne Knüppel, Educational Scientist, App Camps. Interview 16 September 2014.
41. See <http://blogs.hbr.org/2013/01/eight-brilliant-minds-on-the-f>

42. See www.huffingtonpost.com/dr-keith-devlin/moocs-and-the-myths-of-dr_b_2785808.html
43. See <http://blogs.hbr.org/2014/10/the-real-revolution-in-online-education-isnt-moocs>
44. Mourshed, Mona; Patel, Jigar & Suder, Katrin (January 2014), *Education to Employment: getting Europe's Youth into Work*, McKinsey & Company.
45. Mourshed, Mona; Patel, Jigar & Suder, Katrin (January 2014), *Education to Employment: getting Europe's Youth into Work*, McKinsey & Company. p. 9.
46. Vodafone Institute for Society and Communications: *Talking about a Revolution – Europe's Young Generation on Their Opportunities in a Digitised World* (Survey conducted by YouGov: Qualitative results – Italy pdf. p. 7).
47. *Vodafone European Youth Survey*: Qualitative results – Czech Republic pdf. p. 7.
48. Mourshed, Mona; Patel, Jigar & Suder, Katrin (January 2014), *Education to Employment: getting Europe's Youth into Work*, McKinsey & Company.
49. Mourshed, Mona; Patel, Jigar & Suder, Katrin (January 2014), *Education to Employment: getting Europe's Youth into Work*, McKinsey & Company. p. 10.
50. *Vodafone European Youth Survey*: Qualitative results based on 6 focus groups in D, UK, ES, NNL, IT and CZ. September 2014. Qualitative p. 16.
51. Vodafone European Youth Survey 2014: Quantitative results – Italy pdf; Czech Republic pdf; the Netherlands pdf; and Spain, pdf: p.9
52. See www.unifrog.org
53. Linnar Viik, IT Scientist from Estonia, Founder of IT college in Estonia: Interview 9th October 2014.
54. Mourshed, Mona; Patel, Jigar; Sudar, Katrin (January 2014) *Education to Employment: Getting Europe's Youth into Work*. McKinsey & Company.
55. Mourshed, Mona; Patel, Jigar; Sudar, Katrin (January 2014) *Education to Employment: Getting Europe's Youth into Work*. McKinsey & Company. p. 13.
56. Maitland, Alison & Thomson, Peter (2014), *Future Work: Changing organizational culture for the new world of work*, Palgrave Macmillan p. 3.
57. Maitland, Alison & Thomson, Peter (2014), *Future Work: Changing organizational culture for the new world of work*, Palgrave Macmillan p. 6.
58. 'From follower to leader – how will Gen Y lead us in the future?' Survey presented by Adam Kingl at London Business School's Global Leadership Summit 2014 (www.london.edu/gls).
59. Allan Päll, Secretary General at the European Youth Forum. Interview 6 October 2014.
60. *Future Work* p. 205.
61. 'From follower to leader' *op. cit.*
62. *Future Work* p.5
63. 'After the Baby-Boomers: The New Generation of Leadership' (Odgers Berndtson and Cass Business School, 2013 p. 8.
64. 'After the Baby-Boomers: The New Generation of Leadership' (Odgers Berndtson and Cass Business School, 2013 p. 13.
65. *Future Work* p. 13.
66. See www.economist.com/news/special-report/21621237-digital-revolution-has-yet-fulfil-its-promise-higher-productivity-and-better
67. See www.bmmagazine.co.uk/in-business/running-your-business/26517/automate-three-ways-workload-automation-can-make-business-lean-mean
68. See www.theguardian.com/sustainable-business/crowdsourcing-open-innovation-change-world
69. See <http://knowledge.insead.edu/leadership-management/organisational-behaviour/secrets-of-virtual-success-537>

70. *Future Work* p. 7.
71. Bloom, Nicholas. 'To Raise Productivity, Let More Employees Work from Home.' *Harvard Business Review*. January – February 2014. p. 28.
72. RSA Animate. Coplin, Dave: *Re-Imagining Work Shifts in the Digital Revolution* see www.youtube.com/watch?v=G11t6XAIce0
73. Bloom, 'Let More Employees Work from Home.' p. 28.
74. Bloom, 'Let More Employees Work from Home.' p. 28.
75. *Future Work* p. 3.
76. Falk, Armin; Kosfeld, Michael. Distrust – The Hidden Cost of Control. Discussion Paper No. 1203. IZA, July 2004.
77. See <http://www.virgin.com/richard-branson/why-were-letting-virgin-staff-take-as-much-holiday-as-they-want>
78. See www.red-gate.com
79. See www.red-gate.com/assets/our-company/about/assets/book-of-red-gate-2012.pdf p. 82.
80. *Vodafone European Youth Survey* 2014. Quantitative results – Czech Republic pdf, p. 5.
81. See www.huffingtonpost.com/david-volpi-md-pc-facs/technology-depression_b_1723625.html
82. See www.huffingtonpost.com/2013/04/15/internet-stress-tops-work_n_3084889.html
83. See <http://america.aljazeera.com/articles/2014/8/22/digital-social-skills.html>
84. *Vodafone European Youth Survey* 2014: Quantitative results – Czech Republic pdf, p. 5.
85. RSA Animate. Coplin, Dave *Re-Imagining Work Shifts in the Digital Revolution* See <https://www.youtube.com/watch?v=G11t6XAIce0>
86. Chui, Manyika, Bughin, Dobbs, Roxburgh, Sarrazin, Sands, Westergren. *The Social Economy: Unlocking value and productivity through social technologies*. McKinsey Global Institute, July 2012.p. 46. See www.mckinsey.com/insights/high_tech_telecoms_internet/the_social_economy
87. *The Social Economy: Unlocking value and productivity through social technologies*. p. 3
88. Dupsy Abiola, Founder, Intern Avenue. Interview 1 October 2014.
89. Rajeeb Dey, Founder, Enternships. Interview 29 September 2014.
90. *Startup Manifesto for Entrepreneurship and Innovation to Power Growth in the EU*. p. 1
See <http://startupmanifesto.eu>
91. See the Communication from the Commission "Towards a job-rich recovery", 18.4.2012, COM (2012) 173 final. Cited in *Entrepreneurship 2020 Action Plan. Reigniting the entrepreneurial spirit in Europe*. Brussels, 9.1.2013 COM (2012) 795 Final. p. 3.
92. "The European accelerator ecosystem consists of 57 accelerators, which have graduated 738 startups. These startups have created 3,500–4,500 new jobs." The European Seed Accelerator Ecosystem. Accelerator Assembly, 2014, p. 8. See http://files.basekit.com/live229668_euacceleratorsassembly-seedaccelerators-evidencedata.pdf
93. *Entrepreneurship 2020 Action Plan. Reigniting the entrepreneurial spirit in Europe*. Brussels, 9.1.2013 COM (2012) 795 Final. p. 3.
94. Commission calculation based on Eurostat data (2009). Cited in *Entrepreneurship 2020 Action Plan* p. 4.
95. EU Commission Flash Eurobarometer No354 "Entrepreneurship".
96. *Entrepreneurship 2020 Action Plan* p. 4.
97. *Entrepreneurship 2020 Action Plan* p. 4.
98. *Entrepreneurship 2020 Action Plan* p. 4.

99. *The Connected Future for SMEs: What Europe's small businesses think about technologies*. Vodafone Group 2013, p. 3.
100. *Startup Manifesto for Entrepreneurship and Innovation to Power Growth in the EU*. p. 1.
See <http://startupmanifesto.eu>
101. *Startup Manifesto for Entrepreneurship and Innovation to Power Growth in the EU*. 2013. p. 4.
See <http://startupmanifesto.eu>
102. *Startup Manifesto for Entrepreneurship and Innovation to Power Growth in the EU*. 2013. p. 4.
103. *Vodafone European Youth Survey 2014: Quantitative results – Italy* pdf, p. 9.
104. *Vodafone European Youth Survey 2014: Quantitative results – Spain* pdf, p. 9.
105. *Vodafone European Youth Survey 2014: Quantitative results – Netherlands* pdf, p. 9.
106. *Vodafone European Youth Survey 2014: Quantitative results – UK* pdf, p. 9.
107. *Vodafone European Youth Survey 2014. Quantitative results – Spain* pdf, p. 9.
108. *Vodafone European Youth Survey 2014. Quantitative results – Italy* pdf, p. 9.
109. *Vodafone European Youth Survey 2014. Quantitative results – Spain* pdf, p. 9; and *UK* pdf, p. 9.
110. Philipp S. Krüger, Visiting Fellow, Digital Economy Project at Stiftung Neue Verantwortung. Interview 25 September 2014.
111. See www.founders4schools.org.uk/about
112. See www.svc2uk.com
113. Science, Technology, Engineering, Mathematics.
114. Nick Harrison, Chief Operating Officer, Founders4Schools. Interview 5 November 2014.
115. *European Commission Staff Working Document. Strengthening the environment for web entrepreneurs in the EU*, Brussels 11.4.2013.
116. See <http://tech.eu/research/29/there-are-roughly-100-active-startup-accelerators-europe>
117. See <http://startupwiseguys.com>
118. See www.rockstart.com/accelerator
119. See <http://theopenfund.com/Default>
120. See <http://nextstars.fr>
121. See <http://team-e-accelerator.com/web/progra>
122. See <http://tech.eu/research/29/there-are-roughly-100-active-startup-accelerators-europe>
123. See <http://tech.eu/research/29/there-are-roughly-100-active-startup-accelerators-europe>
124. See www.venturefounders.co.uk/about
125. *Startup Manifesto for Entrepreneurship and Innovation to Power Growth in the EU*. p.8
see <http://startupmanifesto.eu>
126. See www.seiswindow.org.uk
127. Nicola Broom, Co-Founder, upmysport. Interview 13 October 2014.
128. Tim de Vere Green, Angel Investor. Interview 30th October 2014.
129. The European Commission's Flash Eurobarometer 192 "Entrepreneurship Survey of the EU (25 Member States), United States Iceland and Norway" (2007) and Flash Eurobarometer 283 "Entrepreneurship in the EU and beyond" (2009). The possibility of going bankrupt is the greatest fear of setting up a business amongst European citizens. Ahead of the "uncertainty of income", "job insecurity" or "need [for] too much energy or time". Cited in *A Second Chance for Entrepreneurs: Prevention of Bankruptcy, Simplification of bankruptcy procedures and support for a fresh start*. European Commission for Enterprise and Industry, January 2011, p. 3.
130. Nick Harrison, Chief Operating Officer, Founders4Schools. Interview 5 November 2014.

131. *Entrepreneurship 2020 Action Plan*, p. 6.
132. *Entrepreneurship 2020 Action Plan*, p. 17.
133. *A Second Chance for Entrepreneurs*, p. 3.
134. *Entrepreneurship 2020 Action Plan. Reigniting the entrepreneurial spirit in Europe*. Brussels, 9.1.2013 COM (2012) 795 Final. p. 17.
135. *Startup agenda: From Creation to Growth to Internationalization. Policy Brief* Forum Digitale Agenda, Stiftung Neue Verantwortung January 2014, p.6.
136. *Startup Manifesto for Entrepreneurship and Innovation to Power Growth in the EU*. 2013, p. 10 see <http://startupmanifesto.eu>
137. *Startup Manifesto for Entrepreneurship and Innovation to Power Growth in the EU*. 2013, p. 7 see <http://startupmanifesto.eu>
138. See www.upmysport.com Note the author is a minority shareholder in this startup.
139. *Startup agenda*, p. 4.
140. *Startup agenda*, p. 4.
141. *Startup agenda*, p. 4.
142. See www.opengovpartnership.org
143. *Startup Agenda*, p. 2.
144. Anne Bouverot, Director GSMA. Interview 17 October 2014.
145. See <http://ec.europa.eu/digital-agenda/en/high-speed-broadband>
146. Mobile Economy Europe. GSMA, (2013) p. 49.
147. GSMA Mobile Wireless Performance in the EU and US. Executive Summary. May 2013 see www.navigant.com/-/media/WWW/Site/Insights/Economics/Mobile-Wireless-Performance-in-the-EU-and-US.ashx
148. www.gsmamobilewirelessperformance.com/mwp_infographic_fin.pdf
149. Mobile Wireless Performance in the EU and the US. GSMA, May 2013 p. 17.
150. Lisa Felton, Head of Consumer Policy and Content Standards, Vodafone. Interview 2 October 2014.
151. See www.reuters.com/article/2014/07/09/gsma-idUSnBw095512a+100+BSW20140709
152. Mark Deem, Partner and TMT Specialist, Edwards Wildman Palmer UK LLP. Interview 4 October 2014.
153. See www.theguardian.com/commentisfree/2014/jun/11/why-london-taxi-drivers-protesting-uber-tfl
154. Reshma Sohoni, Partner, Seedcamp. Interview 9 October 2014.
155. Arty Rajendra, Partner, Rouse. Interview 11 November 2014.
156. Mark Deem, Interview 4 October 2014.
157. Mark Deem, Interview 4 October 2014.
158. Mark Deem, Interview 4 October 2014.
159. Mark Deem, Interview 4 October 2014.

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