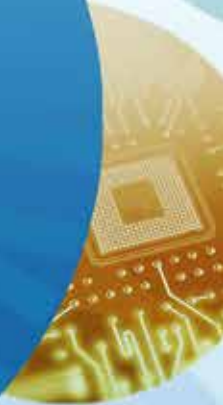




European Internet Foundation
Political Leadership for Network Society



The
**Digital
World**
in **2030**
What place
for Europe?



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A note from the authors

As did our report five years ago **The Digital World in 2025: Indicators for European Action**, this report has evolved in parallel to EIF's programme of live debates and outreach. We have also tried to link wherever possible to evidence and wider opinion relevant to the trends we address. These links appear in blue in this hard copy. You can follow them online and submit comments on this report's mini-website www.EIFonline.org/DigitalWorld2030.

We are deeply grateful for the rich input from EIF members and guests which forms the basis of this report. Its contents remain the entire responsibility of its authors and do not necessarily reflect the views of any individual EIF member.

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Preface from the EIF Board of Governors

Five years ago in 2009, as a newly elected European Parliament prepared to take up its mandate, the European Internet Foundation (EIF) published *The Digital World in 2025: Indicators for European Action*. Now, as we look toward the European Elections of May 2014 and the rapidly digitalising world awaiting the next Parliament, we have repeated this exercise.

- Our purpose remains as it has been: to challenge Europe's political leaders and policy-makers – and more particularly European legislators – to put Europe's place in tomorrow's digital world at *the centre* of their preoccupations and priorities *today*.
- Again this time, what follows is not a forecast or a prediction. Rather, it continues to represent a collective assessment by members of the European Internet Foundation and our many guests of probable outcomes, based on trends observable today.

Once again we hope and expect that many others will now use EIF's independent, politically-led, non-partisan multi-stakeholder platform to challenge this thinking with your own views, and to help us spread much wider understanding of what is at stake. Today, much more clearly than five years ago, it is no exaggeration to say that Europe's future depends on it.

The Board of Governors of the European Internet Foundation (March 2014)

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Introduction

As did 2025 five years ago, 2030 may seem like a long way off. The pressing issues of today necessarily continue to preoccupy European leaderships. Indeed, the five years since our previous exercise have thrown up a succession of systemic financial crises which have taken Europe and the rest of the world to the brink of economic calamity if not collapse. In these circumstances, coming to serious grips with the future has understandably had to wait.

But the future itself never waits. Nowhere is this more evident than in the relentlessly accelerating development and diffusion around the globe of digital technologies. Nobody is putting this genie back in its bottle. To the contrary, five years ago we concluded that, “given current trends any distinction between ‘the digital world’ and any other worlds will have become largely academic by 2025”. For all intents and purposes, fast-forward 10 years because we are already there – or rather, here. Humankind’s own ingenuity has created this new world with all of its marvels, disruptions, hopes and fears. Now we have to figure out how to develop it and prosper in it. There will be no opting out.

This report proceeds in five chapters. The first proposes an updated central paradigm for trying to envision the digital world, this time of 2030, and summarises what are likely to be key features. The second updates observable trends in the evolution of the technologies and tools driving the digital revolution. The third turns to observable economic trends, and the fourth to political and social trends. Wherever practical we have revisited and updated our 2009 trend analysis before breaking new ground. Not only does this facilitate the task but does we trust also preserve the integrity of the exercise. Finally we ask what will be Europe’s place in the digital world of 2030, looking more specifically at those public policy areas which – for better or worse – will largely determine the answer.

None of these sections pretends to be comprehensive, nor could they possibly be given the actual or prospective digitalisation of just about everything. Rather, once again they reflect the issues, ideas and trends EIF members and guests have chosen to highlight over the course of this project as well as major trends in wider commentary among close observers. And once again our new 15-year horizon – this time 2030 – should not be taken literally. It is an intellectual device, challenging us to ask ourselves whether a particular trend will endure and grow to shape our world decades hence, or whether it is merely an ephemeral blip on our ubiquitous screens, noise in cyberspace signifying nothing.

This report in a paragraph

Core digital technologies are evolving and converging rapidly, fueled by real-time, real-world data, driving us toward a Knowing Society and creating the foundation for an avalanche of innovative software platforms and other digital tools available and affordable to anybody and everybody, everywhere for virtually any purpose. In economic terms, we are finally on the cusp of “the real” third industrial revolution. We need to understand and exploit this vast opportunity, while also urgently addressing the intense social and political stresses this revolution will inevitably engender. Europe’s political leaders need to engage with this revolution across their full range of competences. 2030 is now. Completing Europe’s Digital Single Market is the most urgent priority.

A vision of the digital world in 2030

Central paradigm: from “Mass Collaboration” to “Knowing Society”

Five years ago we proposed a central, unifying paradigm to try to capture the common character of the trends we highlighted so as to more clearly envision the world they were likely to create by 2025. The paradigm we proposed was a world driven by “mass collaboration” – enabled by the ubiquitous availability and use of high-speed, high-capacity digital communications systems, tools and services connected by the internet.

In light of developments since 2009 and today’s dominant trends, our “mass collaboration” paradigm of five years ago certainly stands scrutiny as far as it goes, but does not capture the depth and breadth of what we can now more clearly envision.

Today we can see that the accelerating development, uptake, and especially convergence of digital technologies around the world portends a radically different world by 2030, driving us toward what can usefully be thought of as a “Knowing Society” in which the real-time, real-world ability to continuously track, measure, and interpret – i.e. to “know” – and react to the current state of virtually any external condition or phenomenon at any scale at any time through continuous targeted real-time data capture and analysis (today widely referred to as “Big Data”) becomes the primary source of economic, social and political power at any scale.

Europe’s place in this future Knowing Society will depend on our ability from this moment forward to both facilitate and manage “knowing-driven” change on our continent. Marginal reform of long-standing political, social and economic models will no longer suffice. Responsibility for meeting this challenge will increasingly lie with our younger generations at a time of unprecedented aging of the European continent.

Marginal reform of long-standing models will no longer suffice.



The digital world in 2030: major features

Any distinction between the digital world and the wider world is fast eroding. The trends identified in this report therefore need first to be set in this wider frame. Fortunately for this purpose we can call upon two groundbreaking efforts to understand the future, both rooted in the EU institutions.

ESPAS : Global trends 2030

The European Strategy and Policy Analysis System (ESPAS) brings together officials from all EU institutions to identify and analyse key trends, challenges and policy choices for the EU in the decades ahead. A first comprehensive ESPAS global trends report will be published in the course of this year (2014), developing the framework perspectives set out in an **Autumn 2013 interim report**. To frame the focus of this report, we draw particularly on the demographic dimension of the ESPAS work:

- By 2030 the world's population may have reached a plateau, while the overall average age of the global population will increase. Already by 2020 the global active population will start to shrink.

- There will be a youth bulge in the developing world: Africa and Asia's labour force will have more than doubled between 1990 and 2020, while Europe's workforce will shrink.
- We will see a growing global middle class, notably in high-growth emerging economies.
- Europe will confront a "demographic deficit" and rise of age-related expenditure which could lead to economic stagnation if not managed.

How does this picture look when we infuse it with the digital trends identified in this report? A starting point is to consider their growing power to greatly increase the productivity of all human activity – economic but also social.



All ESPAS papers and reports can be found here:
http://europa.eu/espas/papers/index_en.htm

Aspirational visions of our "Digital Futures"

Meanwhile, the **European Commission's DG Connect** has been looking at the future through the other end of the telescope. Instead of analysing current trends or trying to predict the future, through its (innovative) "Futurium" platform the **Digital Futures project** enables stakeholders to co-create digitally-driven futures that matter to them in a 2050 horizon, and to work "backwards" to see if and how these futures might or might not grow out of the present. Thousands of people have participated in this exercise. As can be seen on the inside back cover of this report, this input has now been distilled into 11 "emerging themes", spanning a "people dimension" and a "system's dimension".

For the purposes of this EIF report, we stress how *radically different* this composite, stakeholder-generated, aspirational future world looks compared with the world legislators are engaged with today, and that *nothing* in our own trends analysis precludes such futures "growing out of the present". It is this "reality gap" which legislators in Europe and around the world will increasingly have to address across the full span of their established competences.

This aspirational future world looks radically different from today's world.

(See inside back cover)

Technologies for a real-world revolution

Attention! Digital technology avalanche dead ahead! More powerful converging core technologies, proliferating clouds and platforms, cognition available as a service, “swarm intelligence” and an explosion on the new manufacturing frontier of “maker” tools... all increasingly accessible and affordable to anybody, anywhere, for any purpose, at the same time. In a 2030 perspective, there are no technology barriers and no limits. We are just at the beginning of the real-world digital revolution.

In this chapter we first briefly revisit our most important 2009 digital technology projections, and then go on to ask: What core trends did we underestimate or miss entirely five years ago? What new trends should we be focusing on today to try to conjure a picture of digital technology 15 years out? The short take: five years ago we were on the right track but far too limited in foreseeing the explosive potential for technological convergence, asleep at the switch on the imminent explosion of mobile communications, and far too timid in stressing the infinite potential of software. And we missed a couple of big ones altogether.

2009 overview

Five years ago we found the trend very clear: at every level of the value-chain, from computer processing power and data storage to network capabilities, software tools, intermediate applications and digital content, R&D investments were increasingly driven by the prospect and promise of exploding worldwide demand for the ability of individuals (and now also “things”) to communicate and collaborate with each other online, *en masse*.

Horizon 2030 overview

Today, in early 2014, we can see much more clearly how it is **the convergence** of the core digital technologies that is driving us way beyond a world of “mass collaboration” toward the emergence by 2030 of a “Knowing Society” based on real-time data flowing in unimaginable volume through an **“Internet of Everything”**. We can likewise see much more clearly how this convergence is driving the development and uptake of powerful derivative tools and technologies – largely software but also new forms of hardware and man/machine interfaces – increasingly central to transformation across our economies and societies, auguring what **one commentator** has called a digital technology “avalanche”.

In a 2030 perspective, there are no technology barriers and no limits.

To recall: four core technologies

2009

Computing power and data storage capacity

In 2009 we reported on the evolution of technologies seeming to ensure that “Moore’s law” – predicting that the capacity of microchips would double every two years – would continue to apply at least into the 2020s.

» Horizon 2030

Virtually all digital futurologists continue to assume the future availability of effectively limitless computing power and memory. On the other hand, it is widely acknowledged that foreseeable physical and economic constraints could defeat Moore’s Law by the early 2020’s. **But** this does not necessarily mean that raw computing power and memory capacity will not continue to explode. Why? First, because software is making the underlying computing hardware fully flexible. Further out, radical new technologies not subject to the same constraints are under development – notably **optical or photonic – computers** that use visible light or infrared beams instead of electric currents to perform, and **quantum computing**, which harnesses the power of atoms to perform computational tasks. And there’s the potential wonder material, **graphene**.

Data capture technologies

In 2009 we observed that the internet was producing unprecedented growth in the amount of data we are generating, capturing, replicating and storing, and foresaw that by 2012 the volume of internet traffic would be 100 times greater than it was in 2002. By 2010 digital data was expected to double in volume every two days. We stressed the emergence of the Internet of Things, enabling the mass collaboration of things with things and things with people, and noted the development of easily programmable wireless sensor networks able to continuously sense different physical states and send this data to the IP network.

Not only were those forecasts too timid, today the **expected future growth** in internet traffic is stunning (notably for video content), while sensor, GPS and other data capture technologies continue to evolve. By **one estimate** there will be 50 billion devices of all sorts connected to the internet by 2020, all pouring real-time data into the network. And let’s not overlook miniturisation, as for example **this chip** small enough to provide live 3D images from inside a human blood vessel. Moreover, increasing categories and numbers of “things” connected to the internet will not be passive captors of data, but rather smart, interactive devices with computing power similar to PCs and smartphones... think vehicles and appliances. The point we stress today looking forward is that virtually every byte of this data tsunami can be captured, fuelling the real-time knowing that will transform our economies and societies.

Internet transmission infrastructure and coverage

In 2009 we reported that major investment by telecom network operators and equipment manufacturers was focused on the development of “next generation networks” based on the Internet Protocol (IP) and thus capable of transporting all digital communications and services over the internet via fully converged, scalable wireline and wireless networks. And we observed that from the user’s perspective this “IP everywhere” model opened up the prospect of access to all digital communications services through any single device connected to the internet.

IP-enabled devices have become the rule, while the deployment of incrementally more powerful fixed and wireless (4G/LTE) broadband networks has accelerated worldwide since 2009. Other **experimental access mechanisms** can also be seen. But the big 2030 network technology story is not about incremental evolution of today’s technologies. It’s about “5G”, the next revolution in network technology.

Relentless development of software at every scale, able to create new value from data flows

In 2009 we stressed that software is what would turn raw digital technological power and data into economic and social goods, and that the opportunities for software would become as limitless as the human imagination.

Today it has become impossible to overstate this trend and its significance, although we try further on in this chapter!

New technology horizons 2030...

The big one we missed in 2009 - smart mobility

Remarkably, five years ago we paid short shrift to the prospect and central importance of exploding demand for and supply of mobile broadband connection to the internet, driven by the breakneck evolution and overwhelming market uptake of smart mobile devices. At least we were not alone. In the words of one **authoritative study**, “The pace of growth in mobile data traffic is staggering, and society has embraced mobile wireless technology in ways that were unthinkable a mere five years ago.” Thank you!

Today we can see much more clearly that it is precisely this phenomenon – ever more powerful mobile devices in the hands of ever-growing numbers of people around the world, connected by ever-expanding and higher capacity wireless infrastructure, which has today become the most dynamic driving force for the Knowing Society. Indeed, the pace of this change since 2009 and looking forward is breathtaking, with most of the traffic growth accounted for by data (everything but voice).

Highlights

- In 2013, some 4.3 billion of 7.2 billion people (60 %) on earth had mobile devices, a connected population that will grow by close to a billion in five years (+23%). Assuming only modest growth of another billion in uptake in the ten years thereafter, 6.3 billion of a projected 8.4 billion, 75% of humanity, will be connected and mobile by 2030.
- Smartphones and tablets **will continue to account for most of this growth**. At the end of 2013, global smartphone penetration had exploded from 5% of the global population in 2009 to 22%, an increase of nearly 1.3 billion smartphones in four years. Tablets are showing faster adoption rates than smartphones (because as penetration in a market grows overall growth slows).
- Mobile devices are no longer just smartphones and tablets, as for example the emergence of wearable mobile devices like eye-glasses, watches and contact lenses.
- The entire human knowledge base on your mobile phone: microchips providing a terabyte of memory on a smart mobile device requiring 20 times less power with 20 times more endurance are **just around the corner**.
- The traffic on mobile data networks in 2012 – 885 petabytes – was nearly 12 times greater than total internet traffic around the world in 2000, back when the web was taking off. Wireless data traffic will continue to grow 66% a year for the next five years.

This means that by 2017, monthly mobile data traffic will reach 11.2 exabytes per month, or 13 times what it is right now, with no end to this exponential growth in sight. **One exabyte** can hold a hundred thousand times all the printed material in the **US Library of Congress**.

- Meanwhile, the spectacular growth of Wi-Fi internet access points (**an expected tripling** from 2011 to 2015 to 5.8 million worldwide) in both public and private spaces, often more cost-effective and reliable than our mobile operator services, has bred in us the expectation of ubiquitous connectivity. **A recent European Commission funded study** found Wi-Fi delivered 71% of all wireless data to smartphones and tablets in the EU, likely rising to 78% by 2016.

In fact, **network operators themselves are now embracing Wi-Fi** as a way to off-load wireless traffic into the fixed network more rapidly and efficiently. The **next step** (Wi-Fi 2.0) will be for mobile devices to automatically join a Wi-Fi subscriber service whenever the user enters a hotspot area. In this scenario the number of hotspots worldwide could triple again to approach 20 million by 2020.

In response to this extraordinary demand for smart mobility, mobile network technologies have evolved to provide incremental increases in speed and efficiency, as can now be seen in the growing migration of networks worldwide from 2G and 3G toward 4G/LTE. But on our 2030 horizon lies the prospect of the next network technology revolution...

5G network technologies: like the air we breathe...the ambient internet

So-called 5G network technologies now under study and development will not be another incremental evolution of today's 4G, but rather will drive the next network revolution through “softwarisation” and integration of mobile and fixed networks. Think of future internet access as akin to the air we breathe – present everywhere and essential for the very existence (in this case economic and social) of people and objects. That's the prospect of 5G. In a word, “ambient”.

This said, in absolute volume fixed data traffic will remain dominant, for the simple reason that virtually all data traffic passes through fixed networks for some part of its journey. In addition to the Wi-Fi trend there is also a trend toward “**small cell technology**” with a range of a few metres to a few kilometres, allowing for more efficient wireless off-load to the fixed network. Today mobile data traffic represents 5% of the total, rising to 12% by the end of this decade. Greater convergence between mobile and fixed networks **may be expected** going forward in a 5G framework.

5G research focuses ultimately on enhancing the “universal quality of the network experience” for users while reducing the total cost for network operators. Softwarisation will introduce the service flexibility, **energy efficiency** and future network adaptability required to pursue these twin objectives. Indeed, there should be no future need for a 6G. Rather the 5G network will evolve continuously to meet future needs through software development and replacement, thereby also enabling the horizontal integration of sectoral systems (such as energy and transport) today operating in vertical silos. **Here’s the latest 5G thinking from a recent EIF event.** Meanwhile, softwarisation is not just a network technology trend. It’s the dominant technology trend across our economies and societies worldwide...

A software-driven technology “avalanche”

The convergence of ever-higher capacity computing, data capture, broadband transmission, smart mobility and software development over the past five years has laid the foundation for what will inevitably over the next 15 years become a world-changing digital revolution, driven essentially by an avalanche of software innovation throughout our “knowing” economies and societies, comprising everything from the apps on your phone to the most complex manufacturing systems. Beyond the sheer magnitude of this prospective avalanche, what major structural features will characterise and shape our software-driven world? Think “clouds” and “platforms”.

- **Clouds:** In **2009** we observed that the metaphor of the Cloud did seem to capture a scenario made possible by (then) current technology trends – a digital world in which we no longer need to acquire and carry around with us our own hardware, software and data, but rather could access and use them anytime, anywhere, safely and securely through the internet, from on-line providers whose location is irrelevant.

Horizon 2030 The five intervening years have not only confirmed this trend, but have vastly expanded our understanding of the central role of cloud services in the emerging Knowing Society and a 21st century economy driven by transformation and innovation across all sectors. In effect, cloud services liberate us in space and time while keeping us connected to the real-time, interactive knowing that will increasingly underpin our economic and social well-being. Clouds also cut the cost of data storage and processing, thus supporting the growth of internet-based services and enabling new business models (smart clouds, dumb phones?). This can be clearly seen in the current trends and outlook for the development, uptake and impact of cloud services. Highlights from the **most recent forecasts:**

- By 2016 the bulk of new IT spending will be for cloud computing platforms and applications;
- The total economic impact of cloud computing could be \$1.7 to 6.2 trillion *annually* by 2025;
- Public sector cloud services could reach over \$100 billion.

Moreover, in the words of **one authority**, “There is a flawed perception of cloud computing as one large phenomenon. Cloud computing is actually a spectrum of things complementing one another and building on a foundation of sharing. The public cloud, hybrid clouds, and private clouds now dot the landscape of IT based solutions. Because of that, the basic issues have moved from ‘what is cloud’ to ‘how will cloud projects evolve’.”

Think “clouds” and “platforms”.



- **Platforms** We had nothing to say in **2009** about platforms, although several were literally staring us in the face in the form of operating systems on our computers and other devices.

Horizon 2030 It's a pretty bracing leap from such blindness to this statement in a recent **Economist special report**: "...the impact of platformisation will be monumental. Those who see the current entrepreneurial explosion as merely another dotcom bubble should think again. Today's digital primordial soup contains the makings of the economy and perhaps even the government of tomorrow."

Whoa! In this vision, a platform is a combination of standard software components on which creative applications can be built and run. Some are "open" to any would-be app creators, others "closed" to some degree. What's new here is the prospect that society will come to be dominated by an infinite variety of platforms in every walk of life creating infinite applications possibilities. In this vision "open" and interoperable is typically seen to trump "closed" because it triggers exponential progressions of knock-on creativity, innovation – and competition. **One digital icon** has moved in this direction to reconstruct its own open-source technical infrastructure, and saved \$1 billion in the process. This stuff works. On the other hand "closed" platform strategies have also met with strong consumer acceptance and thus commercial success.

Speaking of apps... As we try to grasp the full scope and impact of our software-driven future, let's visit the outer limits of **current software thinking**. That would include "Cognition-as-a-Service" – or CaaS. "Higher intelligence is coming to applications in another form..."

and this may just be the next evolution of the operating system. CaaS will enable every app to become smart in its own niche. CaaS powered apps will be able to think and interact with consumers like intelligent virtual assistants – they will be "cognitive apps." You will be able to converse with cognitive apps, ask them questions, give them commands – and they will be able to help you complete tasks and manage your work more efficiently." Or do the heavy lifting...

Smarter, stronger robots are on the way. So too may be the **migration of drone technology** from the military sphere to commercial and social uses. Heads up! And here's **another bright idea** from the military that could find its way – literally! – into our consciousness. And get ready for...

"Swarm intelligence" inspired by... termites!

Harvard University researchers have designed a construction crew of tiny robots able to build complicated structures without blueprints or outside intervention. The robots are the latest innovation in what computer scientists and robotics researchers call swarm intelligence—a field in which scientists are exploring ways to enable large groups of simple robots or flying drones to collaborate.

Indeed, machines that can learn from streams of real-time data may be the only practical way to analyse and act on the growing volumes of data coursing through the internet. Says **one researcher** in the science of such artificial intelligence, "The dream of AI is to build full knowledge of the world and know everything that is going on." These folks do not lack for ambition!

Inspired by... termites!

The new frontier: "maker" tools and technologies

In 2009 we had nothing to say about so-called "3D printing" and related software technologies for manufacturing (i.e. making) a three-dimensional solid object of virtually any shape from a digital model. Today they have exploded into our consciousness, and are driving a movement of "**maker communities**" around the world thriving on collaboration and real-world, real-time knowing. What are they founded on? "A plethora of physical and virtual platforms to serve them—from platforms that inspire and teach, to those that provide access to tools and mentorship, to those that connect individuals with financing and customers". **Here's a perfect example**, a self-described "open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists and anyone interested in creating interactive objects or environments". Is this a window on a third industrial revolution?

Read on...

Toward the digitally-driven economy 2030

In this chapter we first revisit and update our 2009 economic trends before analysing newly emerging trends likely to shape the global economy in 2030. The short take: five years ago we were on the right track, asking the right questions. Today we begin to see and experience the true scale of this third industrial revolution.

2009 overview

To assert that the “traditional economy” will by 2025 be radically transformed, superseded by a “global digital economy”, is already to repeat no more than conventional thinking. Indeed, it is self-evident that digital communications are already changing traditional models of production, supply and demand at every level of the value chain for ever increasing numbers of economic sectors and actors.

On the other hand, can anybody yet say with any authority what the sum of countless such micro-economic revolutions will add up to by 2025 in macro-economic and structural terms? Steel will still be steel, and humankind will still need to eat.

One way to try to wrap our minds around this may be to ask ourselves: in the digital economy of 2025, who will be prepared to pay for what? Looked at from the other end of the value chain, who will be prepared to invest in what? Who will be offering what value added, and through what structures? What will be the role of government?

Horizon 2030 overview

The third industrial revolution will differ in one defining and decisive way from its predecessors: the digital technologies and tools driving it will be increasingly accessible and affordable to anybody, anywhere, for any purpose, at any scale, *at the same time!* It took well over a century, government-led planning (and often investment), and scarce human brainpower to build out the 19th century industrial base in even the most advanced countries. The speed of technologically-driven change accelerated in the 20th century, but we ain't seen nothing yet. Today the entire world can play on the leading edge and our 2030 transformation horizon looks like an eternity. Our ability to adapt as individuals and societies is going to be put to the test.

Today the entire world can play on the leading edge and our 2030 transformation horizon looks like an eternity.

Back to the future

2009

Smart systems, smart – sustainable – growth

In the digital economy of 2025, digital intelligence will be embedded across entire systems, and systems of systems, notably those constituting the core infrastructures: transport, energy and environmental management.

The web-enabled enterprise

The successful enterprises of 2025 will be those that exploit rather than resist digitally-enabled external market forces and internal demand for enhanced operational and social ways of working, and also participate in collaborative global networks with other enterprises.

The virtual enterprise

Expect to see the emergence of VE's created by internet enabled and empowered individuals able to easily group, regroup and dissolve collaboration with others anywhere, outside established statutory frameworks.

The future of the western welfare state

The western welfare state is built on an industrial model and economic structures which bears little resemblance to our vision of a digitally-powered economy in 2025. New policies will be needed to maintain such levels of social security.

Skills and education

Re-designing education around participative, digitally-enabled collaboration within and beyond the individual educational institution will become the dominant worldwide educational paradigm underlying the economic strength of every successful society by 2025, together with a digitally-skilled and flexible workforce throughout the economy.

>> Horizon 2030

This vision remains a central feature of a 2030 “Knowing Society”, but progress has been spotty in Europe and elsewhere. Today we can see – notably through the prism of “Smart Cities” policies and leading-edge experience – that **the essential factor for progress is political leadership**. This trend takes on particular importance in view of the unrelenting urbanisation of humanity.

Every successful enterprise today is already way down this road. The next horizon is to become fully-fledged knowing enterprises, able to exploit continuous real-time, real-world internal and external data capture and analysis to continuously innovate and reinvent themselves. What does this mean in practice? **Here's one way to look at this sort of enterprise “elasticity”**. And here are **ten companies on the leading edge**.

Collaborative tools like **github, yammer, basecamp, asana, Box, Google apps, Huddle** and **others** are today facilitating this trend among company and partner networks of all sizes spread globally. Think of it as “hyper-elasticity”.

Red alert! See further on in this chapter.

In the economy of 2030, the high-value skills will be those enabling the individual to add value to the capture, communication and analysis of real-time, real-world data. This isn't only – or even primarily – about scientific skills. Already today we see the emergence of **“niche experts”** in many fields able to do this with basic e-skills. And we see **internet-based systems** (platforms) evolving to recognise an individual's real world skills and achievements.

2009

Regulatory rules for the digital road

A stable and predictable policy environment is needed to attract the hundreds of millions of euros of largely private investment needed to build Europe's "next-generation networks", and by 2025 our "next-next-generation" networks.

» Horizon 2030

No country or region will be able to compete in the digitally-driven economy of 2030 without competitive network infrastructure connectivity and coverage. Viewed in global and 2030 perspective, the last five years have seen **Europe lagging other parts of the world** in the deployment of high-speed broadband networks, particularly for mobility. Within Europe, **a recent report for the European Parliament** shows a more complex picture for fixed and wireless coverage, notably between urban and non-urban areas, and concludes that "on balance Europe is not doing badly." This is however cold comfort for Europe's broadband have-nots. By 2030 will ambient internet access have become a reality in Europe... and perhaps even a legislated right?

Intellectual property

The future character and enforcement of intellectual property rights (IPRs) will remain one of the central public policy issues, if not the central economic policy issue, for IPR-dependent industries in any 2025 scenario, with intense debate over amendments to statutory IPRs and enforcement frameworks in Europe and elsewhere continuing over the next five years. Given current trends it is reasonable to speculate that by 2025 the IPR environment will include new digital tools – including new collaborative tools – for more effective and efficient creation, management and enforcement of IPRs, as well as greater use of business models based on the voluntary offer by rights holders of licensing terms and conditions tailored to appeal to particular markets.

Profitable **new market-driven models** continue to emerge in which creators share their rights with peers or make them available to wider audiences through digital online platforms. On the legislative front, updated EU legislation on orphan works, collective rights management, multi-territorial licensing of rights in musical works for online uses, and patents have been adopted, with community trademark legislation pending and assessment of the need for copyright adaption under study. Will these steps prove sufficient to manage the inherent tensions between rights based on territorial jurisdiction and a borderless internet?

From social networking to economic mainstream

The migration of social networking models and tools (Web 2.0) into economic life is also gathering momentum. In a number of areas this has already gone beyond early trial and error to demonstrate the market power of personalized, people-centric, community-based economic collaboration. Time alone will tell how deeply such socially-rooted collaborative digital paradigms will penetrate and contribute to the transformation of economic life.

Today this trend continues to build, notably in the **return of an "artisan economy"** in which community-centric markets seek out individual skills and product attributes conforming to their values and life-styles (as for example in the **music market**). This trend can also be seen as the reintroduction of the idea of craft as an essential component of culture, as can be seen in **this example from India**. But it can also be seen in the now well-established trend for major producers using social networking tools to themselves catalyse the coming together of communities and conversations around their brand values, products and services. In these models, the "knowing" runs both ways.

2009

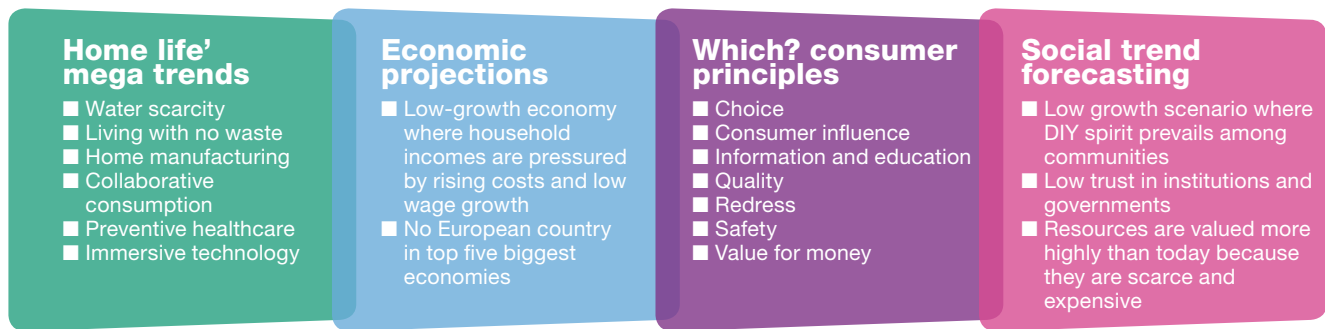
Community-based consumer empowerment

A new balance of power is already evident in certain markets where consumers increasingly exploit the power of mass collaboration. There is every reason to believe that this phenomenon is only in its infancy. But as the next generations of digital natives mature, this dynamic, changing balance of power between consumers and producers looks certain to become a defining force in the digital economy of 2025.

>> Horizon 2030

Beyond direct community-based conversations between producers and consumers, vendor and intermediary platforms increasingly host consumer reviews and ratings whether producers like it or not. Nor do we lack for examples where viral internet-based consumer activism has compromised the very existence of **products** or companies.

OK, but what does our future look like from the perspective of those with deep experience in the promotion of consumer interests? Try **this** must-read report from Which? (the UK consumer organisation), a challenging and comprehensive consumer-oriented view of our world in 2030. Here are their four main research strands in a nutshell...



Social production

We see a steady increase in what can be called the “social production” of digital goods. Such tools, products or services clearly represent an economic force and economic value, whether monetised or not. However, we are still unfamiliar with how to create the metrics for measuring and valuing social production, particularly when there is no pricing signal.

This trend continues to develop deep in the **open software** movement. But it can also be seen in the **rise of a wider barter economy** facilitated by social media.

2009

» Horizon 2030

Monetising models - all advertising all the time?

Free search engines, social websites and consumer review/feedback sites as well as most news sites are today monetized through paid advertising and links, not through payment for access. The increasing power of digital tools and systems to collect and process vast amounts of data raises important questions of principle and practice concerning the use of personal information. It is reasonable to expect that by 2025 this advertising-based business model will have become an integral, widely-understood and accepted form of collaboration between web-based commercial or social platforms and consumers, operating with much more precise targeting tools and within clear rules (legislated or market-imposed). In this scenario, the advertising model looks likely to remain a primary advertising internet monetisation model, thereby also continuing to multiply channels for SME's to enter the market through affordable, targeted, user-friendly advertising. This said, some market participants doubt that there will be sufficient demand for advertising to fully sustain all social and commercial on-line media by 2025, while consumers used to "free" may remain unwilling to pay. And the advertising model is not necessarily adapted to all business models and products – notably in the cultural sector.

We have already gone beyond the free/paid debate of five years ago, with sites like YouTube offering a **paid option** and platforms like iTunes, Spotify and Amazon Kindle creating paid models for content. Major news organisations with brand power are likewise moving toward paid online access ("**paywalls**"). The debate will now shift to how much to pay, to whom, and who faces the customer. At the same time, advertising expenditure will continue to migrate to increasingly innovative and interactive online **knowing-based systems** and individual **consumer profiling**, with all the attendant data privacy baggage.

Identity and privacy

Current trends seem to converge on one important conclusion: through the combined interaction of law, technology and internet literacy, by 2025 people should be in a position to control how their own personal information is made available and used for commercial (or other) purposes. Whether we chose to make use of this ability is another question.

Well that was a leap of pure faith! What we can categorically say today is that people are much more concerned and literate about these issues five years on. Major acquirers of personal data are therefore under growing pressure to reassure customers that their data will be safe not only from breach but from unwarranted intrusion – especially by governments. Our vision of 2009 remains compelling, but progress – particularly on the legal framework in Europe and elsewhere – has proved a struggle.

Harnessing the "meta-data"

There is enormous potential for new understanding of markets and society from capturing and analyzing the "meta-data" we are collectively generating. Add to that the ability to capture and analyze data generated by an infinity of "things" connected to the internet, and we can imagine a powerful new source of competitive advantage and governmental performance.

Indeed! But it's not just the meta-data. It's real-time, real-world data at any scale – including individual – which is becoming "the new oil" for Knowing Society.

The conceptual economy

Value will be in the meaning of products, not just their function, with meaning created by creative people everywhere, empowered and sharing their creativity through web-based open platforms supporting "open innovation". Creative talent itself becomes a new currency and asset in working life.

Yes! That was indeed perceptive, as we can now more clearly see.

Economic horizons 2030: what's new?

So what did we underestimate five years ago? What did we miss entirely? What trends should we be focusing on today to try to conjure a picture of the global economy in 2030? Arguably we missed the main story!

Macro-economics

To be fair, in 2009 we did observe that “we have as yet no models for a global economy dominated and driven by mass collaboration...Nor has mass collaboration yet become so pervasive as to have produced widespread, irreversible structural change in the economic, political and social spheres. The challenge is to imagine how, by 2025, it will have...” And we did give Bismarck and his 19th century industrial welfare state a perfunctory send-off, but to be supplanted by...what?

Today it would be fair to say that while we still have no “models” per se to guide us, we do have a rapidly growing academic – and increasingly political – debate centred on growing income and wealth inequality and the apparent precarity (not to say disappearance) of middle class employment, at least in our western economies. By some estimates 60% of our middle-class jobs involve information processing which can and will be taken over by digital systems. **One recent study** found that two-thirds of the 7.6 million middle-class jobs that have vanished in Europe were the victims of technology.

Is this then the core, ineluctable, disruptive, cumulative macroeconomic effect of the accelerating digital revolution – the “widespread, irreversible structural change” we are facing? **Is the internet making us poor? Is software “eating the world”?** Are we destined to revert to the sort of “hourglass” economy which characterised most of human history before 20th century industrial society? How can we begin to make sense at all of the future of wealth creation and work? A good place to start is with this important

new contribution, **Race Against the Machine**. For the purposes of this summary exercise, we offer four reflections:

- While there is today as yet no clear consensus, this debate can be expected to increasingly dominate economic theory, policy and politics, for the simple reason that the core technologies driving this revolution will continue to evolve and will increasingly dominate economic life.
- It is self-evident that this third industrial revolution is proceeding at a much faster pace than its predecessors, and much more broadly across our economies and societies, because the tools are constantly evolving, instantly available and affordable.
- There is no doubt that the fastest growing “middle class” job markets in our mature economies are for skills directly related to the development, deployment and operation of these core digital technologies at every level and in every sector. Take for example the world of **software applications developers**, a rapidly growing global professional community already numbering in the many tens of thousands. In the US – home today of 54% of the world’s app developers where the “app economy” is estimated to have created over half a million jobs by 2012, the average age is 33 and the average salary is higher than that of doctors and lawyers. (On the other hand, 91% are male.)

Continued on page 17

Is software “eating the world”?



- There is also no doubt that high-tech jobs have multiplier effects. **This recent academic study** of high-tech employment and wage trends in the European Union between 2000 and 2011 found that the creation of one high-tech job in a region results in more than four additional non-high tech jobs in the same region.

Current debate over the shorter term balance between digital job creation and destruction can be expected to intensify. But by 2030 humankind will be way down this revolutionary road. It becomes increasingly clear that over the intervening 15 years our democratic societies will need to have transformed the very foundations of our economic prosperity and social cohesion in a borderless world. Failure is not an option. So what will success look like?

The return of the artisan ?

One way to think about this is to see it as a challenge to rethink the nature, structure and organisation of work which served us well in the industrial age, responding to a market that increasingly rewards **“individual rather than firm-specific capital...where there is less value in being the company man (and more in being) your own man possessing a dynamic skill set applicable in a variety of ways.”** And here’s another...

A real-world industrial revolution – the democratisation of manufacturing

Five years ago we addressed only this throwaway line to the future manufacturing economy of physical things as distinct from the pure “weightless” digital world of electronic bits: “Steel will still be steel and humankind will still need to eat.” Lest we forget, we are talking here about some 90% of the global economy!

In the words of digital chronicler Chris Andersen (he of **“the long tail”** - niche products for niche markets), “The past ten years have been about discovering new ways to create, invent and work together on the Web (a fair summation of our guiding 2009 ‘mass collaboration’ paradigm). The next ten years will be about applying those lessons to the real world” – by which he means the design, manufacture and sale of physical things.

In his 2012 book **Makers** (essential reading) he describes and documents the arrival of this long-awaited, digitally-driven Third Industrial Revolution driven by the “democratisation of manufacturing”. And lest we underestimate the significance of its arrival, he defines “industrial revolution” as “a set of technologies (those set out in our previous chapter) that dramatically amplify the productivity of people, changing everything from longevity and quality of life to where people live and how many there are of them.” As Mark Twain remarked of religion, “Important, if true”.

Think this is all a fantasy? **Some do. These folks don’t.** Nor does the **UK government**. Where do (might) these trends lead? Quoth Andersen, “(Large companies) aren’t disappearing... What we will see is simply more. More innovation, in more places, from more people, focused on more narrow niches. Collectively, all these new producers will reinvent the industrial economy, often with just a few thousand units at a time – but exactly the right products for an increasingly discriminating consumer... Welcome to the Long Tail of things.”

A world of entrepreneurs?

In this economic future, where digital tools and digitally-enabled business services make taking a new idea from conception to viable business much easier, faster and far less capital intensive, untold numbers around the world will presumably try. If so, many will succeed at every scale. There are a lot of smart, energised folks out there – typically also feeding off of each other. Innovation to the nth power. It could become a very long tail.

Need to equip yourself with the digital tools and capacity to get started and grow? There’s a cloud out there somewhere just right for you. Need somebody to make your innovative product? **Cloud manufacturers** can’t wait to help. Need somebody to find your markets and trigger your selling anywhere around the world? **Easy**. Need the services of business or technical professionals (“artisans”) – maybe somebody to engineer your design – but don’t need to employ them? **The independents** are out there, available and growing rapidly in numbers (+82% in Europe since 2000). Need venture capital? Intermediary platforms **like this** can help. Or maybe **crowd-funding** is the best option.

And as we have already noted, this sort of “elasticity” is coming to characterise the world’s most successful large enterprises too, where **“intrapreneurs”** increasingly drive change through the **transformational power** of the “industrial internet”.

We are talking here about some 90% of the global economy!

A new economic animal – “the accelerator”

Accelerators support startups with funding, mentoring and training for a defined period (usually three months), in exchange for equity, whereas traditional business incubators are often government-funded, and generally take no equity. Now we begin to see **large companies** also adopting this model as a way to reach out beyond their own corporate structures to grass-roots innovation.

The future of work

All fine and dandy, but what about the vast majority of humanity who for whatever reason will not become successful entrepreneurs? No opting out for them (us!) either. **One authoritative view** from 2009 expected that already by 2015 90% of jobs across all sectors would require tech skills. Unsurprisingly, current thinking therefore centres on the need to embed and integrate the teaching of “e-skills” into education from an early age and across all disciplines (including the humanities), with a corollary need to increase the percentage of students (and women) opting to pursue mathematical and scientific (especially ICT related) studies.

This “**e-Skills Manifesto**” produced jointly in 2012 by DIGITALEUROPE and European Schoolnet (both Associate Members of EIF) makes this case and policy prescription for Europe in irrefutable detail, calling the digital capability gap “a problem of epic proportions because technology literacy, capability and skills are critical for all industries” as “old industrial age models... are being turned on their heads by globalisation and the digital revolution.” Amen.

But where will the demand to employ such capabilities actually come from? Is this **well-known 2011 study** on the economic effects of the internet on the right track in concluding that “among 4,800 small and medium-size enterprises surveyed (in the G-8 and five other countries), the internet created 2.6 jobs for each lost to technology-related efficiencies? Virtually all relevant research agrees that in micro-economic terms SMEs will indeed account for most of the growth in employment in tomorrow’s healthy digital economies. But this brings us back to the macro-economic frame...

Labour productivity in the digital economy

Productivity growth is widely seen to drive economic growth, but productivity growth in advanced economies has **largely declined** over the past half century, with no immediate reversal in sight. On the other hand, the productivity of major digitally-powered enterprises is today **off the charts** compared with most industrial icons. This picture leads to a simple conclusion: digitally-driven transformation is the key to future economic growth, because it will drive the growth of labour productivity. Which takes us...

Beyond Bismarck

In a world where our economies and job markets are progressively re-founded on and driven by a vast, inherently elastic and collaborative ecosystem of entrepreneurial and intrapreneurial activity rooted in digital capabilities, where barriers to innovation, production, and market entry crumble everywhere (for both bits and atoms), as economic power increasingly accrues to those who “know” and respond in real time, as value increasingly accrues to individual skills rather than corporate structures, and as labour productivity rises, how will the policies of our welfare states have to change? This question can no longer be left for another day. **Here’s one provocative prescription.** At the same time, it is important to ask whether these same tools and new models can and will render government administration and welfare services more efficient, cost-effective and fraud-proof to the point where they are strengthened and sustainable.

Already by 2015 90% of jobs across all sectors will require tech skills.



Demography is destiny

Global demographics and **current trends** leave no doubt: global growth in the coming decades will be powered by the emerging markets. The good news is that our “long tails” can extend around the world, offering a world of opportunity.

At the same time, Europe’s demographic profile to 2030 and beyond, and the consequent risks for continued funding of our mature welfare states (notably health care), are well documented and widely understood. Less well understood is how the inevitable aging of our societies in the decades to come fits with the digitally-driven economic transformation foreseen in this report. Points to consider:

- If part of the solution is a gradual rise in the retirement age, digitally-rooted roles and tasks will be essential to help extend productive working life.
- Digital solutions can deliver the increased productivity that will be essential for social services consumed primarily by the elderly (notably health care).
- At the same time, seniors will constitute the wealthiest segment of our societies, with major implications for consumption. **By one estimate**, today’s aging baby-boom generations in the western world will come to control at least 70% of disposal income, and comprise 40 to 60% of consumption.

Opening digital markets

As we hurtle toward our 2030 global, knowing economy, we may increasingly run up against national jurisdictional borders inhibiting or preventing the free flow of digital data, products and services across the global internet. This friction will carry an increasingly heavy opportunity cost if not reduced. Today two parallel efforts to open digital markets command our attention:

- **A Single Digital Market for Europe?** This is the objective of the **actions** comprising Pillar I of the outgoing European Commission’s original **Digital Agenda for Europe (DAE)**. The most recent research finds that the full benefit of completing Europe’s Digital Single Market would be at least €250 billion per year, more than Europe’s 1992 Single Market programme.
- **Pillar II of the DAE – interoperability and standardisation** – also carries high and growing economic stakes. The digital standardisation game is increasingly played for keeps at global level among many private-sector stakeholders with varying degrees of market power and divergent interests if not business models. As we have seen, open platforms are generally seen to generate wider economic benefit, but powerful market players may see their own interests differently. Competition regulators have already entered this territory and look likely to remain.
- **TTIP and the Transatlantic Digital Market?** Five years ago the quest for a trade and investment treaty between Europe and the United States was seen as quixotic at best. Times change. Today the two are deep into negotiations for a **Transatlantic Trade and Investment Partnership agreement (TTIP)**, with horizon 2015 for endorsement by their respective legislatures (the European Parliament on this side). What place will further transatlantic digital market opening have in an eventual agreement? Not clear. But there is a consensus among participants and close observers that in order to pass legislative muster there will need to be at least a commitment to institutionalised engagement on the flashpoints of data privacy and protection. This said, irrespective of the digital scope of TTIP, the EU and the US will both pay an increasing price for failure to remove barriers to digitally-enabled, data-driven transatlantic commerce – particularly in view of the prospective growth in these markets in Asia.
- **Other third markets** As we have seen, other fast-growing third markets offer vast opportunity for digitally-driven European sectors. In a 2030 horizon Europe’s interest lies in reducing barriers to digital commerce more widely around the world.



The future of retailing

On-line retail shopping continues to grow (together with the resulting delivery services). Commercial districts in many towns and cities seem to be withering, undermining their economic viability – and this at a time when urban populations continue to grow at the expense of peri-urban and rural zones. What's going on here and where does it lead?

Beyond the convenience factor, a growing school of thought and experience points to the “knowing” advantage on-line retailers enjoy compared with their bricks and mortar competitors. We shop on-line, we leave data trails. We shop in person, we leave few or none. Advantage on-line retailer. Looked at from the consumer end, we can rapidly survey a vast array of competing products and prices online. In-store we are confined to the merchant's choice of inventory. Advantage on-line retailer.

What this picture suggests is that bricks-and-mortar retailing has also to enter the knowing economy, generating its own customer-specific data in order to attract and better serve its core clientele – provided of course that customers see their own advantage in leaving such data trails. **Indeed, this is what we now see trending**, and here are some of the **new tools**. Keep an eye as well on tools **facilitating** a related trend toward “hyper-local” retailing, as local communities begin to favour products newly-produced (by artisans) much closer to home.

The emergence of a “sharing economy”

Digital online cloud platforms (**Airbnb, Uber, Lyft**) are today driving the emergence of innovative – and disruptive – models for the sharing of assets and facilities, driven by real-time data (and often mobile access). Such sharing transactions clearly generate value – otherwise they wouldn't happen – but may also bypass regulated markets (as for example the sharing of passenger vehicles bypasses licensed taxi services). Certain sectors can expect to see demand for such sharing services grow.

Money, money, money, it's a bit-man's world

Or is it? People are funny about money. We had nothing much to say five years ago about the impact of the digital revolution on the financial world or money itself. Time to catch up.

- Let's start with **alternative currencies... is Bitcoin the future?** Some think so, others think it is on the verge of collapse. But a third school thinks that its true importance is as a software protocol enabling the growth of anonymous peer-to-peer payments cutting out financial institutions, whether or not Bitcoin itself proves able to compete as a currency with the world's central bankers.
- What **capital investment models** may we see emerge to fuel digital transformation? Here's **one farsighted three-legged model** looking at the future roles of the state, financial capitalism, and the market economy in the production and exchange of goods and services.
- **Crowd-funding** is still a drop in the global capital ocean, but this trend to bypass established capital market players is growing rapidly, notably for digital technology sector start-ups, thanks to **online platforms like this**.
- **Your wallet on your phone:** all the technology – notably Near Field Communication – is available to grandfather cash and credit cards, but this transition has yet to really take off in developed economies. Developing economies – most of the world's population – are another story. But in a 2030 horizon, **surely the day is coming**.
- At the same time, moving to **mobile and online payment systems** can facilitate cross-border transactions in a safe and efficient manner.
- And what about so-called “**high-frequency trading**”, arguably the ultimate “knowing” capability, in which data-fed algorithms dictate virtually instantaneous short-term buying and selling on major exchanges? Interestingly, **this trend seems to have peaked in 2009**, accounting for an estimated 60 to 73% of all US equity trading volume, with that number falling to approximately 50% in 2012. Maybe when everybody has a faster gun, nobody does?

The role of regulation in Europe's economic transformation

Throughout the course of this project, EIF members and guests have consistently stressed the power of public policy and regulation to shape – for better or for worse – Europe's digital future. The purpose of this report is not to prescribe policy, but rather to highlight policy areas seen to exert high leverage on this future, which we do in the following chapter. Responsibility for choices will rest, as it should, with our democratic institutions. But we need to recognise that many of these won't be easy...

Policies and regulation impact the speed of disruptive innovation

Virtually every day we see stories about disruptive – or potentially disruptive – new digitally-driven capabilities and business models which threaten established economic interests and regulatory models. Dealing with such disruption at the political and policy levels will arguably demand the most difficult judgments and decisions from legislators going forward. How rapidly can our economies adapt to such disruption? Entrepreneurs typically want regulators to just “get out of the way”. If only it were that simple!

Already today policy-making itself can't cope with the speed of change

This reality is widely recognised inside and outside government. Digital tools and technologies accelerate innovation. EU legislation typically takes three to five years. How to reconcile these two worlds? European experience with “co-regulation” and “soft-regulation” may point the way.

If only it were that simple!





Social & political features of the digital world in 2030

Here again we first revisit and update our 2009 projections and then turn to newly emerging trends. The short take: our ability to manage the social and political stresses generated by the economic revolution ahead of us will determine what sort of world awaits us in 2030.

2009 overview

By 2025 we may expect to inhabit a world where mass collaboration may have become the pervasive economic paradigm, powered by limitless networked computing power. But what about society itself? What will be the effects of these capabilities on our social interactions and governance in a hyper-networked world?

It is useful at the outset to observe just how much has already changed in the last 10 years. There is a surge in online social behaviour, as we increasingly create, maintain and facilitate relationships via greatly expanded social networks, and use them to organize not just our own social activity, but social and political movements, organizations and events. New digital tools will have been developed by 2025 to further broaden and deepen these trends. This prospect poses fundamental questions:

- In the digital society of 2025, what will be the role of government and public service?
- How will we deal with issues like security, privacy and identity?
- How will we inform ourselves and make judgments?
- How egalitarian and how virtual will society become?

Horizon 2030 overview

Five years on, we offer this thought: in view of the economic trends highlighted in the preceding chapter, the most significant prospective digitally-driven reordering of social identity in the next 15 years may be between those who find economic well-being and social inclusion in the global Knowing Society, and those who do not. Ultimately such a “digital divide” will no longer be determined simply by the possession or not of digital devices and skills – because ultimately most of humanity will be connected digital natives – but rather by the economic and social uses to which an individual is or is not able to put these skills. By 2030 we will be a long way down that road, ready or not.

Citizens are ahead of parliamentarians in their expectations.



Back to the future

2009

Digital democracy

The digital tools of mass collaboration have already begun to blur the line between established forms of representative democracy and more direct democracy in which mobilised citizens are able to permanently engage in and often decisively influence policy priorities and legislative outcomes. Most legislative bodies have yet to welcome this phenomenon, let alone re-engineer themselves in order to facilitate and manage it. By 2025, all will have had to.

» Horizon 2030

Anecdotal evidence and everyday experience confirm that most elective bodies in the OECD world, and many elsewhere, have got this message and are moving to respond. This said, one 2011 **UK-based research effort** includes international comparisons (UK, Canada, Chile, Australia) showing that citizens were ahead of parliamentarians and parliamentary officials in their expectations for greater parliamentary use of new technologies to increase transparency, accountability and interactivity with the public.

Indeed, the most important trend in this space is arguably growing citizen pressure everywhere on elected bodies, enabled by a proliferation of platforms designed to do just that. Some are generic, such as **this platform**. Others are issue and stakeholder specific, **such as this one**.

At the same time many elected bodies are themselves pushing forward to make use of the enabling tools, particularly at local level. Meet for example the “Senior Consultation and Involvement Officers” at Norfolk (UK) Country Council – and many other practical ideas – **here**. And let’s not overlook the considerable efforts of the European Parliament itself, as highlighted at **this EIF event**.

On the leading edge, we should also take note of software development projects and experimentation with so-called **electronic direct-democracy (EDD)** enabling direct citizen participation in legislative processes. **Here’s one “for digital natives”**.

On the other hand, there remain many governments which, far from embracing digital democracy, are trying to repress the use of social media for political activism. This has prompted **one academic to observe** that training professional and citizen journalists to manage their digital security will be paramount if democracy is to be promoted digitally. This task is already being performed by a number of civil organisations and networks.

Digital government

By 2025 the governed will typically be at least as well-informed as governments, producing a transition from government as an institution to government as a platform (full marks!) where stakeholders – people – can actively participate, collaborate and add value. Rather than a decision-making body at the top of a pyramid, (democratic) government will function as a coordinating and mediating platform at the centre of connected expert and stakeholder communities.

Most governments at all levels in democratic societies have by now at least gone the first step, creating platforms to host access to their full range of public services. The **US government site** is a particularly compelling benchmark. Beyond lies the possible institutionalisation of direct stakeholder consultation in policy making. Here again, the trend is for the development of tools (platforms in clouds) **like this**. And let’s not forget the **European Commission’s Citizen’s Initiative**. In this scenario there will need to be safeguards to prevent gaming the system. At a more practical level, **governments** increasingly see the economic and social value of **open access to their own data**, both to improve their own service relevance and delivery but also to trigger creative data-driven entrepreneurship fuelled by the same data – as **for example weather data**.

2009

Net Patrol

By 2025 not just the model but the responsibilities of government will likewise have morphed to reflect the reality that the internet has become the central nervous system of our economies and societies. Most notably, governments will have become at least as concerned with the cyber-security and safety of citizens and nations as they are with safety from physical harm or attack. Meeting this responsibility will require new concepts, new tools, new talent, and new frameworks for cooperation across society. It will not be sufficient to pursue these efforts in Europe alone.

This said, cyber-security in 2025 will not be found only in technical solutions administered by public authorities. Government will need to create the platforms and tools for collaborative efforts with individuals, businesses and other non-governmental organizations to reduce vulnerabilities throughout society.

Digital freedom

In a 2025 national security environment of greatly expanded cyber-risk, democratic societies will need to balance the responsibility of the state to protect its citizens with individual privacy rights and freedom of internet access. Indeed, this balance looks like becoming a primary differentiating feature between open, democratic societies and those states which attempt to control the internet not to protect their citizens, but to protect themselves from their citizens. The world's democracies will find it increasingly difficult to ignore the need for policies to shape future political and economic relations with such states.

Knock knock, who is it?

Security and privacy in the digital world share one important feature: they both benefit from a climate of trust in the safety and reliability of the internet. Key to the creation of this climate is trust in the identity of individuals, businesses, government and other organizations we encounter on-line. Progress is at hand. By 2010, all European citizens, businesses and administrations will be able to benefit from a secure means of electronic identification (eID). Well before 2025 we should all be in possession of an electronic "European Citizen Card".

» Horizon 2030

As reflected in **the most recent report from the European Union's Agency for Network and Information Security (ENISA)** the past five years have seen a dramatic race develop between ever-more potent cyber-threats and collaborative, typically government-led, efforts to counter them. ENISA makes clear that threat agents have increased the sophistication of their attacks and their tools, and that multiple states have developed the capacity to infiltrate both governmental and private targets.

Unsurprisingly, **ENISA's overview** of current and future threats is a mirror image of the evolving digital technology environment. Most notably, cyber-threats have gone mobile. Attack patterns and tools targeting PCs which were developed a few years ago have now migrated to the mobile ecosystem, while two new digital battlefields have emerged: big data and the Internet of Things. (**Is your fridge participating in a spam attack?**) We may reasonably conclude that strategies, organizations and tools to combat known and unknown future threats will demand constant evolution and increasing resources.

Five years ago European citizens weren't really thinking about their exposure to the security-focused surveillance activities of their own – or allied – governments, facilitated by governmental access to the data collected by commercial operators. Today we do. If nothing else, this has blurred the policy line between national security data and commercial data. It has also weakened the western voice for digital freedoms globally. These realities have set in motion new force fields on a number of fronts, to which we return further on. These circumstances have also triggered efforts by commercial holders of data to **make public** such data requests by governments.

Today 10 member states of the EU issue **Electronic Identity Cards**. Predictably however, the vision of an electronic European Citizen Card in the pocket of every EU citizen has **hit strong political headwinds** in member states where the very idea remains a third rail of national politics. The paradox is that both sides base their positions on the need to protect their citizens.

But let's think a bit out of this box for the moment, because greater security may be on the way for the individual user in the form of "two-factor" technology. Today, most of us are only protected by a single password we enter when we fire up our devices and go online. Relatively easy to hack. That's why many banks have gone to a second security hurdle for online banking in the form of a second coded device the user must satisfy. But this is awkward as a mandatory second proof that you are you every time you visit a website. But **this new stuff** could make a second identity test much less irritating.

2009

“News” – who do you trust?

The spread of digitally-enabled mass collaboration in the creation and dissemination of “news” looks like another powerful lever for political and societal change by 2025. The new way of finding news and processing it is to look at sources not under intermediate editorial control. In this scenario, professional journalism could be more alive than ever in 2025, although the output may be published in different ways. More bloggers will be the journalists of 2025 and vice versa, often not working exclusively under the umbrella of a single newspaper, TV station or magazine. This has particular relevance for politicians, who will need to be active participants in this developing, no-holds-barred marketplace of ideas.

This said, the “old” electronic media, notably television and radio, reach mass audiences with the same information and content, arguably creating an “informational commons” and thus arguably fostering informed, participative citizenship. Individually customized access to and use of information and communications could undermine this societal function and effect. Serious political debate has yet to begin on the future relevance of communication that serves basic public interest objectives – and more specifically on the future place and character of public service media in the internet-based digital world of 2025.

» Horizon 2030

Trends since 2009 suggest that public service media (PSM) indeed have an important role to play in a digital world where information is overabundant and often difficult to verify and source. Public service media websites are today consistently among the most consulted for information as a point of reference as well as for impartial and independent coverage of politics. As long as they are seen to ensure impartiality and independence PSM may well evolve as customised central access services for information in the digital sphere. Public service media able to adapt to the digital world while maintaining the public trust can also be seen as ensuring future investment in high-quality content. Audiovisual media convergence is also eliminating the distinction between “old” and “new” media. So-called “old” media will either establish strong online presence, as many have done, or die.

Content is still key to develop people’s interest in and use of these new access tools. People will still rely on “trustable” / trusted content providers. (Looked at from the media channel side in this light, internet-delivered radio looks to be a prospective winner in our digital future, as repeatedly shown by [Eurobarometer](#).)

Note also the trend toward bundling of telecom services and content (such as sports programming) with content the main consumer attraction.

Global governance for a global internet?

The global inter-governmental and multi-stakeholder debate on future internet governance and management looks certain to intensify through the UN-based [Internet Governance Forum](#). One clear pressure point is the growing demand to accommodate languages other than English, seen by many as a necessary condition for the continued existence by 2025 of a single worldwide internet. A second is the push for more multi-lateral governmental oversight of ICANN, the private, not-for-profit corporation responsible under mandate from the U.S. government for managing the assignment of internet domain names and numbering and other technical aspects of the internet.

On the language front, [ICANN](#) was moving decisively even as we wrote those words in 2009 to internationalise domain names, largely accomplished today. (This does not necessarily mean that our future digital world will be language-neutral viewed from the user end.)

On the other hand a growing split has emerged between governments and stakeholders (with a strong transatlantic base) committed to a bottom-up multi-stakeholder approach, and other governments intent on transitioning to a top-down, multi-lateral, intergovernmental, approach modeled on the treaty-based International Telecommunications Union (ITU).

These have become fast-flowing political waters with the end of the IGF mandate in sight in 2015, and the stakes are high. This road leads to São Paulo in April of this year at a conference co-sponsored by the Brazilian government and ICANN. For a synopsis of what is at stake (and testimony that the influence of the United States has been undermined by revelations of global eavesdropping), see this [summary](#) of our recent EIF discussion.

Social & political trends 2030 – what’s new?

How long is a piece of string? Social scientists are now appealing to the science of complex systems and network theory to try to foresee the **interplay of society and the internet**. Our observations are more modest. In today’s world we are all to varying degrees both participants in and observers of this new age of human intercourse, viewed through our own individual frames of reference and values. Older generations have the advantage of historical perspective, younger generations of native familiarity with the technology, and deep immersion in contemporary social and political currents. But maybe it goes deeper than that...

Is the internet rewiring our brains?

Recent science does seem to point in this direction, characterized by one leading-edge researcher (among many) as a **“brain gap” between young “digital natives” and older “digital immigrants”**. “Young people spend an average of 8 1/2 hours each day exposed to digital technology. This exposure is rewiring their brain’s neural circuitry, heightening skills like multi-tasking, complex reasoning and decision-making. But all that tech time diminishes ‘people’ skills, including important emotional aptitudes like empathy... On the opposite end of the spectrum, (older) digital immigrants have to work hard to embrace technology without the already-developed brain form and function. The good news is that the flexible brain is eminently trainable”. Well at least there’s that!

For purposes of this exercise, we simply observe that if we consider anybody born after 2000 as a digital native, by 2030 the native brain with native cognitive advantages will be ascendant everywhere (especially in emerging economies), but (in our democracies at least) not yet in the majority. What will that political equation look like?

Be that as it may, across all social categories it is useful from a policy strategy perspective to think of three different groups of wanderers in the digital world: passive users with basic functionality; active users without technical knowledge but with the ability and interest for creative use; active users with technical knowledge enabling a broad range of functionality.

Education in – and for – the digital world

We have already touched on our growing imperative for an e-skilled society. Clearly educational curricula will need to address this imperative. But let’s not overlook the fact that education is itself becoming **“ground zero for disruption”**, and that we seem to be at the dawn of the age of **adaptive learning** and **personalized learning** also building on data analytics and flexible platforms. Noteworthy in this space is growing experimentation by leading universities with **MOOCs** (Massively Open Online Courses).

The future locus of political power

Trends in the legislative and governmental spheres beg a central question: will the Knowing Society shift the locus of political power from the nation-state (and EU) level towards regional and local levels, or rather toward more centralised power – even at global level? One might usefully rephrase the question: what is leadership in a hyper-connected world – stewardship, curation and enabling at the centre of the network or command and control? If the former, as the trends suggest, then each level can be seen to have its future role to play, provided it embraces this digitally-driven leadership paradigm.

Knowing Society or Surveillance Society?

As can be seen in this report’s updates of our 2025 trend analysis, five years ago we were conscious of growing concerns over the nexus of data privacy, online freedom and cyber-security issues, set against the prospective economic and societal benefit of the data-driven world we have now irreversibly entered. But that was before Edward Snowden and today’s heightened public awareness of surveillance and the proliferation of surveillance systems and kit (GSP, video cams, drones, **mini-quadcopters**!).

Irrespective of the eventual adoption of privacy policy and legislation in response to a mobilised citizenry, one resulting trend is clear: people are increasingly attracted to the expanding offer of digital tools and services which guarantee protection of personal data in cyberspace – if not outright anonymity – the very antithesis of the social media culture.

*Education is itself becoming
“ground zero for disruption”.*

Take for example this **fast-growing cloud-based service** effectively allowing an individual to stop websites from knowing or logging who you are and where you live, meaning you can use your existing web browser, and even your phone, to browse the internet with complete anonymity. And here's **another do-it-yourself innovation** offering data security. Should this trend continue, it could well force us to confront a fundamental question: should online anonymity be legal? Welcome to ...

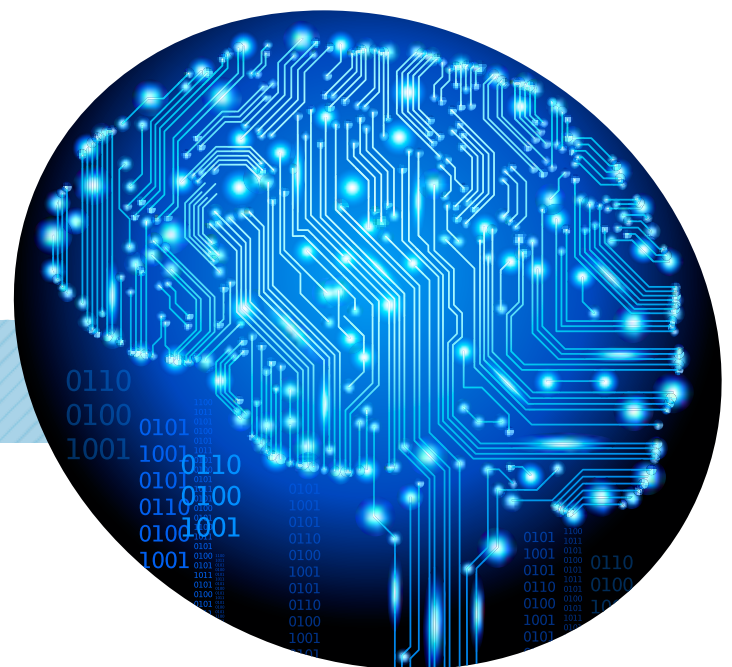
The “Dark Web”

People other than law-abiding individuals seeking to protect their personal data already inhabit dark zones of anonymity in cyber-space where much organized cyber-crime operates. Law enforcement agencies are therefore expanding efforts to penetrate and crack down on the services (**notably e-mail**) enabling such hidden activity. If nothing else, this trend poses a second-order question: will legislators in our democratic societies charged with “oversight” of national security and law enforcement surveillance have sufficient understanding of the complexities involved to do their job – or will the geeks run the world? And arguably just as important...

Are data and data sets objective?

In the words of **this specialist**, “Sadly they are not. They are creations of human design. We give numbers their voice, draw inferences from them, and define their meaning through our interpretations. Hidden biases in both the collection and analysis stages present considerable risks, and are as important to the big-data equation as the numbers themselves.”

And another related thought for the future: if and as data (biased or unbiased) is increasingly brought to bear on political and social questions through real-time measuring and prediction of real-world conditions of whatever sort, what will be the reaction of ideological, traditional or faith-based attitudes and behavior should their understanding be “disproved”?



Will the geeks run the world?

What digital world(s) do we want?

Five years ago we concluded this chapter as follows: the prospect that by 2025 ubiquitous high-speed broadband access will become commonplace has led some to predict that we be living in a much more unified and socially egalitarian world. Others suspect that the online world will be largely a reflection and intensification of real world networks and communities, including social and cultural distinctions.

Arguably the most important question we have confronted in this exercise is also the most difficult to answer: over the next 15 years, will the digital technologies and tools of mass collaboration draw human society closer together, or will they rather fragment our societies into myriad self-conscious, self-communicating, self-absorbed communities of special interest or specific identity, with unpredictable political, economic and social consequences?

Five years on, we offer this concluding thought: in view of the economic trends highlighted in the preceding chapter, the most significant prospective digitally-driven reordering of social identity in the next 15 years may be between those who find economic well-being and social inclusion in the global Knowing Society, and those who do not. Ultimately such a “digital divide” will no longer be determined simply by the possession or not of digital devices and skills – because ultimately most of humanity will be connected digital natives – but rather by the economic and social uses to which an individual is or is not able to put these skills.



Europe's place in the digital world of 2030

There is much hand-wringing at the moment over Europe's ability to compete and prosper in the digital world awaiting us. However, the trends identified in this report are also increasingly seen (a trend in itself) to play toward abiding strengths of European civilization and humanism. These strengths include notably:

- design
- engineering
- scientific research
- academic excellence
- cultural legacy and creativity
- Urban planning, management and social integration (the "agora")
- Social services
- global leadership in many highly sophisticated industrial and service sectors
- established presence in many 3rd markets

The creative and pervasive uptake of leading-edge digital tools and technologies can leverage all of these strengths at local, European and global scale. If indeed this is Europe's opportunity and emerging strategy to prosper in the world of 2030, then we need to urgently address the necessary framework conditions and digital capabilities were we have fallen or risk falling behind other parts of the world. Here is a look at the policy instruments we have – or need – to address what are seen to be areas of highest priority.

Completing the Digital Single Market (DSM)

There is a growing political consensus that completing the EU's digital single market is the single most powerful policy instrument Europe has to catalyse growth and jobs across our economy. The most recent research finds that the full benefit of completing Europe's Digital Single Market would be at least €250 billion per year, more than Europe's 1992 Single Market programme.

Moreover, the necessary actions do not demand funding from the EU budget. They do, and will continue to, demand effective leadership – not to say courage – from the EU institutions and member states, because **the actions required** comprise a number of policy areas which have proved intractable over many years. But the evident fact that they are hard does not change the evident fact that they are increasingly urgent and necessary.

The European Commission's **most recent DSM composite scorecard** dates from June 2013. It shows considerable progress on the initial action agenda, but this is not the whole story. Follow-on actions – notably where Parliament and Council have entered the legislative track – remain problematic in a number of key areas including notably data privacy and network security. Issues and actions relating to intellectual property have progressed in a number of areas, but remain contentious in others. In other difficult areas – notably spectrum – the actions taken have served primarily to structure what remains an ongoing (and long-running) debate. And here's a closer look at recent follow-on action for one of the most difficult and important DSM issues...

Network infrastructure

We won't be able to play the new global game without our own ambient internet, which will require ubiquitous high speed, high quality access to broadband.

Europe has long been and remains a world leader in the mobile technology space, but cannot afford to fall behind other parts of the world in the deployment of region-wide high-speed wireless access and coverage. Recent data show that we are behind both the US and China in 4G/LTE rollout.

On the fixed side, competition for incumbent telecom operators has emerged over the past five years across Europe for higher speed broadband provision – largely in densely-populated areas – from upgraded (and unregulated) coaxial cable networks.

Current access concerns relate notably to extra-urban market areas insufficiently rich and dense to attract commercial investment in leading-edge technologies from either fixed or mobile operators. They may be home to large percentages of the population and small businesses at risk from digital marginalization. What is clear and worrisome in this trend is that economic, social and political power in the digital world of 2030 will increasingly map high-performance network footprints. Areas with ambient access will prosper. Those without will not. Here's a look at the most important EU policy instruments bearing on this scenario.

- **Telecom regulatory framework** EU telecom regulation is fraught with history, divergent stakeholder interests and growing financial pressure on operators. There is no doubt that these instruments will continue to exert high leverage on Europe's future ability to compete in the world of 2030 – for better or for worse.

A new “**Telecom Single Market**” proposal from the European Commission in September 2013 tries to reconcile Europe's Open-Network-Provision-based framework (enforcing competitor access to incumbent fixed networks) with less intervention at wholesale level, dismantling of internal EU market roaming charges, and internal EU market harmonisation of other framework conditions, notably so-called “net neutrality”, consumer rights and spectrum.

- **State aid policy** Beyond market areas sufficiently rich to attract commercial investment by telcos or cable operators (or both), satellite operators may offer internet connection superior to the little or nothing on offer or in prospect from fixed or mobile operators. But this still leaves open the question of public investment by member-states to ensure competitive future ambient coverage in these areas. Recently adopted **European Commission state aid policy guidelines** for such intervention increasingly come into play here, with real-world outcomes for underserved communities difficult to predict at this stage but important to assess.

- **EU funding** Member-state enthusiasm for EU-level funding of broadband infrastructure has proved limited within the framework of Trans-European Network (TENs) funding. Support for network build from EU regional and structural funds is seen by some to offer an alternative.

Data policies for a data-driven economy

Regulatory frameworks for data privacy and security have clearly emerged as political priorities for a Knowing Society. (We note in passing that the privacy debate is moving toward concepts of “**privacy by design**” and “privacy by default”.) But the boundaries of “data policy” are expanding in a world where the collection of data,

access to data, ownership of data, and exploitation of data are becoming the primary sources of economic (and indeed political) power. In particular competition policy issues are already part of the mix and look certain to evolve.

e-Skills and competencies

Recent modeling based on 2012 data shows that “even the worst scenario sees increasing excess demand in Europe for high-level e-skills, reaching over 900.000 by 2020 in the main scenario. This reflects the huge opportunity for jobs creation generated by new mobile technologies, cloud computing, big data and social business in all industry sectors”, with job growth strongest in highly skilled areas. Moreover, the picture is similar around the world, meaning that Europe will need to compete in the global marketplace for these human resources.

The 2012 **e-Skills Manifesto** funded by the European Commission called this gap “a problem of epic proportion” and pointed to the “disengagement” of European boys and girls from scientific and technical subjects from late primary and early secondary education, despite their heavy use of the internet – **especially girls**, who remain dramatically underweighted at academic and professional levels, and in comparison with other leading countries.

At the same time, the e-Skills imperative goes way beyond scientific and technical expertise. As the Manifesto points out, “everybody will need a degree of proficiency, competency and knowledge about the tools of our time, as they are becoming critical to the

successful execution of every job function”. Indeed, how else will we leverage our many strengths without these human resources throughout society? The Manifesto goes on to set out an action agenda demanding the support and active engagement of all stakeholder communities. This agenda is no longer optional for Europe. Joined-up leadership is now essential at all political levels:

- Increase adoption of the **European e-Competence Framework**. The e-CF is a component of the **European union's strategy for e-Skills in the 21st Century** supported by the European Commission and The Council of Ministers. The Framework supports key policy objectives of the **Grand Coalition for Digital Jobs** and benefits an ever-growing user community from the EU and across the world.
 - Enhance IT education for non-IT professionals.
 - Create new partnership models between industry and educational institutions.
 - Promote IT to young people, with special focus on the gender gap.
-

Europe's attractiveness for entrepreneurial start-ups

Not everybody can be an entrepreneur, but all trends confirm that we will increasingly depend on growing this community in Europe to power future growth and job-creation. On the other hand, there is a long-standing and marked perception that European societies are risk-averse, bureaucratic and penalize risk-takers who fail. This has become a strategic issue for Europe in competition to keep or attract and support the best entrepreneurial talent. There is no simple solution here. As the **most recent report from the Global Entrepreneurship Monitor** makes clear, the motives and expectations of entrepreneurs are complex and vary around the world.

Europe has put in place **programmes** intended to support entrepreneurship as part of the EU's broader **Competitiveness and Innovation Programme**, but the roots of this challenge clearly go much deeper. Indeed, the bottom-up message to political Europe is of a different order: "get out of the way!". This mindset points to a need for bottom-up assessment, beginning locally but including all levels, of the justification for policies that are seen to be "in the way", connected to a continental framework for the sharing of most effective policy practice. Thriving new digitally enabled business clusters in many places across Europe are the best place to start.

EU-level research & innovation programmes

The so-called "**Horizon 2020**" framework for EU-level funding includes a number of important public-private-partnership (PPPs) for Europe's future competitiveness in digitally-based innovation, focused on ICT in science, ICT in industrial leadership and ICT in societal challenges. Among those of high strategic importance in view of the trends identified in this report we note the **Robotics PPP**, the **Future Internet PPP**, and especially the new **5G PPP** which needs to be seen and supported in its wider context. European firms continue to hold **world-leading positions** in the telecom technology and equipment sectors. The 5G PPP now embodies their joint determination to ensure that the next generation of communications networks will be "made in the EU", a strategic opportunity and imperative of the highest priority.

The wider and more fundamental European policy debate over the value of public investment in research and innovation needs to take account of recent influential research into the value of "**the entrepreneurial state**" demonstrating that public investment "has not just fixed markets but actively created them." This said,

publicly-funded ICT research and innovation is but a part of the equation for future European competitiveness in the digital world. Private sector and academic investment will likewise prove decisive, and thus so will national and local framework policy conditions – including of course fiscal policies.

A recent conference hosted the EU's Joint Research Centre concluded that "the great heterogeneity of companies and framework conditions across countries and regions, calls for much more systematic and comprehensive policy analysis and monitoring of instruments, as well as proper indicators. One salient conclusion of the conference has been the call from both scientists and policy makers to establish a stronger network of R&D and innovation policy evaluators, to support the proper implementation of the up-coming European financial support instruments agreed for the period 2014-2020".

We would add that Europe's success in stimulating ICT research and innovation will need to be measured against similar efforts elsewhere in the world.

Can Europe surf the software avalanche?

We will have to. Europe's recently adopted **Cloud Computing Strategy** based on a multi-stakeholder **European Cloud Partnership** aspires to create 2.5 million new jobs in the cloud sector by establishing models for safe and fair contract terms and promoting standards to ensure cloud interoperability. More fundamentally in the view of one **European software leader**, software development still remains more art

than engineering discipline. There is an opportunity for Europe to apply our engineering skills to create a standard foundation platform for future software development.

But of course exploiting these opportunities brings us back to Europe's urgent need to both develop and attract world-class software developers....

Smart Cities – a European priority and opportunity

For the first time in history, more than half of the world's population now live in towns and cities. By 2030 this number will swell to almost 5 billion, with urban growth concentrated in Africa and Asia with many mega-cities (10 million + inhabitants). By 2050, 70% of humanity will live in cities. That's a profound change and will demand a different development and management approach from what is possible today.

Europe's urban, human-centric civilization has its roots in the ancient world and continues to stand out for spatial organisation, aesthetic and cultural value, public services and spaces, and social integration. Europe's cities can be models for tomorrow's world. Europe's **Innovation Partnership for Smart Cities and Communities** needs to be seen in this context not only for our own urban development based on digital systems integration, but also as a virtually limitless opportunity for European innovators in this space to export their experience and know-how to the world.

Internet governance

In the preceding chapter we stressed the growing global debate over the future governance of the internet, and Europe's commitment to internet freedom, an open internet and the multi-stakeholder internet governance model. "Governance networks" will be part of this debate, self-organising stakeholder solutions which can then be adopted by competent political authorities in jurisdictions where deemed necessary.

Europe itself will need to present a strong, united multi-stakeholder front going forward as this debate heats up, which must include strong governmental and parliamentary involvement at EU and member-state levels. The **European Commission's proposal** of 14 February 2014 is a good place to start.

Tax

Pressure for adaptation of industrial-era fiscal strategies, policies and practices is growing. This debate will necessarily and inevitably engage governments and

legislators at all levels across Europe, notably within the Euro zone.

Transatlantic and wider digital market integration


The ongoing **TTIP negotiations** create the opportunity to further align EU and US policies which may otherwise inhibit transatlantic flows of online data and services.

Europe also needs to remain engaged in global and bilateral efforts to reduce such frictions, particularly in other growing markets.

"Internet Ready" legislation – an idea whose time has come?

We conclude our whirlwind tour with this thought: Europe's Digital Agenda adopted in 2010 must continue to progress and figure among the highest EU priorities for the coming 5 years as far as it goes. But as we have tried to stress in this report, the digital world itself will go much, much further, transforming our economies and societies "horizontally" and therefore demanding political engagement and policy innovation of similar scope. How can we respond in a practical manner to this imperative?

One practical idea deserving support from the next European Commission and European Parliament is to require that all EU policy and regulatory instruments from now on be "Internet – or perhaps more broadly ICT – Ready", meaning that the foreseeable impacts of this revolution be explicitly taken into account in their analysis and content. Indeed, why not adopt this discipline at every political level across our continent?



Why not adopt this discipline at every political level across our continent?

About the European Internet Foundation (EIF)

EIF is a parliamentary forum founded by Members of the European Parliament in the year 2000 as a non-profit association. EIF's mission is to help provide European political leadership for the development of European and multilateral public policies responsive to the political, economic and social challenges of the worldwide digital transformation. Its purpose is to help ensure that Europe remains at the forefront of this transformation and benefits fully from it through enhanced global competitiveness and social progress.

EIF focuses on issues and actions at the top of the political agenda and on emerging future trends at both European and global level. Through a continuous programme of live debates and special projects featuring open and inclusive dialogue, EIF creates a space for greater understanding of the digital world.

EIF does not itself take any position nor represent any specific interests.

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A word from the EIF Chair



As you can see on these pages, the European Internet Foundation serves as an independent, politically-led multi-stakeholder platform for the analysis and debate of issues and policies bearing on Europe's digital future. Our membership brings to this mission an exceptionally wide range of experience, interests and extended networks of their own. This adds up to a unique resource for Members of the European Parliament engaged – or considering engagement – on these issues. At the same time our politically-led **governance structure**, statutes and operating procedures ensure the integrity of the foundation. We are financed entirely from our annual membership fees. **EIF is inscribed in the Transparency Register of European institutions.**

EIF is a member-driven organisation in which our political, business and associate members collaborate to create our programme agenda, and organise and conduct individual events. We also benefit from the committed participation of the European Commission, and a growing number of

EU member-state permanent representations. As you can see (and hear) from this retrospective of our programme over only the past year, we are an active community!

Since our incorporation under Belgian law in 2000, EIF has maintained a strong cooperative relationship with the **United States Congressional Internet Caucus** and the **Transatlantic Policy Network (TPN)** with whom we partner for the annual TPN Transatlantic Week in Washington. More recently we have sought to establish working relationships with organisations in EU member-state capitals sharing the same governance principles. This has resulted so far in Memoranda of Understanding with the **Digital Policy Alliance** in the UK and **iPoort** in The Netherlands. We have also recently established an **antenna in Asia** to keep us posted on digital developments.

EIF has regularly conducted study-tours for our political members to digital-technology centres in Europe (**Sophia Antipolis, (France); Berlin**) and beyond (United States: various locations including silicon valley; **Asia-Pacific region**: Hong Kong; Shenzhen (PRC) and Seoul).

We are also regularly present at major digital-policy events around the world, including all annual meetings of the **UN Internet Governance Forum**, the annual **State of the Net Conference** hosted by the Advisory Committee to the US Congressional Internet Caucus, and the **World Mobile Congress** in Barcelona where we recently hosted a high-level roundtable for input into this report.

As this report shows, we live in extraordinary times. The next European Parliament will be called upon across a growing range of policies to help ensure that Europe's future in the digital world is a bright one. I have no doubt that EIF will continue to contribute to that essential task.

Pilar del Castillo MEP

As you can see from this retrospective of our programme over only the past year, we are an active community!

EIF Political Members (March 2014)

Governors

Alexander Alvaro MEP
Pilar del Castillo MEP, EIF Chair
James Elles MEP and EIF Co-Founder
Malcolm Harbour MEP
Edit Herczog MEP

Arlene Mccarthy MEP
Bill Newton Dunn MEP
Angelika Niebler MEP
Marietje Schaake MEP
Catherine Trautmann MEP
Lambert Van Nistelrooij MEP

Political Members

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Christian Engström, MEP
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Keith Taylor, MEP
Alexandra Thein, MEP
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Róza Gräfin von Thun und
Hohenstein, MEP
Rafał Trzaskowski, MEP
Ioannis Tsoukalas, MEP
Inese Vaidere, MEP
Sabine Verheyen, MEP
Axel Voss, MEP
Graham Watson, MEP
Rainer Wieland, MEP
Cecilia Wikström, MEP
Pablo Zalba Bidegain, MEP
Joachim Zeller, MEP
Roberts Zile, MEP



2014

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Launch of EIF Report 'The Digital World in 2030: What Place for Europe?'

Chairing MEP Pilar del Castillo

Speakers:

Peter Linton, co-author of the report and Advisor to EIF Board of Governors
Robert Madelin, Director-General, DG CONNECT, European Commission
Vladimír Sucha, Director-General, Joint Research Centre, European Commission
Jan Muehlefeit, Chairman Europe, Microsoft
Gianpiero Lotito, Founder and CEO, FacilityLive
James Elles, MEP and EIF Co-founder

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The Telecom Single Market

Chairing MEP Pilar del Castillo

Speakers:

Malcolm Harbour CBE, MEP, IMCO Committee Chair and EIF Governor
Roberto Viola, Deputy Director General, DG CNECT, European Commission
Göran Marby, Chair, BEREC
Nicola Frank, Head of European Affairs, European Broadcasting Union
Pablo Pfost, Director of Corporate Regulatory Affairs, Telefonica
Stephen Lerner, General Counsel & Regulatory Affairs Director, Three UK
Guillermo Beltrá, Senior Policy Officer, BEUC

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EIF High-level Roundtable on EIF report 'The Digital World in 2030: What Place for Europe?' Organised in the context of the Mobile World Congress in Barcelona

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Next Generation Network Infrastructures

Chairing MEP Malcolm Harbour

Speakers:

Mario Campolargo, Director, Net Futures, DG CONNECT, European Commission
Nicolas Demassieux, Senior Vice President Research, Orange Labs
Marnix Botte, VP Open Innovation EMEA and head of Bell Labs Belgium, Alcatel Lucent

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The Digital World in 2030: Europe's place in the technology race

Chairing MEP Malcolm Harbour

Speakers:

Patrik Regårdh, Head of Strategic Marketing, Ericsson
Cafer Tosun, Senior Vice President Strategic Research and Innovation at SAP
Craig Burchell, Vice President External Relations Europe, Samsung
Lord Erroll, Chairman of the Digital Policy Alliance (UK) tbc

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Feedback from Internet Governance Forum 2013

Chairing MEP Sabine Verheyen

Speakers:

Nigel Hickson, VP, Stakeholder Engagement - Europe, ICANN
Prof. Michael Rotert, Chairman of eco

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Digital trends 2030

Chairing MEP James Elles

Speakers:

Franco Accordino, Head of taskforce 'Digital Futures', DG CONNECT
Peter Linton, co-author and advisor to Governors, EIF
Franck Debié, Chair of Inter-institutional Working Group 2 on the future of European Society, ESPAS

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Smart Cities and Communities: the EU Innovation Partnership

Chairing MEP Lambert van Nistelrooij

Speakers:

Paul Timmers, Director, Sustainable and Secure Society, DG CONNECT, European Commission
Harry van Dorenmalen, Chairman, IBM Europe
Jan Olbrycht MEP and President of the Urban Intergroup of the European Parliament

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Cybersecurity: the EU action plan

Chairing MEP Pilar del Castillo

Speakers:

Yvon Le Roux, Vice President, Cyber Security, Threat Response, Intelligence and Development, Cisco
Gerold Hübner, Chief Product Security Officer at SAP
Jonathan Sage, Governmental Programmes Executive at IBM, EMEA lead on cyber security and cloud computing policy

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Workshops on EIF project 'The Digital World in 2030'

Moderators: Edit Herczog MEP and Amelia Andersdotter MEP

DECEMBER

EIF debates regularly take place in the European Parliament in Brussels and are chaired by EIF Members of the European Parliament.

- 27** **Net Neutrality**
Chairing MEP Pilar del Castillo MEP
Speakers:
Thomas Grob, Senior Expert Regulatory Strategy at Deutsche Telekom
Dr. Klaus Illgner, Managing Director of the IRT (Broadcast Technology Institute)
Andrea Renda, Senior Research Fellow at CEPS
- 26** **The Digital Single Market**
Chairing MEP Malcolm Harbour
Speakers:
Claire Bury, Director of the Directorate E (Services), DG Internal Market and Services, European Commission
Christian Verschueren, Director-General, EuroCommerce
Penelope Naas, Vice-President and Head of EMEA Public Affairs for UPS
Monique Goyens, Director General of BEUC
- 12** **Discussion 'Follow-up event with Digital Futures Project of European Commission (DG CONNECT)'**
Chairing MEP James Elles
-
- 21-25** **EIF Delegation at Internet Governance Forum in Bali, Indonesia**
- 16** **Preparatory meeting: the Internet Governance Forum in Bali**
Chairing MEP Sabine Verheyen
Speakers:
Nigel Hickson, VP, Stakeholder Engagement - Europe, ICANN
Linda Corugedo-Steneberg, Director, Cooperation, DG CONNECT at European Commission
Victor Silveira Braoios, First Secretary of the Brazilian Mission to the EU
- 15** **Investments in broadband in Europe**
Chairing MEP Edit Herczog
Speakers:
Vittorio Vallero, Deputy Coordinator, Infrastructures and Access, Digital Agenda for Region Piedmont, Italy
Michael Garvey, Vice Chair of Buckinghamshire Business First, representing Digital Business First
Gábor Bihary, Committee of the Regions
Stefan Zottli, Cabinet of Johannes Hahn, Commissioner for Regional Policy
Anthony Whelan, acting director for Electronic Communications Networks and Services, DG CONNECT, European Commission
- 1** **EIF-K4I debate at the EU Innovation Summit 'IT as a tool for driving Innovation'**
Chairing MEP Lambert van Nistelrooij,
Speakers:
Dr. Burton Lee, PhD MBA - Lecturer, European Entrepreneurship & Innovation, Stanford School of Engineering
Harry van Dorenmalen, IBM Europe Chairman
Thibaut Kleiner, Advisor, Cabinet of European Commission Vice President Neelie Kroes
-
- 25** **How e-Health, m-Health and telemedicine are changing the delivery of care**
Chairing MEP Milan Cabrnoc
Speakers:
Joan Cornet, Director of the mHealth Competence Center at Mobile World Capital Barcelona
Paul Buchanan, the founder and Chief Executive of Team Blood Glucose
Gisele Roesems-Kerremans, Deputy Head of Unit "Health and Well-being", European Commission DG CNECT
- 24** **Big Data analytics**
Chairing MEP Pilar del Castillo
Speakers:
Roberto Viola, Deputy Director General, European Commission DG CNECT
Stefan Sigg, Senior Vice President for Big Data at SAP
Jens-Henrik Jeppesen, Director, European Affairs, Center for Democracy & Technology
- 24** **EIF Meeting with European Commission VP Neelie Kroes on Telecoms Single Market: Building a Connected Continent**
Chairing MEP Pilar del Castillo
- 5-7** **EIF Study Visit to Berlin: How to create the right ecosystem for top ICT hubs: the Berlin case**
-
- 15-18** **Transatlantic Week 2013 in the USA (Washington DC)**

NOVEMBER

OCTOBER

SEPTEMBER

Visit our website www.EIFonline.org to read the summaries of our events and listen to our prominent speakers.

- 10** **Online payments and e-Signatures**
Chairing MEP Malcolm Harbour
Speakers:
Lorenzo Gaston, Convenor of Innovative Payments Task Force EPC – Cards Stakeholders Group; Gemalto
Marta Ienco, Regulatory and Policy Director, Government & Regulatory Affairs, GSMA
Philippe Pellé, Deputy Head of Unit Retail Financial Services and Consumer Policy, DG MARKT, European Commission
- 9** **The Economic Impact of the Internet: measuring and monitoring**
Chairing MEP Lambert van Nistelrooij
Speakers:
David Dean, Senior Partner and Managing Director, The Boston Consulting Group
Katrine Ellersgaard Nielsen, co-author of the Copenhagen Economics report 'The impact of online intermediaries on the EU economy'
James Waterworth, Vice President, CCIA Europe
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- 17** **EIF breakfast meeting with Digital Business First**
Chairing MEP James Elles
Remarks by Digital Business First's representatives, including:
Alex Pratt, Chairman, Buckinghamshire Business First and Buckinghamshire Local Enterprise Partnership
-
- 29** **Feedback from EIF Study Visit to Asia**
Chairing MEP James Elles
Remarks by:
Pilar del Castillo, MEP and EIF Chair
Lambert van Nistelrooij, MEP and EIF Governor
Ivailo Kalfin, MEP and EIF Political Member
- 28** **Cybersecurity in Europe: what next?**
Chairing MEP Ivailo Kalfin
Speakers:
Robert Madelin, Director General, DG CONNECT, European Commission
Mats Nilsson, Director GF Technology, Cyber Security Lead, Ericsson
Graham Palmer, Director Information Security EMEA, Oracle
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- 25** **EIF-EC joint lunch 'Girls in ICT Day'**
Chairing MEP Pilar del Castillo
Speakers:
Roberto Viola, Deputy Director-General, DG Communications Networks, Content and Technology, European Commission
Hamadoun Touré, Secretary-General, International Telecommunication Union
- 24** **Preparatory meeting for the 5th World Telecommunication / ICT Policy Forum**
Chairing MEP Sabine Verheyen
Key-note speaker:
Hamadoun Touré, Secretary-General, International Telecommunication Union
Remarks:
Erika Mann, Board Member, ICANN
Larry Stone, President, Group Public & Government affairs, BT
Linda Corugedo Steneberg, Director, Cooperation, DG CONNECT, European Commission
- 23** **Kick-off of EIF project 'The Digital World in 2030'**
Chairing MEPs James Elles / Pilar del Castillo / Edit Herczog / Lambert van Nistelrooij
Panelists:
 - Ajit Jaokar, Founder, Futuretext and European Policy Bloggers Network
 - Patrik Regårdh, Head of Strategic Marketing, Ericsson
 - Burkhard Neidecker-Lutz, Chief Development Architect and Research Fellow, SAP
 - John Finney, Chief Commercial Officer, O3b Networks
 - Matthias Wulff, Head of Communications Clubs and Direct Marketing, Bertelsmann
 - Peter Linton, EIF Advisor and principal author of the 'Digital World in 2025'
 - Howard Williams, Professor, Oxford Internet Institute
 - Taylor Reynolds, OECD, author of the OECD 'Internet Economy Outlook'
 - Phillida Cheetham, researcher in the Consumer Insight team, Which?
 - John Higgins, Director-General, DIGITALEUROPE
 - Joost Van Der Vleuten, Policy Officer, European Commission (DG CONNECT)
 - Žiga Turk, Professor, University of Ljubljana
 - Stefano Zanero, assistant professor, Computer Engineering department, Politecnico di Milano University
 - Franco Accordini, Head of taskforce 'Digital Futures', European Commission (DG CONNECT)
 - Michal Kosinski and David Stillwell, co-authors of 'Private traits and attributes are predictable from digital records of human behavior', University of Cambridge - The Psychometrics Centre
- 1-6** **EIF Study Visit to Asia (Hong Kong – China – South Korea)**

JULY

JUNE

MAY

APRIL

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The future Internet and the challenges of European Institute of Innovation and Technology

Chairing MEP Lambert van Nistelrooij

Speakers:

Prof. Dr. Willem Jonker, CEO EIT ICT Labs

Zoran Stancic, Deputy Director General, DG CONNECT, European Commission

Magnus Madfors, Director, R&D Policy Ericsson and member of the Executive Steering Board of EIT ICT Labs

19

Data Protection

Chairing MEP Pilar del Castillo

Speakers

Harri Koponen, Chief Operating Officer, Rovio

Kati Levoranta, Chief Legal Officer, Rovio

Mikko Niva, Global privacy counsel for Nokia Corporation

Richard Ward, Government Relations at IBM and Industry Vice Chair of the Data Protection Subgroup in the Digital Single Market Group of DPA

Ilias Chantzios, Senior Director, Symantec Government Affairs and Industry Executive of the Data Protection Subgroup in the Digital Single Market Group of DPA

19

EIF meets the EU Media Futures Forum

13

EIF-DPA joint event 'Perspectives for Mobile and Broadband in the UK 2020', London**Speakers:**

James Elles, MEP and EIF Governor

Lord Erroll, DPA Chair

Peter Linton, Managing Director, Burson-Marsteller Brussels and Advisor to EIF Board of Governors

Matthew Copeland, independent advisor on telecommunications networks and technologies

Alex Pratt, Buckinghamshire Business First

Frank Nigriello, Oxfordshire Business First

Neelie Kroes, European Commission Vice President responsible for the Digital Agenda for Europe

Peter Olson, President, Digital Europe

Tim Davie, Acting BBC Director-General

20

How is the European Parliament Preparing for the New Elections

Chairing MEP Alexander Alvaro

Speakers:

Juana Lahousse-Juárez, Director General of DG COMM, European Parliament

Jaume Duch, Spokesman and Director for Media at European Parliament

Thibault Lesenechal, Head of Web Communications at European Parliament

19

US Presidency 2012 – Lessons for Online Campaigning

Chairing MEP Alexander Alvaro

Speakers:

Nathaniel Lubin, Digital Director at the US Presidential Inaugural Committee.

Philip Weiss, Founder and Chief Hyperthinker at ZN.

29

The Future of Technology and its Implications for Society, the Economy and Regulation

Chairing MEP Malcolm Harbour

Keynote speaker:

Craig Mundie, Senior Advisor to the CEO, Microsoft Corp.

23

Children in the Online Environment

Chairing MEP Sabine Verheyen

Speakers:

Natasha Jackson, Head of Content Policy, GSMA

Lucy Woodward, Director, Interactive Live Services for EMEA, Walt Disney

Jakub Boratynski, Head of Unit: Fight against organised crime, European Commission, DG HOME

22

Connected TV

Chairing MEP Sabine Verheyen

Speakers:

Lorena Boix-Alonso, Head of Converging Media and Content Unit, European Commission

Romain Bausch, President and CEO of SES

Arnaud Brunet, Director of External Relations Europe, Sony Europe

Jürgen Kleinknecht, New Media Editorial Department, ZDF

Business Members



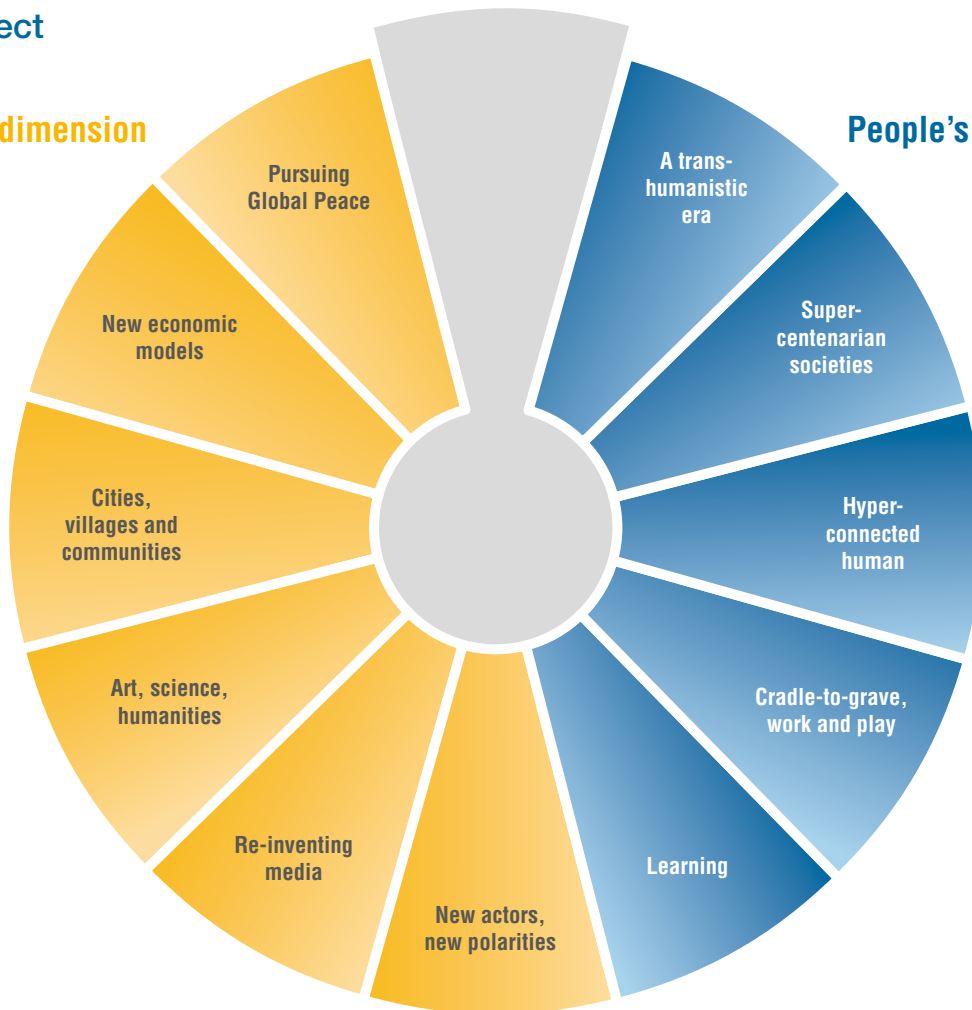
Associate Members



Aspirational visions of our “Digital Futures”

European Commission
DG Connect

System's dimension



Systems: “the matrix” is no longer fiction!

In 2050 the internet will connect bits and atoms at the speed of light. Its algorithms will orchestrate zillions of smart objects, which will share zettabytes of data every month, thus bridging the physical and virtual worlds instantaneously. In such a scenario, prediction and decision will be easier and faster than ever, based on scientific evidence and people aspirations and on the outcomes of experiments we do in a simulated world.

People: the singularity is approaching!

In 2050, our cognitive and physical capabilities will be enhanced with bio-technological add-ons. Cyborgs will perform complex tasks like humans – they take over all routine jobs, from agriculture to construction, from office to industrial automation. We will live longer and healthier because we apply pre-birth prevention, regenerate and repair organs as needed. We will be able to learn, work and play from the cradle to the grave.



You can contribute to these Digital Futures here:
<http://bit.ly/Futurium>



European Internet Foundation

Political Leadership for Network Society

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