Unlocking the ICT growth potential in Europe: Enabling people and businesses

Using Scenarios to Build a New Narrative for the Role of ICT in Growth in Europe

EXECUTIVE SUMMARY

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Unlocking the growth potential of Information and Communications Technology in Europe: Enabling People and Businesses

Today, Information and Communication Technology (ICT) is deeply intertwined with almost every aspect of economic and social activities, and it continues to hold the promise of tremendous innovation and growth opportunities going forward if the right enabling conditions are put in place. The past 40 years have seen the emergence of ICT as the key general purpose technology (GPT) of modern times. The ICT revolution first affected the automation and computerization of manufacturing. With the invention of personal computers and the Internet, broad sectors of the economy previously untouched benefited through investment and productivity. In particular, market service sectors, which constitute the major portion of GDP in developed economies, have experienced major benefits from ICT. Recently, non-market sectors such as health, education, and government have become more receptive to positive growth effects from ICT.

Europe has also experienced positive effects from ICT on its economy, business growth, and living standards. However, ICT has lost some of its steam as a driver of growth since the mid-2000s. First, the economic and financial crisis reduced the potential to invest and to create new or expanded markets for products and services that benefited from ICT. In addition, fragmented regulatory frameworks, lack of ICT skills, underinvestment in ICT infrastructure, and even cultural constraints may have brought the innovation and growth effects of this technology to an early standstill. The rise of mobile broadband Internet, big data, cloud computing, and more powerful devices necessitates a fresh look at the role of ICT in the economy and how ICT policy can be reframed to support new technologies.

The new narrative describes the opportunities and constraints of the role ICT can play in growth, starting from today's slow growth environment. As European policymakers search for solutions to take the economy out of recession in the short run and to resume a healthier structural growth path for the medium and long term, a key to generating faster growth is to unlock the existing ICT-enabled growth potential in Europe. This will give a larger role to technology and innovation and their translation into the production of more and better goods and services at lower prices for Europe's domestic markets and the global economy.

Two major game changers put ICT policy centre stage

Two factors have led to a new sense of urgency and a golden opportunity for ICT as a growth enabler:

(1) Europe's economic woes create a vacuum that technology and innovation can fill.

(2) The rapid diffusion of high-speed networks and mobile devices empowers consumers to drive demand in new ways.

European companies and citizens have a unique opportunity to leverage Europe's internal economies of scale and scope to exploit the benefits offered by ICT and at the same time secure Europe's role as a global growth centre.

Historically, Europe realised a sizeable quantitative impact from ICT

Pinning down the precise impact of ICT on economic growth is difficult, given the wide range of estimates gleaned from many economic and non-economic factors, including spillovers.[1] Europe seems to have fallen behind the United States in terms of impact of ICT-related investment and productivity on GDP growth from 1995-2007. The Conference Board estimates that one third (0.7 percent) of the average 2.2 percent GDP growth rate in Europe from 1995-2007 can be traced to ICT, of which more than half came from investment in ICT, one third from productivity gains in ICT production, and the remainder from productivity through ICT use. The United States achieved a larger ICT contribution, almost double that of Europe, of 40 percent of the total GDP growth of 3.1 percent (ICT's share: 1.3 percent of 3.1 percent GDP growth) from 1995 to 2007. The larger U.S. contribution from ICT was due to a bigger impact from ICT investment and productivity of ICT producers, while the productivity effects from ICT use were much smaller and similar between the U.S. and Europe, at 0.1 percentage point. However, the market sector of the U.S. economy produced a much stronger productivity effect from ICT use at 0.5 percentage points of growth compared to only 0.2 percentage points in Europe from 1995-2007.

Since the financial and economic crisis began in 2008, ICT has contributed less to GDP and productivity growth in both Europe and the United States. While growth in ICT investment per worker dropped, especially in the United States, and productivity growth from ICT users marginally declined, productivity performance of ICT producers in the United States remained relatively strong compared to their European counterparts. With imminent economic recovery in the United States, the likelihood of a pickup of investment in ICT and productivity growth from its users seems more favourable to the United States again. Meanwhile, the contribution of ICT to growth has also increased in other parts of the world, notably in some of the largest emerging markets.[2]

Multiple scenarios are possible

The precise impact of ICT on business and consumers depends on a complex combination of trends, changes and uncertainties in the medium term, and it is also highly dependent on the broader economic, social and political context. Scenario analysis shows that the way ICT affects economic growth will depend on the pace of growth in the global economy and the speed at which Europe can accomplish the completion of the internal market, especially the Single Market for Services and the Digital Single Market.

The Conference Board has identified four plausible scenarios in which the EU may find itself by 2017.

[1] Available studies point to positive effects and are likely to underestimate the true impact. Measurement of spillovers, which reflects the network effects of increasingly wide-spread connectivity as well as the benefit that consumers obtain from lower prices for the technology, is notoriously difficult to capture.

[2] See Corrado, C., K. Jaeger, and B. van Ark (2014), "Broadband and its impact on economies", a Conference Board study underwritten by Telefonica S.A., forthcoming.

What will happen? Four plausible scenarios for the role of ICT in European economic growth

Robust global economic growth

The digital savannah A fragmented EU market makes it difficult for firms to grow beyond borders, but several growing firms skip the EU market altogether and aim for global growth opportunities, in particular in the U.S. market, with varying success. Most firms are eventually acquired by U.S. or other non-EU firms, possibly including Chinese firms. EU consumers continue to face high prices as fragmented markets create niche opportunities. GDP growth in Europe does not accelerate much beyond 1.1 percent, with ICT effects limited to 20 percent of total GDP growth (about 0.2 percent-point).	**The digital rainforest** An integrated EU market leads nation-based firms to venture across borders, much like product firms did in the past. EU-based global firms compete vigorously in a robustly growing global economy. Consumers benefit from lower prices and more choice for products and services. GDP growth in Europe accelerates to 2.5 percent, with an ICT contribution of 60 percent (1.5 percent point).
The digital desert Slow global economic growth of 3 percent leads to a contracting economic environment in which nation-based EU firms have difficulties flourishing and engage in a "race to the bottom". An occasional firm goes beyond national borders but insurmountable barriers keep it from going beyond the region. Such firms may be acquired by non-EU firms. Consumers are less incentivised to maximise utility of ICT products and services. Medium-term GDP growth in Europe drops to 0.8 percent, with ICT effects limited to 10 percent of total GDP growth, which in absolute terms is less than 0.1 percent per year.	**The digital glasshouse** An integrated EU market leads nation-based firms to venture across borders, much as product firms did in the past. EU-based firms compete in a global albeit regionalised market. But slow growth and accompanying protection prevent the emergence of a European Google, for instance. Consumers have more difficulty accessing highest quality goods and services at lowest prices, as protectionist attitudes shut out world class products. GDP growth in Europe does not accelerate at more than 1.1 percent, but ICT effects increase to 40 percent of total GDP growth (about 0.4 percent-point).

EU keeps fragmented digital & services markets

EU creates single digital & services markets

Slow global economic growth

Note: The vertical axis shows the pace of global economic growth; the horizontal axis shows the degree of integration in the European Market. The growth estimates are based on estimates from *The Conference Board Global Economic Outlook 2013* and van Ark *et al.* (2013).[3]

[3] B. van Ark, V. Chen, B. Colijn, K. Jaeger, W. Overmeer, and M. Timmer (2013): "Recent Changes in Europe's Competitive Landscape and Medium-Term Perspectives: How the Sources of Demand and Supply Are Shaping Up", The Conference Board Economics Program Working Paper EPWP#13-05, The Conference Board, New York.

A Digital Rainforest Creates Faster Growth but Big Challenges too

In an optimal economic environment of strong global growth and a fully integrated digital market—a digital rainforest—the combination of hyper-competition and the rise of European firms as first-class global players could mean substantial benefits from ICT on GDP level and growth. Indeed, in this scenario GDP growth in Europe could accelerate from the 1.3 percent average growth of the past decade (2002-2012) to as much as 2.5 percent average annual growth in the decade ahead, with a very significant contribution (up to 60 percent) of that growth coming from more ICT investment and more effective ICT production and usage.

While this type of environment would benefit from strong ICT-supported growth, it would also be characterised by constant change and great disruption, implying adjustment costs and a need for flexibility from all economic actors, factors which may be less desirable from a social than an economic point of view. Also, it may not be easy to leapfrog to such a situation in an economic environment that is threatened by the short-term concerns of financial instability and budget constraints and that suffers from a long-term structural growth deficit as the result of incomplete market integration, lack of scale, and weak incentives for greater competition.

To be sure, today Europe is not enjoying the benefits or suffering the perils of a digital rainforest. But neither is it in a digital desert. European citizens are well-connected, businesses that use ICT have generally improved their performance, and growth of the ICT sector has been reasonably strong in the past two decades. However, Europe's infrastructure looks unfit to cope with future demands from the next wave in ICT, especially the rise of mobile and the use of big data and cloud computing. Market fragmentation continues to hinder firms in scalability, flexibility, and cost-effectiveness. Businesses and small innovative firms are discouraged by the many barriers they encounter. Therefore, there is a heightened need for policymakers to act now to avoid the risk of Europe falling into a digital desert. Serious ICT policy action can help to avoid a scenario in which medium-term GDP growth in Europe drops below 1 percent, with ICT effects limited to only about one-tenth of that growth.

Fragmented markets will continue to constrain the contribution of ICT

Even if the internal market were to remain as fragmented as it is today, some (national) champions in ICT could still gain by developing themselves into global players, especially as emerging markets and the United States see improved growth performance. In the digital savannah scenario, ICT could still bring a considerable contribution (20 percent) to the EU's GDP growth. However, GDP growth would remain constrained at around 1.1 percent due to the lack of a single market, with EU consumers facing high prices. Moreover, most firms could eventually be acquired by U.S. or other non-EU firms, including Chinese firms. In fact, this is the scenario Europe has lived under in the past decade or so.

Even if global growth remains slow, integrated markets help ICT to perform better

The financial and economic crisis in Europe and other mature economies casts doubts as to the sustainability of the current situation. Even if the global growth trend slows as anticipated, a better functioning internal market can still help to provide key products and services at lower prices to

consumers (the digital glasshouse scenario). At the same time, a level playing field within the EU can create barriers for key outside players as slower global growth creates less growth potential elsewhere. In those cases Europe's ICT performance and its impact on growth will be more comparable to the past decade, with 1.1 percent growth, on average, but with 40 percent being allocated to ICT investment and productivity. In such a scenario, unrestrained use of ICT across the digital market can in fact partly compensate for the impact of slow global growth on the EU.

Clearly, no matter what scenario the EU finds itself in by 2017, Europe needs to move to the next stage in ICT, growth and innovation. In spite of the fact that it is impossible to put a precise number on the impact of new investments in ICT on growth and employment, *laissez-faire* would be a risky strategy that could plunge Europe into the digital desert. Instead, smart policy and business actions can help Europe to use its ICT infrastructure effectively, making its companies productive and competitive and its citizens empowered and wealthy.

Priorities to Raise ICT's Contribution to Economic Growth

Europe is well placed to exploit its strengths

The good news is that Europe is well placed to benefit from the potential of ICT in the future. The huge size of its GDP, which has made it the largest economic bloc in the world, its relatively high levels of per capita income and productivity, the major and increasing contributions from European firms to producing for the global value chain of manufactured goods, and the above-average level of innovation infrastructure in which business, government, and research interact, are putting Europe in a favourable position to book results, for example, by improving Europe's ability to bring its innovations to market. But time seems to be running out. Other countries and regions are racing ahead, and in the digital world, many activities can flow to where they will flourish, with lags proving increasingly difficult to make up.

If Europe wants to build on its existing strengths, it must not wait longer with making meaningful, and sometime bold, changes. It must overcome its current complacency, political complexity, and inertia to act. Government and European Commission actions are likely to be successful only if they happen in concert and, importantly, create more scale and scope for growth across Europe and create the conditions that allow a greater role for consumers and businesses to drive the impact of new technologies through their effective use.

- Pre-conditions for reaping the ICT growth benefits need to be secured by a high-quality and affordable infrastructure in all sectors, capable of supporting the growing cloud,[4] big data,

[4] One useful definition of 'the cloud': "The provision of computing infrastructure, platform or application service as a utility, which can be consumed by any Internet connected device, using open standard protocols where variability in demand is satisfied through the dynamic and automatic provisioning of pooled hardware, network, and software service resources providing the illusion of infinite scalability and are generally billed for on a pay-as-you-go basis." Thus, there are essentially three layers of cloud computing: Infrastructure as a Service (IaaS), which is a computing resource management model; Platform as a Service (PaaS), which is a software development model; and Software as a service (SaaS) which is an application delivery model. Source: http://www.adamalthus.com.

and including high-speed fixed and mobile broadband. This must be matched by investments in the soft infrastructure to equip people with the skills to analyse and synthesise big data and use them to create new business opportunities.

- Government and business can work together to develop and foster the skills and willingness to use ICT within the context of a fully integrated single market. This market can be supported by providing effective platforms that increase readiness and by focusing on government investments where businesses leave them on the table because of the high externalities. Governments play a key role in making the necessary investments and reforms to the educational system to ensure that people are taught the technical and user skills required for today's and tomorrow's world, putting an emphasis on the employability of graduates.

- Governments will need to focus increasingly on facilitating a regulatory environment in which businesses, both inside the ICT sector and outside it, can thrive (and fail). This increases the incentives to innovate by reducing the risks associated with innovating and introducing new technologies, helping the private sector to realise the spillovers that justified the original government investments.

Providing an ICT infrastructure that enables growth remains important

In the case of ICT infrastructure investments, while some uncertainty remains about their precise impact, the actual impact may be greater than what is being estimated as a result of data quality and availability, as well as methodological and estimation challenges. For example, surveying the literature, for broadband investments, the GDP contribution tends to range between 0.3 and 1.4 percent for every 10 percent increase in penetration.5 The employment multiplier has been estimated to range between 1.4 and five new jobs.6 The Internet Economy, to which having a high-class infrastructure is a prerequisite, has been estimated to represent as much as 5.7 percent of GDP for the EU27 as a whole.7. Finally, it has been estimated that cloud computing might add an additional 0.8 percent to U.S. GDP growth.8

Not everything requires big public investment

The second piece of good news is that many of the measures required to optimise Europe's potential do not involve large investment programs but rather require reforming existing situations, a welcome finding given current budgetary pressures.

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[5] R. Katz (2012), The Impact of Broadband on the Economy: Research to Date and Policy Issues, ITU Broadband Series, ITU, Geneva.

6 See, for example, Katz (2012), op cit., and E. Moretti, (2012), The New Geography of Jobs, Mariner Books, Houghton Mifflin Harcourt, Boston, New York. See also

7 Boston Consulting Group - BCG (2012), The Internet Economy in the G-20 – The $4.2 Trillion Growth Opportunity.

[8] See http://www.kurzweilai.net/can-cloud-computing-boost-gdp .

Many of the actions required to accelerate growth are related to reducing regulatory barriers, improving market integration, simplifying administrative rules and procedures, and improving the allocation of funding budgets already available.

Some measures that are urgently required do involve some investments, but it is important to realise that these will have multiplier effects across all sectors of the economy, reducing costs and improving public services and living standards across Europe. These smart investments should focus on putting in place the best high-quality, high-speed infrastructure and investing in education and skills. Research suggests that conditions in the United States have been very conducive to benefits from important spillover and network effects, especially from the "C" in ICT. However, significant barriers in Europe remain to exploiting those effects as well as to the ability to benefit from the next Internet and ICT wave.

A healthier regulatory environment will help

Most measures that must be taken to increase ICT impact go beyond the purview of individual European Commission and government departments. Realising a greater impact from technology and innovation depends on regulation (in ICT-related areas, but also in product and labour market regulation and other areas), the cost and ease of doing business, and access to finance. The complexity of regulatory frameworks ill-adapted to new technologies and innovations is also a huge barrier to reaping the benefits of ICT. Failing to achieve the digital single market imposes not only a huge short-term cost on citizens and businesses, but also threatens Europe's long-term prosperity.

The European Commission has a central role to play in harmonising regulatory frameworks, ideally ending up with a single coherent framework rather than some imperfect sum of 27 different frameworks. But Member States have at least an equal role in implementing the harmonised rules with a view to simplifying administrative procedures, rules, and regulations that affect cross-border activities, be they digital transactions, flows of data, international sourcing of talent and skills, or business regulations. Measures to facilitate and enable access to finance, including from public and European sources, and especially for smaller firms, are also crucial, including for smaller, riskier and more innovative initiatives. Being allowed to fail and try again is important in an economic environment that requires a lot of innovation, because innovation is inherently risky and requires a process of trial and error. Bankruptcy regulations need to be adapted to this environment and harmonised across countries.

Getting ready for the next wave

The contribution of ICT to growth is still hampered by cultural reluctance to embrace change. The consumer may be in the driver's seat, ready to pick up on the latest technological changes and drive the next phase, but he does not yet have his "driving license" to lead Europe there. Europe lacks the skills to exploit the opportunities ICT can create. This includes hard and soft skills: technical skills, business and management skills, and the technological savvy to identify business opportunities in new technologies and applications (van Welsum and Lanvin, 2012). Entrepreneurial skills, which must

be enabled by framework conditions, including a dynamic business environment, are also lacking, as is a cultural readiness to embrace technology and change.

These are major barriers, but governments and the European Commission can help by formulating a strong and coherent vision for all stakeholders. Public funding and procurement contracts can be made more accessible to smaller firms, helping them to transition to the new environment and ease their adjustment process. Governments can also lead by example, reforming their own administrations and making more services available online in conjunction with measures that increase citizens' willingness to use these online services and engage with their government administrations online.

Realising the potential

ICT has considerable potential to contribute to growth and recovery in the EU and to mitigate the consequences of possible decelerating global growth. Shifts in global economic activity are also showing up in the greater importance of technology in emerging economies. At the same time, as many of the larger emerging economies are on a slowing long-term growth trend, the pace of increase in global demand is coming under pressure, forcing Europe to strengthen its own role in driving growth and demand. And as the scaling advantages of new technologies and offerings such as big data and broadband increase, the limits of fragmented digital markets and lack of integration among key user segments in services industries across Europe become an ever bigger constraint.

To unleash ICT's potential in Europe and prevent the region from falling behind, action is needed now. National governments and the European Commission must commit to a long-term coherent and strategic vision for the role of ICT, reforming and investing where necessary, putting in place favourable framework conditions, using public funding and public procurement to further innovation and leading by example.

European Commission

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