Education, technology and connectedness

Global societal trends to 2030: Thematic report 2

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Abbreviations

BEPA Bureau of European Policy Advisers

EGDI e-government development index (United Nations)

ESPAS European Strategy and Policy Analysis System

EUISS EU Institute for Security Studies

HDI Human Development Index (United Nations)

ICT information and communication technology

ISP internet service provider

MOOC Massive Open Online Courses (MOOCs)

NBIC nanotechnology, biotechnology, information technology and cognitive science

SCENIHR Scientific Committee on Emerging and Newly Identified Health Risks

Preface

This Research Report forms part of our series on global societal trends and their impact on the EU in 2030. This analysis is embedded within the framework of the European Strategy and Policy Analysis System (ESPAS) set up to develop a lasting framework to assess global trends and to develop policy responses across EU institutions over the next institutional cycle (2014–2019). The first phase of the project assessed the long-term, international, domestic, economic and political trends facing the European Union for the next two decades; the second phase of the project split trends into three streams, namely the economy, governance and power, and society. RAND Europe's assessment of likely global societal trends constituted 'Trend Report 2 – Society' for this second phase.

This report presents the evidence base, uncertainties and potential trajectories surrounding trends in one of the six major themes that form part of Trend Report 2 – Society: education, technology and connectedness. Other themes studied as part of this series include the rise of the global 'middle class', the empowerment of individuals, the changing demographic profile of the world's population, the role of migration and mobility, and transformations in the world of work and the labour market. Overall findings from all reports may be found in the Synthesis Report published by RAND Europe, while evidence on the other themes may be found in the research reports published as part of this series.

This work is based on desk research in the form of a non-systematic review of the academic and grey literature on the major trends for this theme. It includes additional information for each of the themes studied, which was harnessed through a Delphi with international participants as well as through a series of semi-structured interviews with experts from academia and think tanks, policymakers and leading thinkers from the private or voluntary sector further exploring the findings from the Delphi exercise and desk research. Acknowledgements, and a full list of contributors, can be found in the Synthesis Report.

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Introduction

1.1. The context for this study and the European Strategy and Policy Analysis System effort

Over recent years, the European Union has experienced a number of challenges. Facing these issues has required much effort from European policymakers. These reflect the unstable and fast-changing global environment in which the Union is navigating. In the long term, this may challenge the Union's economic and political influence, and perhaps its ideals and values.

In this new context, expanding the Union's capacity to anticipate future challenges and outcomes and to coordinate responses across institutions will be crucial. The objective of this study was to help the European Union to prepare for a future strategic landscape that will be more competitive and perhaps less cooperative than before, and certainly more uncertain than a superficial reading of opinion pieces and forward-looking reports might suggest.

The European Strategy and Policy Analysis System (ESPAS) project emerged in 2010 when the European Commission sought to investigate the global trends that will prevail in 2030 and to determine the challenges that European policymakers will be faced with in the coming decades. Its purpose is embedded within a wider context of building a permanent EU forecasting capacity, relying on the collaboration of various EU institutions and actors in the individual Member States, and it also aims to set up a continuous framework to assess global trends and to develop policy responses across the EU institutional framework.

The initial effort, carried out by the EU Institute for Security Studies (EUISS 2012), aimed at assessing 'the long-term, international and domestic, political and economic environment facing the European Union over the next 20 years'. The report acted as a pilot project setting the scene for further investigation and evaluation of global trends in 2030 in the field of (i) international relations and governance, (ii) society, and (iii) macroeconomic trends.

In 2012, the Bureau of European Policy Advisers (BEPA) commissioned RAND Europe to investigate further the theme of societal changes by drawing from the experience of the pilot project, by analysing key global trends in this field and by drawing their implications for the Union. The task force at BEPA identified six main thematic areas which were to be refined, documented and analysed, namely:

1. The rise of a global 'middle class'
2. The role of new technologies, new media and increased access to education
3. The empowerment of individuals

4. The changing demography of a globalised world and its impact on different societies
5. The role of mobility and migrations and their impact on identities
6. Old and new labour – and work.

Each of the research reports published as part of this series revolves around one of the six themes. This report focuses on education, technology and connectedness. The overall findings from the analysis may be viewed in the Synthesis Report (Hoorens et al., 2013). The research team has sought to cluster the trends identified above into five major areas in the Synthesis Report. In addition, the Synthesis Report introduces a number of cross-cutting issues that may interact with each of these six themes to influence the long-term strategic landscape and the policy challenges that the European continent may face in the future. In doing so, it relies extensively on strategic and long-term analysis, an approach which may help policymakers grasp the contours of the future and understand how global trends are likely to interact, converge and influence the future landscape.

1.2. The methods used for this Research Report designed to set out the evidence base for major trends

This Research Report presents the reader with findings on education, technology and connectedness, as well as on their impact on the EU landscape, including potential policy challenges for the next 20 years.

Several reports – most of which are referenced in this analysis – have attempted to describe, assess and determine which trends are likely to shape the international strategic landscape or the landscape of a specific region, the EUISS report and the regular efforts of the National Intelligence Council being perhaps among the most notable examples in this context. The objective of the research team as a result is not to replicate these existing efforts, but rather to bring the existing uncertainty surrounding these trends to policymakers' attention.

The findings analysed in this report are based on two phases of research, namely a non-systematic review of the literature available on each of the major trends listed under the six themes identified by ESPAS for the Society Trend Report, and analysis of the quantitative data available. Our approach is designed to identify the consensus as well as the disagreement on a given trend within a specific theme, and therefore to describe this trend, relying on previous analysis and literature. It has allowed the research team to identify the drivers behind the trends and the conditions and assumptions under which they will materialise. The team has sought to review and discuss the evidence for these assumptions and conditions and the level of uncertainty surrounding them. When appropriate, and relying on the assessment of this uncertainty, the researchers have been able to generate alternative narratives for specific trends, which stand in contrast to the consensus.

The second phase of the research (expert consultation) harnessed the knowledge of leading experts worldwide for each of the themes studied through an approach based on the Delphi method. This effort was followed by a series of interviews with leading academics, policymakers and thinkers from the private or voluntary sector to build on findings from the Delphi exercise. Information from the expert consultation phase was used to discuss and to uncover further the surrounding uncertainty for each of the global trends derived from the literature review.

This approach is not, of course, without limitations. The report considers trends one by one and therefore in isolation from all others when in fact they are likely to interact with each other. We try to alleviate this issue by making clear the assumptions of the literature we review.

By emphasising uncertainty and by attempting to raise policymakers' awareness of alternative narratives and paths, we hope to contribute to the debate on global trends that will prevail in 2030, and to facilitate the goals of greater flexibility and resilience. While this approach contrasts with previous, widely publicised strategic analysis reports, it also looks to complement these analyses.

Chapter 1. Growing connectivity or declining connectedness?

Easier access to information, increasing global scientific collaboration, economic growth and interconnectedness – together with rising levels of education in many parts of the world – have enabled a technological revolution in life sciences. Technological progress, connectivity and interactivity have resulted in spectacular growth in several technological areas.

The convergence of the so-called NBIC disciplines (nanotechnology, biotechnology, information technology and cognitive science) has led to promising innovations in fields including intelligent and new materials, human enhancement and personalised healthcare, accompanied by advances in the visualisation and modelling of super-complex interactions through computing and emerging technologies such as 3-D printing. Ultimately, the development of these technologies may have a positive contribution in meeting social challenges, for instance by potentially revolutionising work, changing structural relationships between labour and capital, and returning manufacturing capabilities to developed national contexts (United States, Canada, northern Europe) in the case of 3-D printing (Desmoulin-Canselier 2012; Ratto 2012). At the same time, thanks to the accelerating pace of innovation and the increasing dependence on cutting-edge infrastructure development, the growth of NBIC technologies also brings increasing uncertainties about their future resilience, reliability and direction of development as well as environmental and health impacts, while policymakers often pay limited attention to the social acceptance of the technologies (Eurobarometer 2010; OECD 2010; Scientific Committee on Emerging and Newly Identified Health Risks [SCENIHR] 2009; Siegrist 2010).

While NBIC technologies may be expected to bring along cumulatively substantial societal changes until 2030, this Research Report will concentrate on trends within information and communication technologies (ICTs), as it is the individual area that is likely to have an impact on the everyday lives of citizens to the greatest extent.

The impact of these technologies for the societies and individuals that can afford them is potentially disruptive, although there are divergent views about the extent of the convergence itself and the positive impact of the technologies in realising a more wealthy, healthy and equal 'network' society (Castells 2011; Desmoulin-Canselier 2012; Rainie et al. 2012; Schummer 2010).[1] Experts consulted in the Delphi

[1] Castells (2011) defines the network society as 'an informational society with networks serving as the basic structure of organisation pervading all spheres of this society. This form of society is associated with coordinated decisionmaking accompanied by decentralised implementation, global communication with individualised expression'.

exercise conducted for this study suggested that divides are not likely to be determined by access to the internet (although the question of whether it will still be possible for governments to restrict citizens' access to the internet in 2030 arose, as did the impact of this on the relationship between governments and citizens).

Inequalities are increasingly expected to manifest themselves in terms of capacity (literacy, awareness and skills) to reap the benefits of technology. Finally, technology may act as an accelerator, exacerbating existing inequalities between those who can afford access to it and obtain the skills necessary to benefit from being connected, and those to whom it is precluded (van Dijk 2012). However, as digital natives are increasingly socialised in ICT environments, previously existing income-determined barriers of access to political participation and education could be overcome (see discussion on e-participation and e-learning below). In sum, these inequalities work against democracy and empowerment for some people, while at the same time producing expanded opportunities of political participation and empowering others (Hacker et al. 2009). As new technologies are presumed to represent an S-shaped adoption curve, it remains to be seen to what extent technology-related divides will be reproduced with regard to new technologies. 'Leapfrogging' has taken place in some ICT-related areas (e.g. mobile phone adoption), but it is plausible that, although divides will continue to be bridged with regard to established technologies, new applications (e.g. related to consumer uses of ubiquitous computing) will see the emergence of new inequalities and policy challenges.

At the same time, thanks to the accelerating pace of innovation and the increasing dependence on cutting-edge infrastructure development, the growth of NBIC technologies brings with it increasing uncertainties about their future resilience, reliability and direction of development as well as their environmental and health impacts, though policymakers often pay limited attention to the social acceptance of these technologies (Eurobarometer 2010; OECD 2010; SCENIHR 2009; Siegrist 2010).

Chapter 2. ICTs are a potential key driver of social innovation

As governments increasingly look to alternatives to government-supplied social services and innovative ways to adapt to a changing strategic landscape, social innovation is progressively gaining more weight on policy agendas. While social innovation in itself is not a new phenomenon – at some level all transformative ideas from feminism and Robert Owen's approach to workers' welfare are social innovations – the present turmoil and technological progress offer new opportunities to harness these initiatives to promote social-policy goals and ultimately overcome the societal challenges posed by financial and institutional crises (Helliwell et al. 2013).[2] ICTs are key enablers of social innovation by increasing efficiency and effectiveness, and they facilitate better social innovation through greater connectivity, simplicity and convenience. Ultimately, they enable private and public organisations to do more with fewer resources, and thus innovate adequately for the post-crisis world. Digital technologies provide opportunities for new types of social innovation through the 'network effect' of collective, dispersed or large-scale intelligence. Wikis are a good example of this potential. The tables below show that there is a correlation between levels of digitisation and composite well-being proxy indicators such as the United Nations Human Development Index (HDI) and the indices compiled by Gallup and the OECD. In addition, tools such as multicriteria decisionmaking and social return on investment analysis may allow policymakers to take explicitly into account the social innovation aspect of their decisions. However, there is an overall lack of reliable objective indicators for the impact of social innovation and the corresponding impact of technology within social innovations (Social Innovation eXchange & Young Foundation 2010). The potential of digital technologies for addressing societal challenges is explicitly recognised in the Digital Agenda, with six specific actions that relate to leveraging ICTs' capability to reduce energy consumption by defining potential additional functionalities for smart meters, and deliver better public services including improving cross-border service provision and e-government services.

[2] Social innovation is defined in this context as new responses to pressing social demands by means that affect the process of social interactions (BEPA 2010).

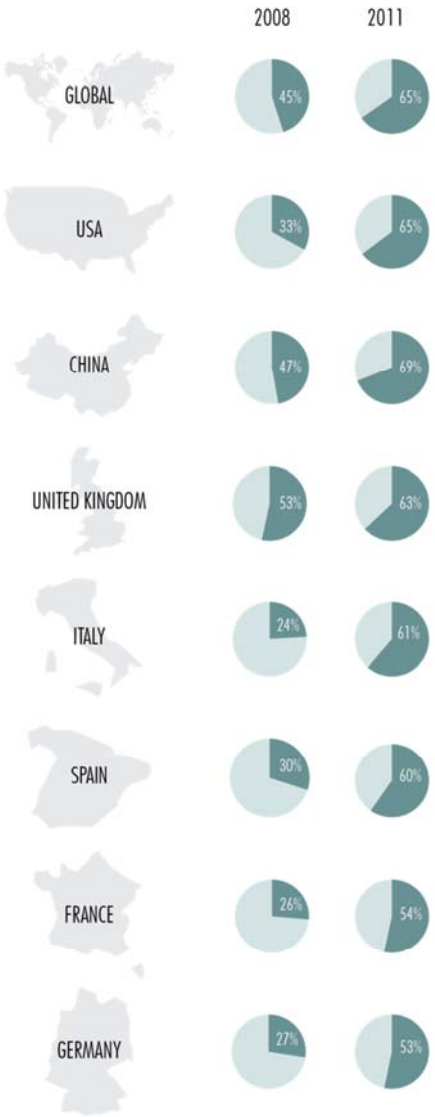
2.1. Social computing is transforming communications, but the extent of global interconnectedness may be less than expected

The presumption of sustained technological progress and expansion of broadband coverage globally underpins beliefs about the sustained growth in the use of platforms for creating and sharing user-generated content. No value-driven backlash against these platforms is envisioned. Assumptions about rising profits from progress in the fields of cloud computing and new business models associated with data analytics sustain the presumption of increased use of these technologies by the private and public sector. This trend is further underpinned by the fast growth of smartphones, tablets and other devices enabling mobile internet access, although the perception of the magnitude of the trend may exceed that of reported data. In fact, 24% of Europeans reported having accessed the internet through a mobile phone and 6% reported using a tablet. Similarly, the fact that only 17% of the population reported using the internet for looking for jobs and 5% reported having participated in an online course also suggests that there is potential to be easily captured. Despite the gradual decrease in digital divides, the potential is even clearer if we keep in mind the differences in technology access and use still present between and within individual Member States, with Member States that have adhered to the Union since 2004 often presenting significantly lower values. Although policy frameworks such as the Digital Agenda prioritise e-skills and digital literacy, the implementation often varies across Member States and the policies are likely to need to be in place for a substantial amount of time to produce visible changes in literacy and skills indicators.

Figure E.1.1: Online activities of the EU population (percentage of the EU population reporting performing the listed activities in the previous year)

Source: Eurostat isoc_bde15cua

Figure E.1.2: Percentage of active internet users using microblogging[3]



Source: UniMcCann 2013

2.2. Limited global connectedness

Although there appears to be a quasi-univocal consensus on the sustained pace of the growth in connectivity at a global scale through social computing, a closer look at the evidence for connectedness through these applications reveals that most platforms are used in a national or local context (Ghemawat & Altman 2012).

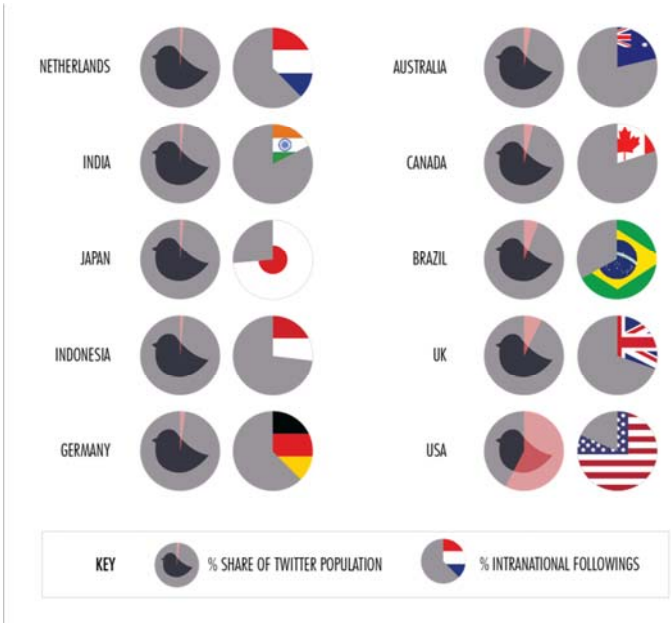
While the majority of the global population is projected to be connected to the web in the forthcoming decades, internet traffic remains mainly domestic (Ghemawat & Altman 2012). Although social network

[3] The term 'active internet users' refers to individuals who use the internet every day or every other day (UniMcCann 2012). Microblogging is the use of social network services specifically created for the sharing of brief entries and content, such as Jaiku or Twitter.

services are perceived as global platforms, 84.2% of Facebook relationships and a large percentage of Twitter relationships were found to be clustered along country lines (Gonzalez et al. 2011; Kulshrestha et al., 2012; Ugander et al. 2011), as illustrated in Figure E.1.3. Consequently, the future may be potentially less globalised and more determined by local and national cultures and preferences as opposed to a rising global value system based on the deepening and broadening of global networks.

Although the level of globalisation of connected technologies is uncertain, there is some evidence that the use of these technologies may have significant impacts on the online and offline behaviour of users. This influence, merging online and offline spheres, is mainly exerted through the potential to connect individuals, facilitate the flow of information and change the options for self-expression and exerting influence over others. (Ultimately, it is likely that the growing population of individuals using social networks will disclose increasing quantities of personal information online, and will be influenced and build their identity and opinions on the basis on interactions with other users in both private and professional contexts (Gross & Acquisti 2005). The assumed upward trend in levels of connectedness at the individual and community level over time (and also the increasing socialisation of younger generations in ICT environments) is highly likely to influence outcomes in all human social activities – political participation (discussed more in detail below) and health and consumer behaviour (Contractor 2010; Guo et al. 2011; Henning-Thurau et al. 2010; Huang et al. 2013), as well as the formation and exploitation of social capital and cultural identities (Ellison et al. 2011; Oh et al. 2014; Steinfield et al. 2012). These developments need to be further examined and taken into account by policymakers in certain areas (e.g. data protection) but may be leveraged in the formulation of specific initiatives across all areas –for example, by exploiting social media to encourage healthy behaviour in adolescents (WHO 2012) .

Figure E.1.3: Intranational Twitter followers outweigh their countries' share of the overall global Twitter population



Source: Kulshresta et al. (2011)

Chapter 3. Progress in technology will require society to reflect on values and ethics

Social functions are increasingly mediated through technology, which may have an effect on the way people perceive the moral significance and consequences of their actions. This effect is further enhanced by the trend towards an increasing digitalisation of personal information and personal characteristics made possible by Internet of Things technologies and Big Data analytics. Therefore, it may be possible that as an effect of technological change the significance of mental categories, such as the meaning of values and ethical concepts, has changed or diminished. Social reflection on the meaning of ethical categories is likely to gain importance in the coming years, as emerging technologies enter citizens' everyday lives. For instance, as Western societies age, Ambient Assisted Living technologies could be seen as cost-effective care for elderly citizens, but also as potential threats to human dignity and autonomy (Heersmink 2011; Hildebrandt 2012; Wright 2011).

At the same time, there is potential for a global culture to develop around the internet, in which users worldwide share similar attitudes related to certain values – online freedom of expression, privacy, trust and security – although the level of prioritisation of these values may vary along socio-demographic lines (Dutton, Dutta and Law, 2011; Eurobarometer 2012b).

3.1. The role of technological progress in changing values

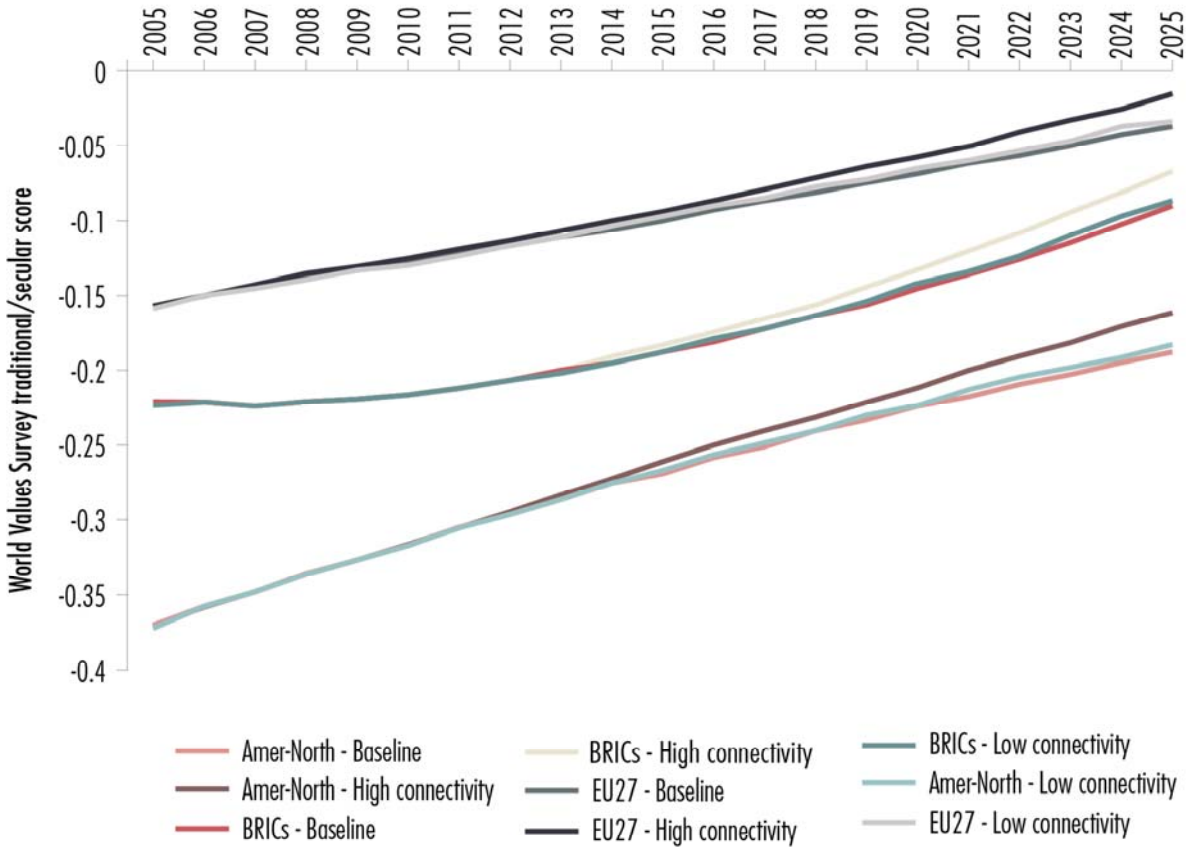
The way in which most social interactions are progressively becoming mediated by technology raises questions about the value systems underpinning our approach to technology. A growing awareness of this tension drives the trend towards increased reflection surrounding values.

An assumption often found to be latent in arguments about technology and value systems is one of technological determinism, implying that increased global access to information technologies will lead to a diffusion of 'Western' secular (as opposed to traditional) values. However, as countries with value systems different from those dominant in Western countries (in Asia and South America) are becoming the dominant nations online, having the greatest numbers of users despite lower levels of adaptation, questions arise over the future balance of cultures on the web (Dutton, Dutta and Law, 2011; Van Oranje-Nassau et al. 2009).

A previous RAND study modelled the diffusion of rational values for three scenarios with different levels of strong public governance, open technologies and collaborative market structures. The results showed that Europe (EU-27) is most likely to lead a global trend towards secular rational values, followed by the

BRIC countries (Brazil, Russia, India and China) and North America – see Figures E.2.1 and E.2.2 (Cave et al. 2009).[4] However, the same study also found a lack of correlation between levels of connectivity (here represented by the degree of access to the internet) and rational–secular values. The lack of such a correlation underlines the mixed impact the technology trends have on the way people inform themselves and how decisions are made (Cave et al. 2009). Therefore, it is likely that even in a projected global progress towards more rational and secular values, connectivity is not the foremost driver for the trend.

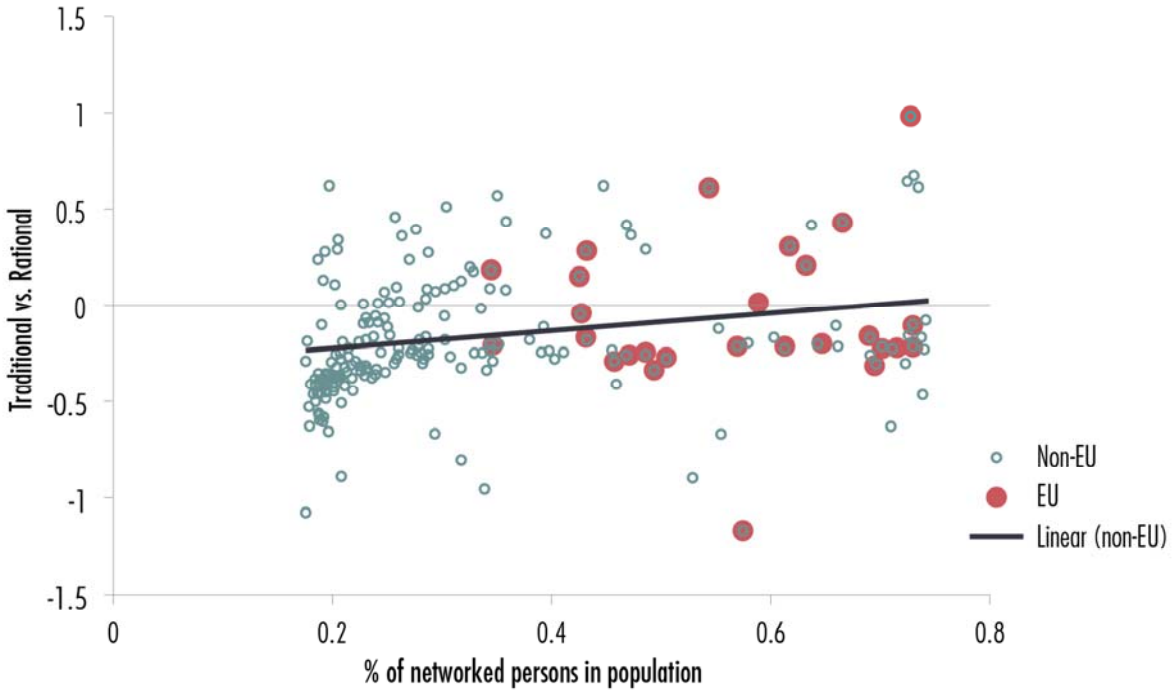
Figure E.2.1: Projections for progress from traditional towards rational-secular values in scenarios with different governance, openness and market structures



Source: Cave et al. (2009)

Figure E.2.2: Regression analysis for connectivity and rationality

[4] In the figures the abbreviations refer to three scenarios constructed for different connectivity futures where CW refers to Connecting World – a world with high levels of connectivity between individuals, where people rely on a strong public sector; BW to Borderless World, a free, open and commercially driven scenario; and SW to Scattered World, where technical systems, markets and societal interactions are restricted and individual users and stakeholders find themselves increasingly locked in to specific technologies, business models and social identities.



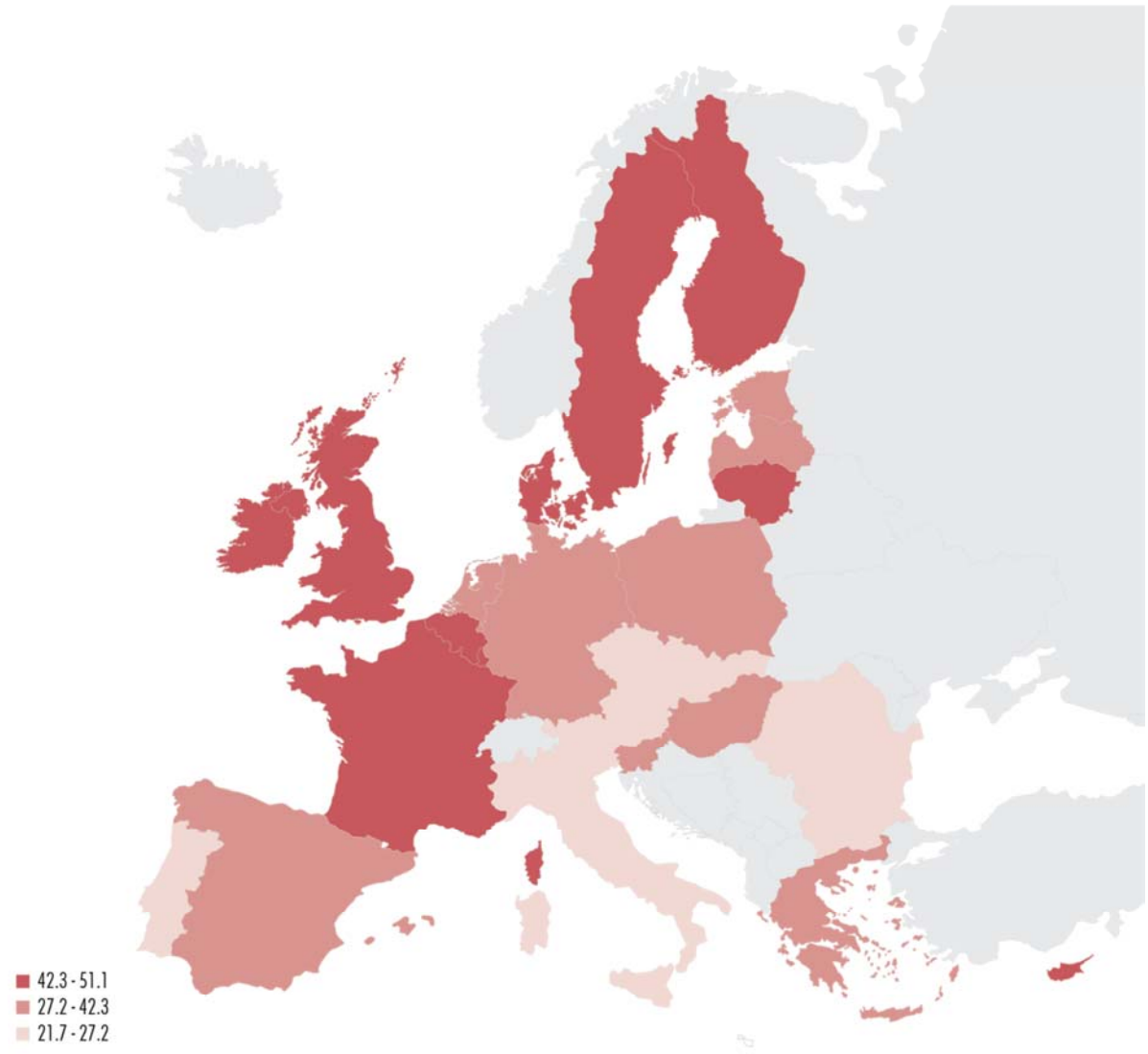
Source: Cave et al. (2009)

Chapter 4. Education will have to address challenges posed by the financial crisis, emerging technologies and the net generation

Findings from the interviews, Delphi consultations and workshops organised by the European Commission suggest that dealing with technological change as well as cost and social pressures will pose challenges to EU education policy and organisation (e.g. accreditation of virtual institutions), although there were disagreements about the exact future trajectory of these changes.

At the curriculum level, although for now the process is mainly top-down, all levels of schooling, led by international institutions, are likely to prioritise e-skills and other transferable capabilities (Anderson & Raine 2012; Cave et al. 2009; Cobo 2012; Daanen & Facer 2007; OECD 2009; Pedro 2012; Vaira 2004). Networked technologies are likely to enhance the potential offered by distance education in formal and informal settings, presenting a novel form of competition for traditional establishments (Ally 2009).

Figure E.3.1: Percentage of the population age group 30-34 who have completed tertiary education, by country in the EU-27, in 2011



Source: Eurostat, 2012b

4.1. Is the net generation changing the way we teach and learn?

Part of the literature and the discussion that took place in the Delphi ExpertLens process undertaken in the course of the project has focused on the demand for a novel paradigm for provision of education made necessary by the neuro-psychological characteristics of the young generations that grew up using networked technologies. Adapting to the skills of digital natives would require schools to offer more individualised, interactive and creative tasks (Tapscott 2008; Vodanovich 2010). However, other findings suggest that the demand for ICTs in education by young people is not increasing as dramatically as these theories would suggest (OECD 2012a).

Education is likely to become an increasingly critical national and personal asset in a globalised labour market, and this may contribute to the spreading of Western values and intercultural attitudes when these students return home (Naidoo 2011; Paige et al. 2009). Correspondingly, the global mobility and flow of

students in tertiary education has soared since the 2000s, increasing by 78% between 2000 and 2010 from a total of 2 million to 3.6 million. The trend is likely to continue in the years that follow[5] (OECD 2009; OECD 2012b). It remains to be seen to what extent international exchange programmes and harmonisation (such as the one exemplified by the European Bologna process) will take place in the coming decades. Such policies may also increase the globalisation of higher education and of associated changes in values.

Technology access and the ability of students to understand and use information effectively have gained importance in school curricula and international policy across the globe. However, measuring and benchmarking information literacy presents methodological challenges (UIS 2012).

Innovation regarding the delivery of open educational content has been on the rise in recent years, enabled by technological progress in connection speed. Massive Open Online Courses (MOOCs), which first appeared in 2008, are an example of this trend. Although their development is not immune to criticism – these courses are often characterised by very high dropout rates, overly traditional teaching structures and little focus on the progress of the individual student – their global reach illustrates well the potential of network technologies for education (Daniel 2012; Kop 2011). Similarly, informal education offered through platforms for user-generated content is enabled by technological progress (Facer & Sandford 2010).

4.2. Uncertainties about the effects of a global education and e-skills

Although the globalisation of education and the diffusion of e-skills are often projected to be associated with better labour market prospects for graduates, some of the literature has forecast a potential effect to the contrary. Despite the decreasing affordability of education, increasing unemployment caused by the financial crisis has led to increases in the number of students enrolled in higher education institutes as education is seen as an alternative to unemployment. The composite effect of rising unemployment and tuition fees, however, has contributed to exacerbating inequalities in access to higher education (see Figure E.3.1 on educational attainment in tertiary education). This trend, which is corroborated by the discussion in the Delphi exercise, is likely to continue into the coming decades (Lewis & Verhoeven 2010; Long 2012). Although the rising importance of ICT-based employment is likely to continue to favour the young and educated, limited access to skilled positions by those with 'second tier' (not technology-oriented) skills could result in a loss of intellectual diversity in the labour market (Cave et al. 2009; Facer & Sandford 2010). In synthesis, as also emerged from the Delphi exercise, possible future impacts of technology use may be crowding out traditional forms of education in favour of informal and online forms, with the potential effect of increasing participation in higher education – especially in countries where enrolment rates are currently low. Alternatively, the effect may be neutral or irrelevant, indicating that technology is not necessarily the answer (or the problem) in the way education is delivered.

[5] UIS interactive map on global education flows http://www.uis.unesco.org/EDUCATION/Pages/international-student-flow-viz.aspx

Chapter 5. Technology will continue to enable democratic change and impact on governments' relationships with citizens

ICTs are likely to continue to empower civil society movements in non-democratic regimes, although there is no clear evidence of their impact on political engagement in democratic societies.

Governments are likely to make increasing use of technology-related applications – in particular e-services, Big Data analytics and network-based open policymaking – in decisionmaking and providing services to the citizen. These may increase transparency in government systems around the world, but trends in censoring and limiting internet use by individuals will continue to be present (Cave et al. 2009; United Nations 2012; van Oranje-Nassau et al. 2009).

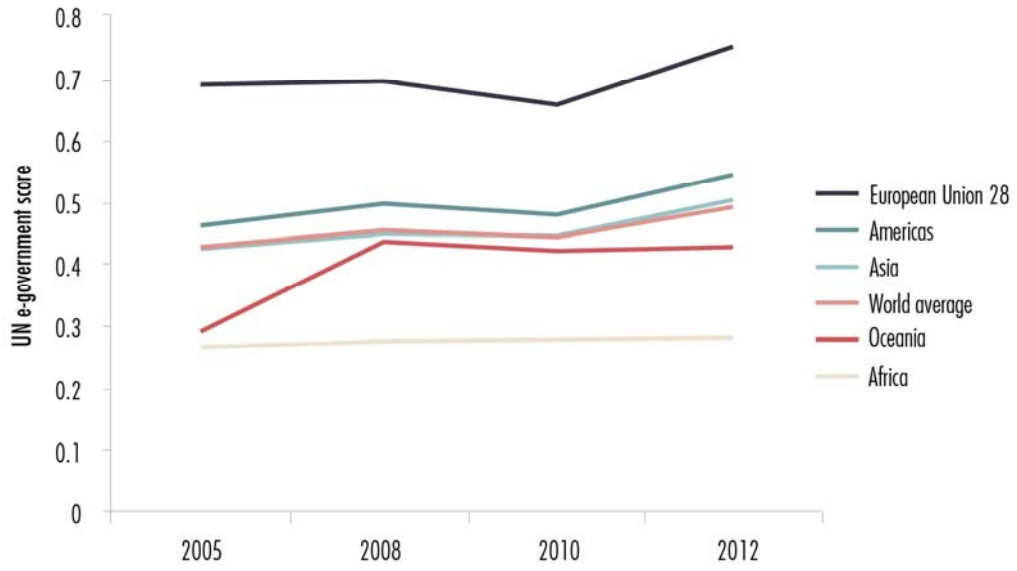
5.1. Drivers of technology and democratic change – not a one-way street

The widespread availability and growing capacity of ICTs and new media accompanied by a decrease in the costs of producing user-generated content have enabled citizens around the world to engage in public discourse and connect with others in order to foster societal change, as illustrated by the recent rising popularity of open policymaking and open data-based initiatives, aiming to harness social innovation to find innovative solutions to policy questions. Furthermore, the projected growth in the potential of organisations to leverage Big Data analytics (from location-based health data to engaging with public opinion) is likely to have an impact on the evidence base that informs policymaking in governments that can access these tools (Johns 2013; Lerman 2013). At the same time, big (and open) data policies will create a need for policies that make sure there is no discrimination between more and less digitally savvy parts of society (Lerman 2013; Tsoukalas 2012).

E-government is potentially seen as a driver behind transparency trends and may result in decreasing corruption in countries that invest in this sector (Bertot et al. , Jaeger and Grimes, 2010) (Figure E.4.1[6]). However, regression analyses performed on large country datasets have suggested that it is the rule of law and transparency culture that drives e-government (Ifinedo 2012; Lee et al. , Chang and Berry, 2011).

[6] The United Nations e-government development index (EGDI) is a composite indicator measuring the willingness and capacity of national administrations to use ICT to deliver public services. It is based on a comprehensive survey of the online presence of all 193 Member States, which assesses the technical features of national websites as well as e-government policies and strategies applied in general and by specific sectors for delivery of essential services (United Nations, 2012).

Figure E.4.1: e-government scores 2005-2012[7]



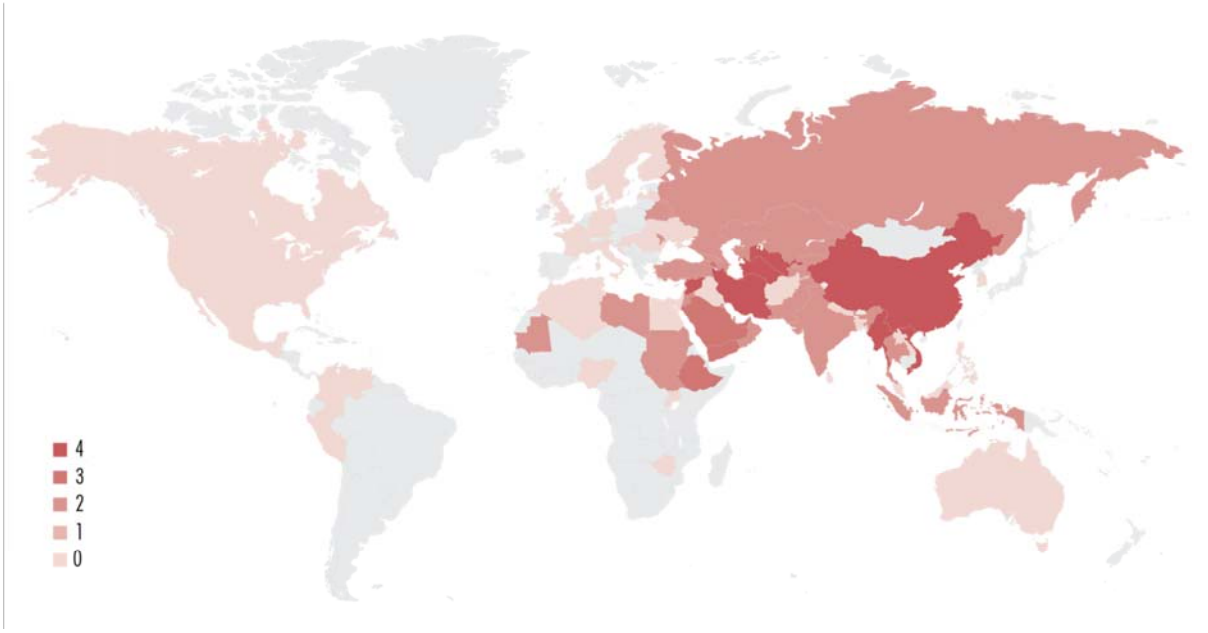
Source: UNEP (2012)

According to the literature, a positive relationship between internet penetration and democracy exists, although the scale of the influence is not uniform. For instance, although analysis found that internet penetration significantly increased democracy ratings, this relationship varied significantly by region. These findings suggest that the internet is not by itself sufficient to promote regime changes, but is instead a component of contemporary democratisation processes (Best & Wade 2005; Groshek 2010; Nisbet et al. 2012, Stoycheff and Pearce, 2012). As extensions of the effects potentially exerted by offline networks, online social networks have been found to be an effective influencing tool for political participation in some cases, such as the 2010 elections for the US Congress (Bond 2012), but the effect of these tools and the awareness created by 'weak ties' for mobilising individuals that would otherwise not participate in traditional political processes in unclear. Although grassroots movements make use of online interaction for self-organisation, empirical studies have not found a clear indication of the translation of online participation into offline activism (Christensen 2011). Similarly, the evidence suggests that the use of social network services may be a tool for the empowerment of minorities. However, minorities and young people – whose participation indicates that these services have a pro-democratic effect – are usually unprivileged citizens who tend to consume less news through more traditional venues online and off (Gil de Zuniga et al. 2012). An open-ended question connected to technology-enabled participation in political processes, in particular by younger generations, in fact concerns the ongoing changes in forms that political processes will take in future, in the wake of the loss of legitimacy of traditional representative entities. It is likely that the face of political processes will pose an important challenge to democratic

[7] The United Nations e-government development index (EGDI) is a composite indicator measuring the willingness and capacity of national administrations to use ICT to deliver public services. It is based on a comprehensive survey of the online presence of all 193 Member States, which assesses the technical features of national websites as well as e-government policies and strategies applied in general and by specific sectors for delivery of essential services (United Nations, 2012).

institutions in the coming decades. At present it is difficult to predict the exact outcome of the interaction of these processes (loss of legitimacy of traditional structures, rise of grassroots movement enhanced by technology-enabled network society) (Chadwick 2013).

Figure E.4.2: Internet censorship scores for political reasons, 2012[8]



Source: ONI (2012)

Governments and public actors also engage in social media, using it both as a tool for interaction with citizens and as a pool of data for surveillance purposes. Since the beginning of the 2000s analysis by OpenNet and Freedom House has found that development turned towards continuous increase in forms of control which became more subtle and nuanced (Open Network Initiative 2010; Freedom House, 2012; Bitso, Fourie and Bothma, 2012) (Figure E.4.2).

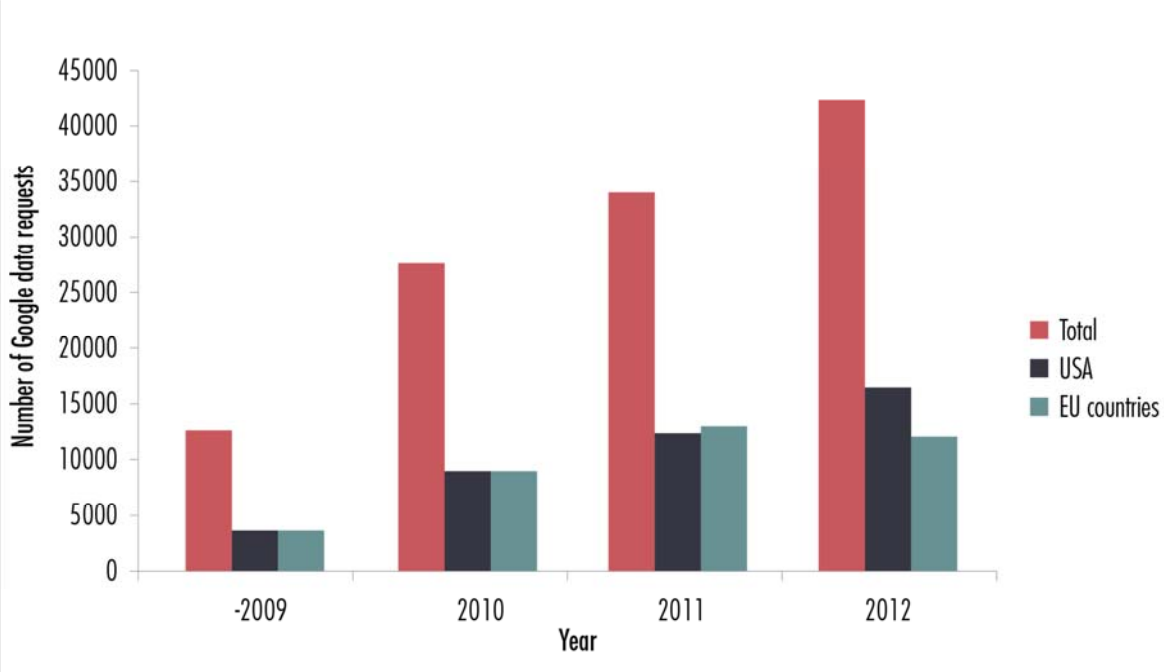
5.2. The promises and challenges of the 'network society'

Another aspect of the interaction of values with the 'network society' is the changing role that internet service providers (ISPs) play vis-à-vis the public. Increasingly, these companies are prompted by public opinion to disclose details of their exchanges with governments, for instance by publishing the number of takedown or information requests received and their attitude towards abiding by those requests (Figures E.4.3 and E.4.4). The growing number of ISPs sharing this information shows a potentially change in the role of these private-sector companies in social processes from pure platform provider to fully fledged

[8] The level of filtering is determined empirically, based on access tests on two (global and local) sample lists of websites cutting across a range of topics (e.g. political, social and internet tools, such as Skype). For political reasons the web censorship category is focused primarily on websites that express views in opposition to those of the current government. Content more broadly related to human rights, freedom of expression, minority rights and religious movements is also considered here (source: OpenNet Initiative Data FAQ https://opennet.net/oni-faq).

political actor. The future role of corporate actors in enabling democratic movements is controversial (Anderson 2012).

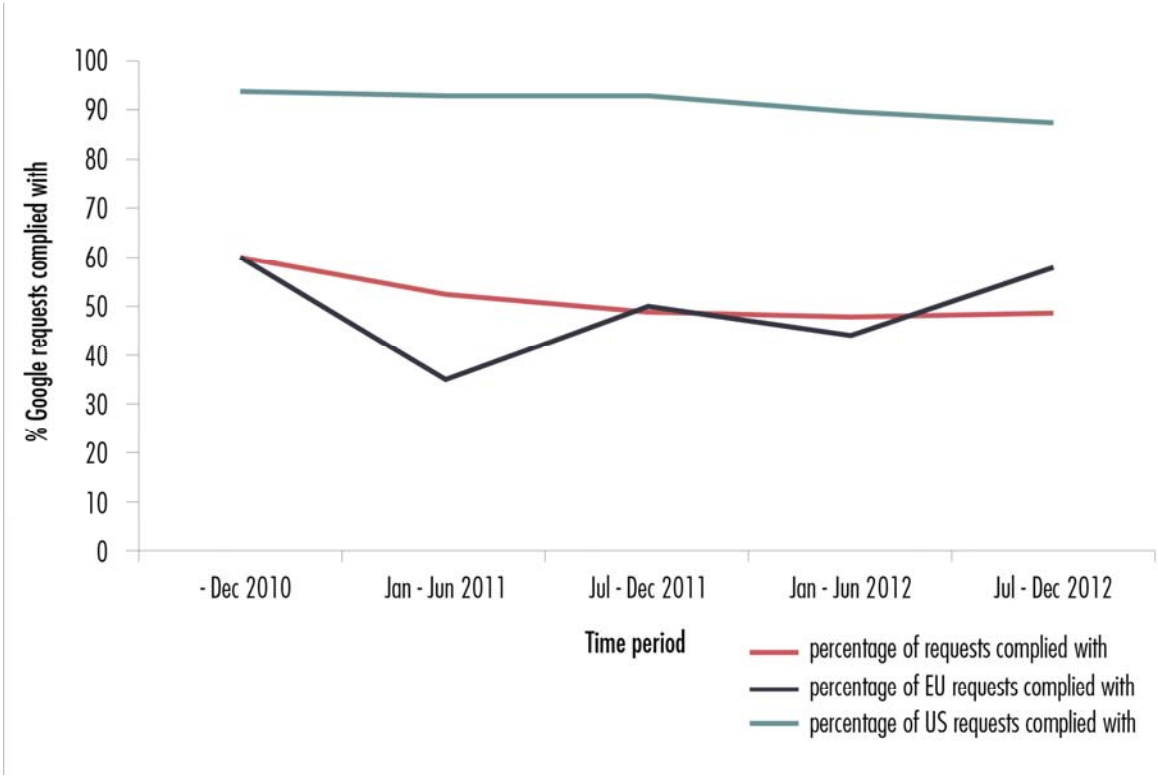
Figure E.4.3: Google user data requests[9]



Source: Google transparency reports

[9] The category includes the following countries, from which Google reported having received requests (not all countries are reported to have filed requests in all years covered): Belgium, Denmark, France, Germany, Hungary, Italy, the Netherlands, Poland, Portugal, Spain and the United Kingdom. It comprises user-data requests, which may specify any users or accounts used to store or provide information on Google's services.

Figure E.4.4: Percentage of user-data requests filed by governments where Google provided at least some of the data requested[10]



Source: Google transparency reports

However, it has to be kept in mind that data mining is not only a tool for the surveillance of citizens and the limitation of freedom of speech. Several governments have shared their databases with the public to spark innovation through data analytics and seek answers to societal problems.[11]

[10] For EU countries, see footnote 10 above. Governments ask companies to remove or review content for many different reasons. For example, some content removals are requested owing to allegations of defamation, while others are owing to allegations that the content violates local laws prohibiting hate speech or adult content. Laws surrounding these issues vary by country, and the requests reflect the legal context of a given jurisdiction.

[11] e.g. opendata.gov; opendata. Gov.uk ; http://open-data.europa.eu/open-data

Matrix for key trends in connectivity

Trend	Drivers	Indicators	Evidence-base (0/+/++/+++/)	Time horizon	Outcomes for the EU	Uncertainty (low/ medium/ high)
Diffusion and market penetration of new technologies	Technological progress, acceptance of emerging technologies, business and pricing models, economic climate, regulation	Market penetration rates, global revenues	++	Medium to long term	Preserving global competitiveness of EU industry, societal impacts of new technologies (work, health, education, etc.)	High
Continuing growing interconnectedness, but inequalities and fragmentation will persist	Technological progress and growing degree of interconnectedness, rise of the global middle class	Access rates and usage indicators	+++	Long term	Social inequality and unequal access to public services, interconnectedness not harnessed to support facing the Union's policy challenges, skills mismatch and polarisation of labour market outcomes	Low
Social innovation, enabled by ICTs among other factors, will continue to grow in importance for policymaking	Technological progress and growing degree of interconnectedness, fiscal constraints, technological progress	Digitisation indices, HDI, wellness indicators, evaluation indicators for individual programmes	+	Medium term	Need for adequate measurements and success indicators, demand for systematic incorporation of SI in the policy toolbox, replacing public sector services with grassroots initiatives	Medium
Online and informal forms of education will have increasing impact on access to education and outcomes	Technological progress and growing degree of interconnectedness, fiscal constraint, limited ability to change educational systems, skills demand, net generation	Number of students enrolled in traditional and online courses / MOOCs, educational attainment, number of universities offering online courses, educational reform, unmet demand on labour market for certain skills	++	Medium term	Need to make educational systems responsive to these developments, unmet skills demand	Medium
e-government and online engagement potentially empower citizens	Technological progress and growing degree of interconnectedness, driven by policy (international benchmarking), demand for services	e-government benchmarking data (EU, UN)	+	Short to medium term	Unequal accessibility and ubiquity of services and citizen engagement across Member States and between strata of society, responsiveness of the democratic system and process to demand for interaction with citizens	High

Trend	Drivers	Indicators	Evidence-base (0/+/++/+++/)	Time horizon	Outcomes for the EU	Uncertainty (low/ medium/ high)
Growing surveillance and data mining create tensions between citizens and governments	Technological progress and growing degree of interconnectedness, growing security concerns connected to cyberspace	Government data requests revealed by ISPs, composite indicators such as OpenNet Initiative data, anecdotal evidence, sentiment analysis outputs	+	Short to medium term	Social acceptance, social conflicts, wildcards such as internet/surveillance policies of foreign states	High
Spread of rational–secular value systems will develop independently from interconnectedness			+			High

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