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**Committee of the Regions**

# **Development of Digital Criteria for European Commission Impact Assessments**

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# Summary

In the last years, the need to coordinate efforts to keep Europe up with the digital revolution has been one of the main goals of our European policymakers. The Digital Agenda for Europe (DAE) is the EU's strategy to address this challenge and to benefit from the opportunities created by the on-going digitalization process. Launched in May 2010, the DAE has already achieved some valuable results, including: the rapid increase of the internet usage (by 12% over the period 2010 - 2013); the good performance of online shopping (increased by 10% from the start of the DAE); and the spreading of high-speed broadband, available to 62% of the population in 2013, i.e. more than twice the 2010 share of 29%. Notwithstanding these positive results, the digital divide within Europe persists, both among regions and across territories (e.g. rural and urban areas).

Within the DAE framework, the creation of a Digital Single Market (DSM) plays an important role in addressing digital gaps and in fostering the flow of online services and entertainment across national borders. A DSM requires trust and confidence in the online world; improvement of consumer rights, data protection and cyber-security; and removal of restrictions and conditions for access, connectivity, and investment. This, in turn, requires policy actions for common EU data protection rules, an ambitious reform of telecom rules, revision of copyright rules, simpler rules for online purchases, facilitation of innovative businesses, and improved digital skills and learning. Due to the cross-cutting nature of the digitalization process, the implementation of the Digital Agenda is also significant to other EU policies such as those addressing the challenges of population ageing, budgetary constraints, climate change, resource efficiency, social exclusion, and security.

For the effective implementation of the DAE, the commitment of Local and Regional Authorities (LRAs) is essential. The "Digital Local Agenda" and the "DAE going local" are two of the initiatives aimed to secure or increase the commitment of the local level to the digitalization objectives. However, although the territorial dimension is important for implementation, ways of measuring and monitoring the progress achieved locally towards the DAE and DSM objectives are rather limited.

The scope of this file note is to identify relevant digital criteria to be considered in the update of the Impact Assessment (IA) Guidelines, with a specific focus on the effects of DAE implementation on the local and regional level. The IA is of crucial importance to ensure that EU policies are consistently evidence-based. Following an analysis of the key impact identification questions included within the 2014 EC IA revision, we have outlined four hypotheses of impact of the

different components of the DAE: *Hypothesis 1*: Relevant effects on local and regional social development; *Hypothesis 2*: Relevant effects on local and regional economic development, including on EU budget, SMEs and micros; *Hypothesis 3*: Relevant effects on access, administrative and transaction costs, and efficiency at the local and regional level; and *Hypothesis 4*: Relevant territorial effects on environment, fundamental rights, and security. Afterwards, we have identified appropriate digital criteria for each of the above hypothesis (for an overall total of 15 criteria), testing these criteria against the empirical evidence gathered from works realised by think-tanks, consulting companies' research, IT and telecom sector studies, articles, reports, and policy documents. Finally, in order to provide additional evidence of the effects of the digitalization process highlighted through the documentary review, and confirm our proposed hypotheses and digital criteria, we have described a number of case studies concerned with ICT-related initiatives and projects implemented at the local and regional level.

According to Hypothesis 1, evidence collected suggests that the implementation of ICT-related solutions is contributing to foster networking and cooperative opportunities, in both the working and learning fields, and that this is necessarily associated to ICT skills enhancement of both public servants and citizens. Increased opportunities to reach global markets have permanently changed consumer behaviour, giving people more information on products and wider choice. All criteria investigated in Hypothesis 2 point to the existence of a direct and significant correlation between economic growth and digital penetration. The digitalization process seems also to have had positive impacts on a more efficient distribution of human resources (e.g. digital services supporting job searching), but direct effects on employment are still controversial as digitalization of working activities may also increase job polarization and skills mismatch. Finally, appreciable effects of the implementation of digital solutions on competitiveness have been observed at the enterprise level, in particular where supporting policies had been tailored considering local baseline conditions. This applies also for start-ups, especially in innovation districts. Concerning the efficiency and accessibility of services under Hypothesis 3, empirical evidence indicates that the online sophistication of services has had positive impacts on the accessibility of services and has contributed to the elimination of expensive (in terms of both money and time) paper-based workflows both in the private and public sector. On Hypothesis 4, evidence leads to emerging issues, such as the additional improvement that should be fostered for increasing the positive effect of technologies on energy savings; the definition of a clear regulatory framework in the internet world both for information consumers and providers; and the strengthening of the role of public authorities and telecom network operators for the improvement of cybersecurity level, given the increasing threats of cyberattacks.

# Part 1: Analysis of the state of affairs in the domain of the DAE and the DSM and their connection to the other EU policy areas

## 1.1 Current state of affairs and policy connections

In the last years, the need to coordinate efforts to keep Europe up with the digital revolution has been one of the main goals of our European policymakers. As stated by the European Commission (EC) Vice-President and Commissioner for the Digital Single Market (DSM), “...the digital economy is growing at seven times the rate of the rest of the economy” (Ansip, 2014), which implies the existence of a huge social and economic growth potential still unexploited. The Digital Agenda for Europe (DAE), launched in May 2010 as one of the seven Europe 2020 flagship initiatives, is the EU’s strategy to address this challenge and opportunity. In particular, the DAE “...aims to help Europe’s citizens and businesses to get the most out of digital technologies” (EC, 2010a). The DAE contains 101 actions grouped around seven pillars (Table 1).

**Table 1: DAE overview**

<b>Pillar</b>	<b>Aim</b>
<i>I: Digital Single Market</i>	Fostering the flow of online services and entertainment across national borders.
<i>II: Interoperability &amp; Standards</i>	Ensuring that new IT devices, applications, data repositories and services can interact seamlessly anywhere.
<i>III: Trust and Security</i>	Identifying solutions to improve cybersecurity, including a coordinated European response to cyber-attacks and reinforced rules on personal data protection.
<i>IV: Fast and ultra-fast internet access</i>	Stimulating investments and proposing a comprehensive radio spectrum plan to bring download rates at least at 30 Mbps.
<i>V: Research and Innovation</i>	Attracting researchers, supporting R&I with appropriate funding, and turning discoveries into marketable products.
<i>VI: Enhancing digital literacy, skills and inclusion</i>	Tackling the digital divide <sup>1</sup> .
<i>VII: ICT-enabled benefits for EU society</i>	Exploiting ICTs capability to reduce energy consumption, support ageing citizens' lives, revolutionise health and cultural services, and deliver better public services.

<sup>1</sup> OECD (2001) refers ‘digital divide’ to “...the gap between individuals, households, business and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities.”

Concrete targets have been set within the DAE, to be achieved in the short- to medium-term (Table 2), with progress being reported by means of annual editions of the Digital Agenda Scoreboard.

**Table 2: Targets within the DAE and latest progress**

<b>Target</b>	<b>Progress as at 2013</b>
<i>The entire EU to be covered by broadband by 2013</i>	100% broadband coverage.
<i>The entire EU to be covered by broadband above 30 Mbps by 2020</i>	Fast broadband coverage (>30Mbps) available to 62% of the population (but progress is very uneven across MS).
<i>50 % of the EU to subscribe to broadband above 100 Mbps by 2020</i>	3% of households subscription of >100Mbps broadband.
<i>50 % of the population to buy online by 2015</i>	Online shopping is performed by 47% of the population.
<i>20 % of the population to buy online cross-border by 2015</i>	Cross-border online shopping is performed by 12% of the population.
<i>33 % of SMEs to make online sales / purchases by 2015</i>	Some 14% of SMEs use the internet for eCommerce.
<i>The difference between roaming and national tariffs to approach zero by 2015</i>	Price gap between roaming and national tariffs is over EUR 0.1. Some 63% of roaming services are at national prices.
<i>To increase regular internet usage from 60 % to 75 % by 2015, and from 41 % to 60 % among disadvantaged people</i>	The share of regular (at least once a week) internet users is 72%. It is 57% among disadvantaged people.
<i>To halve the proportion of the population that has never used the internet from 30 % to 15 % by 2015</i>	Some 20% of the population has never used the internet.
<i>50 % of citizens to use eGovernment by 2015, with more than half returning completed forms</i>	Some 41% of citizens use eGovernment, with 50% returning completed forms.
<i>All key cross-border public services, to be agreed by Member States in 2011, to be available online by 2015</i>	Electronic ID, electronic signature, electronic delivery and electronic invoicing to be implemented in 2014 according to the Connecting Europe Facility Guidelines.
<i>To double public investment in ICT R&amp;D to € 11 bn by 2020</i>	The gap to doubling investment is about 20%.
<i>To reduce energy use of lighting by 20% by 2020</i>	The market share in value of low energy lighting is 19%.

Source: data available as at January 2014 on the [Digital Agenda Scoreboard website](#)

Among the already appreciable impact of the DAE, it is worth mentioning: the rapid increase of the internet usage in the last year (by 12% over the period 2010–2013); the good performance of online shopping (increased by 10% from the start of the DAE); and the spreading of high-speed broadband, available to 62% of the population in 2013, i.e. more than twice the 2010 share of 29%. Notwithstanding these positive results, the digital divide within Europe persists

with, for example, rural areas lagging behind, compared with urban areas, in terms of broadband penetration. Further, low take-up of eGovernment by citizens and scarce adoption of eCommerce by SMEs constrain potential savings and connected benefits as well as growth and job creation (EC, 2014a).

Within the DAE framework, the role of the DSM was recently stressed by the EC President that included the achievement of the DSM among the ten priorities of the Commission under his mandate. In particular, Mr Juncker stated that *“By creating a connected digital single market, we can generate up to € 250 billion of additional growth in Europe in the course of the mandate of the next Commission, thereby creating hundreds of thousands of new jobs, notably for younger job-seekers, and a vibrant knowledge-based society”* (Juncker, 2014). Indeed, the borderless nature of digital technologies means that it no longer makes sense for Member States (MS) to have individual rules for telecommunication services, copyright, data protection, or the management of radio spectrum. Rather, essential preconditions for the DSM will be *“to stimulate Europe’s digital environment, to minimise legal uncertainty and create fair conditions for all”* (Ansip, 2014), that in practice will require to: (i) build trust and confidence in the online world; (ii) improve consumer rights, data protection and cybersecurity; and (iii) remove restrictions and guarantee access, connectivity, and investments. Consequently, policy actions of primary relevance will include (Juncker, 2014):

- Rapidly concluding negotiations on common EU data protection rules.
- Giving more ambition to the on-going reform of telecom rules.
- Modifying copyright rules to reflect new technologies.
- Simplifying consumer rules for online purchases.
- Making it easier for innovators to start their own company.
- Boosting digital skills and learning.

The cross-cutting nature of the digitalization process makes the implementation of the Digital Agenda significant to other EU policy areas. Undeniably, achievements within the DAE contribute to tackle challenges such as population ageing (e.g. better healthcare, independent living for the elderly), budgetary constraints (e.g. more effective and less expensive services, modernization of the public sector), climate change and resource efficiency (e.g. energy saving, intelligent transport, smart cities), social exclusion (e.g. accessibility and inclusion, equity, training and learning), preservation of the European cultural heritage, security issues, etc. In addition, the Information and Communication Technologies (ICTs) are one of the drivers of productivity, and hence of competitiveness and economic growth, and as such make the implementation of the DAE relevant to the objectives of the Cohesion Policy.

In terms of governance, the achievement of the objectives of the DAE requires a “*sustained level of commitment*” at the territorial level (EC, 2010a). With regard to this, the “Digital Local Agenda” and the “DAE going local” are among the initiatives that deserve to be mentioned. The Digital Local Agenda is a planning instrument proposed in 2005 by the Council of European Municipalities and Regions (CEMR) and the European network ELANET (*European Local Authorities Network for the Information Society*). Originally intended as an answer to the i2010 strategy, with a specific focus on eInclusion and eGovernment, it was updated in 2007 with the approval of the Digital Local Agenda Manifesto. The manifesto outlines 28 priorities organised around five digital areas, namely: eParticipation; eInclusion; full broadband access; secured digital local networks; and advanced municipal and local services (EISCO, 2007). While the Digital Local Agenda is a bottom-up initiative, representing local authorities’ self-commitment towards the digitalization objectives, the “DAE going local” is a top-down initiative in which European institutions, and DG Connect in particular, are committed to involve the local level in order to raise awareness about the DAE objectives and challenges. Launched in 2010 by DG Connect, further to the publication of the DAE, the initiative aims at organising visits and events within MS. The focus of the DAE going local changes on a yearly basis; in 2013, for example, it addressed topics such as the Digital Agenda Review, information on Horizon 2020 preparation, and the use of Structural Funds in ICT.

Although the territorial dimension is important for implementation, ways of measuring and monitoring the progress achieved at the local and regional level towards the DAE and DSM objectives are quite limited. Eurostat regional statistics provide information on a few relevant indicators (Eurostat database online) and the annual Eurostat Regional Yearbook (Eurostat, 2014) includes, among other regional analyses, an overview of DAE achievements. By means of these indicators and notwithstanding the fact that the situation is still considerably heterogeneous across European regions, data confirm a positive trend towards the achievement of the above mentioned objectives and since the launch of the DAE. In particular, progress is quantifiable in terms of households that have internet access at home, individuals regularly using the internet, and individuals ordering goods or services over the internet for private use.

## 1.2 The asymmetric development of digitalization across the EU

Literature review confirms the heterogeneous development of digitalization across the EU. Through the use of a composite index including six components (affordability, infrastructure investment, network access, capacity, usage, and human capital), Katz et al (2014) show the existence of significant gaps across MS in terms of uneven development, infrastructure investment, and digital technology usage. They also suggest that heterogeneous digitalization levels need differentiated approaches and that, in particular, the main challenge for more digitalized countries is to cluster around investment in infrastructure and around the development of human capital, while policymakers of countries at the transitional stage have to set up effective policies to accelerate investment in telecommunication networks.

The same considerations on heterogeneous digitalization apply to local and regional contexts. The analysis carried out at the regional level within the Europe's Digital Competitiveness Report (EC, 2010b) illustrates that *“Regular internet use seems to be linked to economic development, with disadvantaged regions lagging behind more economically advanced areas. However, the regional distribution of digital skills, in particular high skills, does not seem to reflect a traditional core-periphery pattern. There may therefore be scope for disadvantaged regions to achieve leading levels of high digital skills and hence a competitive advantage in the digital economy. Nonetheless, many lagging regions have not yet found the means for such success.”*

Looking at the digital “endowment” of European regions and of local contexts, specific policies and investment strategies as well as structural characteristics of the regions may affect and bias the achievement of the DAE objectives and the creation of a DSM at the European level. An analysis carried out by Reggi and Schicchitano (2012, 2014) shows that the 2007 - 2013 allocation of Structural Funds for the development of the Information Society (IS) at the regional level was affected by the digital starting point of the concerned territory. EU regions tended to invest more resources in the IS fields in which they already performed satisfactorily, hence seeking to improve their strengths rather than focusing on their weaknesses. Schleife (2006), when studying the determinants of the diffusion of internet usage in private households in Germany, found that in less densely populated counties internet diffusion was less advanced and that internet penetration was positively affected by characteristics such as higher shares of qualified employees or of one-person households; on the contrary, internet penetration was constrained by higher unemployment rates or higher shares of foreigners.



# **Part 2: Proposal for a methodology to be followed in order to include digital criteria into the guidelines for Impact Assessments**

## **2.1 Methodological approach**

Our methodological approach to identify relevant digital criteria for consideration in the upcoming Impact Assessment (IA) Guidelines and from the viewpoint of LRAs is, in the first instance, based on the analysis of the current guidelines published in 2009 and, in particular, of the key impact identification questions and corresponding categories. The EC impact assessment system was established in 2002. The system has been strengthened over the years and adapted to emerging challenges and needs. As part of this continuous upgrading process, the 2009 IA guidelines were to be reviewed in 2014 and, accordingly, a consultation was launched by the EC from July to September 2014. Coherently with the Communication on ‘EU Regulatory Fitness’ (EC, 2012), where it is outlined that *“the crisis has focused the attention on the costs of EU legislation and the challenges of implementing and enforcing laws”*, impact assessment procedures need to be refined, updated and improved also in order to meet policy goals at minimum costs and to maximise the benefits that the EU legislation can bring.

There is no one-fits-all solution to assess the economic, social and environmental impacts of policy initiatives, but, rather, such impacts need to be evaluated in the light of the content of each initiative undertaken and taking into account a number of framework conditions. Within the EC IA procedure, the outlining of “key impact identification questions” meant to screen policy options against possible economic, social and environmental impacts is a crucial and sensitive step. According to our analysis, only two out of the 147 key impact identification questions outlined within the 2014 EC IA revision (EC, 2014b) explicitly refer to digital aspects. Nevertheless, a number of other questions within the above mentioned framework appear to be relevant to the digitalization process of the society (Table 3).

**Table 3: EU IA key impact questions related with digital aspects**

	<b>Category</b>	<b>Questions</b>
key impact questions directly related with digital aspects		
Economic Impacts	Innovation and research	<i>Does the option facilitate the introduction and dissemination of new production methods, technologies and products?</i>
Societal impacts	Standards and rights related to job quality	<i>Does the option facilitate or restrict restructuring, adaptation to change and the use of technological innovation in the workplace?</i>
key impact questions encompassing digital aspects		
Economic Impacts	Competitiveness, trade and investment flows	<i>What impact does the option have on the global competitive position of EU firms? Does it impact productivity?</i>
	Public authorities	<i>Does the option require the creation of new or restructuring of existing public authorities?</i>
	Consumers and households	<i>Does the option have an impact on the quality and availability of the good/service they buy, on consumer choice and confidence? Does it affect consumer information and protection?</i>
Societal impacts	Employment and labour market	<i>Does the option facilitate new job creation? Does it affect particular age groups?</i>
	Social inclusion and protection of particular groups	<i>Does the option make the public better informed about particular issues?</i>
	Individuals, private and family life, personal data	<i>Does the option impose additional administrative requirements on individuals or increase administrative complexity? Does the option involve the processing of personal data or the concerned individual's right of access to personal data?</i>
	Access to and effects on social protection, health and education system	<i>Does the option have an impact on services in terms of quality/access for all? Does it have an effect on the education and mobility of workers? Does the option affect the access of individuals to public/private education or vocational and continuing training? Does it affect the cross-border provision of service?</i>
Environmental impacts	Transport and the use of energy	<i>Does the option affect the energy intensity of the economy?</i>

Further to the outlining of the relevant key impact identification questions, our methodological approach implies, in the second instance, the identification of hypotheses of impact of the different components of the DAE or digital solutions. Each hypothesis is tested against a set of digital criteria potentially suitable for implementation in the EU IA procedure, where the testing is carried out against the empirical evidence gathered from works realised by think-tanks,

consulting companies' research, IT and telecom sector studies, articles, reports, and policy documents.

As a final step of our approach and in order to provide additional evidence of the effects of the digitalization process highlighted through the documentary review, and confirm our proposed hypotheses and digital criteria, in Part 3 we describe a number of case studies concerned with ICT-related initiatives and projects implemented at the local and regional level.

The four identified hypotheses, corresponding to a total of 15 digital criteria, include:

- *Hypothesis 1: Relevant effects on local and regional **social** development.*  
This hypothesis is tested against five digital criteria related to the extent of high-speed internet usage, the ICT level of competence of citizens and civil servants, and the occurring changes in consumer behaviour. The level and efficiency of support to educational activities is also considered under this hypothesis.
- *Hypothesis 2: Relevant effects on local and regional **economic** development, including on EU budget, SMEs and micros.*  
This hypothesis is tested against four digital criteria related to job creation (employment), competitiveness level, number of innovative start-ups and the level and efficiency of support to entrepreneurship.
- *Hypothesis 3: Relevant effects on **access, administrative and transaction costs, and efficiency** at the local and regional level.*  
This hypothesis is tested against three digital criteria related to cost reduction (of internet access and of public or private services), and to the quality and/or speed of public services.
- *Hypothesis 4: Relevant territorial effects on **environment, fundamental rights, and security**.*  
This hypothesis is tested against three digital criteria related to 'side effects' of ICT penetration, such as those concerning environmental benefits (energy efficiency), better regulation (telecom and copyright rules), and cybersecurity.

### **Box 1: Costs and economic benefits of the DAE**

Investigations on DAE costs and economic benefits are limited. Hätönen (2011) calculated the total cost to reach the DAE targets by taking into account different possible technology scenarios (Minimum, Base, Advanced, Maximum) and by considering three types of areas within each country (urban, with more than 500 inhabitants per km<sup>2</sup>; suburban, with 100 - 500 inhabitants per km<sup>2</sup>; and rural, with less than 100 inhabitants per km<sup>2</sup>). He found that the total cost for the whole EU ranges from approximately EUR 73 billion in the Minimum scenario to EUR 221 billion in the Maximum scenario, with the largest cost item being the second DAE target, i.e. the covering of the total population with high-speed (>30Mbps) broadband access. On the other side, the net benefit derived from the implementation of the DAE is estimated to have an economic impact of slightly more than EUR 222 billion, at the EU level. Gruber et al (2013) analysed the overall effect of broadband use and concluded that broadband investments will be indirectly paid back within the DAE implementation horizon (the payback period is considerably shorter than the useful economic life of the infrastructure, which can be easily in excess of 15 years).

## **2.2 Hypothesis 1: Relevant effects on local and regional social development**

In Europe, increasing pervasiveness of ICT in every social aspect is an unquestionable phenomenon of the last 20 years. Less clear and investigated are the social advantages and disadvantages that the digital revolution has generated. According to the analysis carried out in 2010 within the EC study on “The social impact of ICT”, digitalization has mainly an evolutionary nature, amplifying existing trends in the real world instead of creating new ones. In particular, it accelerates all societal processes, increases mobility, fosters globalization, creates social networks, increases the need of collection of information as well as the control of individual behaviours, increases civil emancipation, rises populism in politics, rises the participation in the media, and increases choice opportunities. However, it may also facilitate growing economic instability and favour economic inequality, due to the potential intensification of the digital divide among different territorial entities as well as social groups (Parayil, 2005; Universität Siegen et al, 2010).

- **CRITERION 1<sup>2</sup>: Increase of the number of high-speed internet users in a city or region**

In the last years, one of the main indicators of the digitalization process has been the increase in diffusion and speed of broadband internet, which is measured in

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<sup>2</sup> Criteria are numbered coherently with the numbers attributed in the Terms of Reference, Annex B.1

terms of users. Eurostat regional statistics (Eurostat, 2014) indicate that, in 2013, 76% of all households (with at least one member being aged 16–74) in the EU28 had a broadband connection. In 2011, the share was 67%, with the take-up rate that has been slowing down since 2007 due to coverage saturation in some regions. As a consequence of the increasing availability of efficient internet connection, all social aspects related to networking opportunities have been affected. For example, the decision of becoming a new internet user in German counties (Schleife, 2006) appears to be mainly influenced by individual characteristics (e.g. age, sex, education, wealth, employment status, marriage status, or nationality) but the share of internet users in the area has also a highly significant impact on this decision, signalling positive network effects.

- **CRITERION 5: Increase of the ICT competence of citizens**
- **CRITERION 6: Increase of the ICT competence of civil servants**

From the analysis of the Italian Strategy of Digital Schools, Avvisati et al (2013) highlighted, among the positive effects of such an initiative, the level of appreciation of the teachers exposed to the pilots (such as Scuol@ 2.0 and Cl@sse 2.0). Teachers demonstrated a positive attitude in experiencing new ICT-adapted pedagogic approaches, sharing of ideas, resources and experiences, as well as in developing new solutions as new teaching issues came up. Therefore, investing in digital education triggers teachers' professional development processes and creates new digital jobs, develops digital pedagogic contents, and fosters learning and training opportunities. In turn, improved digital education is expected to have relevant impacts on both regular students and citizens demanding information. Indeed, because of the opportunities made available by the implementation and diffusion of ICT-based tools and learning platforms, lifelong learning opportunities (e.g. 24h per day availability of platforms, not-in-presence provision of contents, etc.) emerge for both informal and regular education (University of Siegen et al, 2010). While information-demanding citizens and the digitalization of public procedures have a relevant role on improving citizens' orientation to online public services, the analysis on the effect of ICT skills and organisational changes in the public administration of 15 MS by Seri and Zanfei (2012) highlights that the public sector performance in eServices can be considered as the output of the digital investment on the administrations' labour force.

- **CRITERION 8: Changes of consumer behaviour**

If European citizens have become more demanding in terms of public services thanks to digital skills, the same and larger effect has occurred for the private markets. Concrete examples of factors driving the development of consumption

of online goods and services through ICTs include (University of Siegen et al, 2010): (i) the opportunity to compare in real time prices of the same good / service allowing consumers to choose beyond the local offer (Dutton et al, 2009); (ii) the possibility to make online payments and check payments through banks' systems, but also through third party payment systems (e.g. Paypal); and (iii) the opportunity to do home shopping, including second hand / classified sales (e.g Amazon, eBay). The leading factor behind consumer behaviour change is in this case the efficiency of the shopping experience, also in terms of lower transaction costs for the consumer, especially if living in rural or low density-services areas.

- **CRITERION 11a: Increased number and efficiency of initiatives supporting education**

Evidence on the quantitative and qualitative impact of ICT on education is limited and controversial. The work of Punie et al (2013) states that although evidence has been collected in recent years on the impacts of ICT on education, "*longer-term comparative research remains scarce*". This is due to the fact that the implementation of ICT solutions in education is a relatively recent phenomenon; in addition, the authors consider that "*a real breakthrough in eLearning or ICT-enabled learning and teaching has not (yet) materialised*". Likewise, according to the work of Livingstone (2012), although ICTs are widely seen as an opportunity to enhance learning, their actual benefits are difficult to estimate in traditional terms. The work underlines that the impacts of ICT-related initiatives in the field of education are widely exposed to the debate on "*whether ICT should be conceived of as supporting delivery of a traditional or a radically different vision of pedagogy based on soft skills and new digital literacies*". Additionally, the assessment of the impact of ICT education solutions based on the results of students on specific areas of competences (e.g. PISA test scores) risks to be affected by causality measurement (Biagi and Loi, 2013) or by the way characteristics of the population of the sample are accounted for in the model of reference (De Witte et al, 2014).

Aristovnik (2012) attempted to estimate the ICT efficiency and impact on educational output/outcome on the basis of the Data Envelopment Analysis (DEA) applied to selected EU27 and OECD countries. The study results show that, in general, ICT has an important impact on the education sector's output/outcome in terms of school enrolment at all levels, labour force with tertiary education, and PISA 2006 average score. The work considered as ICT-related inputs the following variables: ICT expenditure as a percentage of GDP, internet users, and teacher-pupil ratio (at secondary level). Another work of Wastiau et al (2013), assessing the use of ICT in education, leads to heterogeneous considerations. Although the authors' analysis, based on a survey

across European schools, remains mainly explorative, it underlines the negative effects of the lack of availability of ICT-based educational technologies. However, it also confirms potential risks, such as the ‘second digital divide’ between those having the skills to benefit from computer use from those without competencies; and the gap of ICT use inside and outside the schools.

Overall, evidence suggests that besides infrastructure and internet access, teachers have a key role in leveraging education supported by ICT and that policy interventions aimed at providing them with the appropriate competences are needed in order to transform traditional pedagogic practice by means of technological tools.

### **2.3 Hypothesis 2: Relevant effects on local and regional economic development, including on the EU budget, SMEs and micros**

ICT diffusion was assumed as one of the main drivers of regional economic development in terms of competitiveness (EC, 1997) and job creation (EC, 2000). In the last two decades, a large number of scientific literature has addressed the analysis of the digitalization of the society and its economic impact and side effects. Gruber, Hätönen and Koutroumpis (2013) show, for instance, that investing in broadband infrastructure gains relatively high economic results, making this kind of initiatives an efficient use of public funds. Koutroumpis (2009) finds a strong positive and significant relation between broadband adoption and GDP expansion. On a sample of 22 OECD countries, over the period 2002 - 2007, the main finding is that, on average, the annual GDP raises by 0.24% further to a 10% increase of broadband adoption. An analogous investigation performed by Czernich et al (2011) on a broader sample of 25 OECD countries between 1996 and 2007 confirms that broadband adoption has a significant and positive impact on national GDP per capita, with increases ranging from 0.9% to 1.5% for every additional 10 broadband lines per 100 people. Importantly, the main evidence is that the impact is greater in countries with relatively high levels of take-up. Koutroumpis’s research found that the average annual GDP growth was 0.15% in low penetration countries (such as Greece and Italy), 0.23% in medium penetration countries (such as Germany and the UK), and 0.39% in high penetration countries (such as Norway and the Netherlands). Greenstein and McDevitt (2012) confirm that many OECD countries have experienced increased consumer surplus<sup>3</sup> for the

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<sup>3</sup> The consumer surplus is the amount that consumers benefit by being able to purchase a product for a price that is less than the most that they would be willing to pay (Source: Princeton University, available at: [http://www.princeton.edu/~achaney/tmve/wiki100k/docs/Economic\\_surplus.html](http://www.princeton.edu/~achaney/tmve/wiki100k/docs/Economic_surplus.html))

simultaneous large improvements in broadband quality and reduction of real prices of the related services. For example, the quality-adjusted new consumer surplus from broadband for the UK increased from USD 14 billion in 2006 to USD 45 billion in 2010.

- **CRITERION 13: Increase of employment**

The analysis of the introduction of faster broadband services in a sample of Swedish local administrations shows relevant economic effects (Forzati and Mattsson, 2011). Using a sample of 290 municipalities over the period 2007–2010, they found that a 10% increase in the proportion of the population with access to FTTH (fiber-to-the-home) was associated with a positive change in municipality-level employment of between 0% and 0.2%.

According to McQuaid, Lindsay and Greig (2004), access to the internet can in addition facilitate job search activities reducing frictional unemployment by providing access to information, advice services, and job search networks. For the authors, the use of the internet and other forms of ICTs are effective tools for delivering services for the unemployed, especially if considering experiences and attitudes of job seekers in peri-urban and remote rural labour markets such as those in northern and central Scotland.

However, there is evidence that effects on employment may be controversial. Some think-tank studies (Usanov and Chivot, 2013; Orsted 2014) stress how the implementation of new technologies has led to substantial changes in business organisation, affecting the nature of employer-employee relationship, business processes, compensation systems, and management practices. Although benefits in terms of efficiency are fully demonstrated, a number of negative impacts have also been noted, such as growing job polarization, declining share of labour income in the economy, increasing skills mismatch, and higher structural (technological) unemployment.

Market labour mismatch between supply and demand of professional ICT skills may generate unemployment. This structural link is not verified homogeneously in all European regions (Vivarelli, 2012) but Gini index analysis has demonstrated the possible increase of inequality due to technological progress. This effect, apparently in contrast with the positive social impacts of the digitalization process, may be explained with the necessity of an integrated policy approach: without efficient initiatives to support education, and lifelong learning in particular, technological improvements are likely to increase social inequality.

- **CRITERION 14: Increase of competitiveness**

Innocenti and Molinari (2008) found that there is a positive correlation between participation of regional stakeholders to ICT-RTD programmes, and regional competitiveness and innovation growth. Furthermore, the correlation between funding and regional innovation systems is stronger in the less advanced regions, implying that an enhanced regional convergence can be a side-effect of ICT-RTD programmes, but also confirming that such programmes have a greater impact where the initial conditions are less favourable.

By considering the impact of digitalization on the industrial systems and by looking at ICT as a productive factor, Bertschek et al (2013) found a causal impact of broadband availability on firm performance. Using enterprise-level information from a sample of over 900 German manufacturing and service firms, the authors concluded that at the early stages of broadband penetration in the country (2001-2003), broadband access had no significant effect on labour productivity, but it had a substantial impact on firms' innovation activity in terms of both process and product innovation.

- **CRITERION 12: Increased number of innovative start-ups**

According to Van Oort and Atzema (2004), high-technology enterprises tend to co-locate in areas where the economic activity is spatially dense. In the Netherlands, within the then existing 580 municipalities, agglomeration economies played a relevant role among the factors that determined new firm formation in the ICT sector.

- **CRITERION 11b: Increased number and efficiency of initiatives supporting entrepreneurship**

The effort of increasing the number and efficiency of initiatives supporting entrepreneurship, with a focus on the support to innovation through digitalization of business practices, is crucial in a European perspective. In particular, *“The evolution of e-business or the uptake of e-business practices has become popular to depict as a process involving transitions toward increasing use of ICT coupled to organizational change and sophistication which can impact business performance”* (Gatautis and Vitkauskait, 2009). In such change management processes, several context elements must be considered as possible triggers or barriers towards the digitalization of business processes and eBusiness development. These elements range from policy frameworks and supporting public administrations, to competitiveness/collaboration frameworks, levels and quality of education, entrepreneurial culture, and ICT infrastructure (Gatautis and Vitkauskait, 2009). In general, the possible lack of practical

applicability to the specific business case and little incentive to change business models when returns are unclear might influence the decision of adoption or non-adoption of new ICT assets and capabilities in a business environment. However, change and innovation are keystones in the process of increasing competitiveness, and ICT in particular can boost the effectiveness of such changes (Davenport, 2013). In this framework, public and, for example, trade associations (as specified in Seppae et al, 2007) support policies should be fostered on a wide range of areas, such as: business environment; skills upgrading; network infrastructure; trust infrastructure; digital products and information services; intangible investments and assets; information; and Government online (Gatautis and Vitkauskait, 2009).

In any case, in order to obtain specific evidence on gains from ICT use in businesses, firm-level studies are necessary. Microeconomic analysis finds positive spillovers and supports the linkage between investment and use of ICT and companies' performance (Gatautis and Vitkauskait, 2009). Past research undertaken in the UK demonstrates that firms with higher investment in IT and higher use of digital assets entail higher productivity rates. A Danish case study on 700 enterprises demonstrates that eBusiness-oriented firms have higher productivity, are more innovative, employ more skilled labour force and more often get involved in R&D activities (Gatautis and Vitkauskait, 2009).

## **2.4 Hypothesis 3: Relevant effects on access, administrative and transaction costs, and efficiency at the local and regional level**

Literature provides the evidence that digitalization tends to reduce costs and improve efficiency with regard to both collection of information and acquisition / delivery of goods and services. In fact, ICTs enable the transfer of all types of data over distances, which, together with the increasing digitalization of economic activities (e.g. banking services) and the online delivery of products and services (e.g. shopping of e-books or of digital music), means that data flows are partially substituting physical transport of people and goods.

- **CRITERION 3: Reducing the costs of internet access**

Evidence suggests that promoting competition in the field of internet service provision improves the quality of the services, therefore improving the value for money spent for the said services. A recent work from Rajabiun and Middleton (2015) stresses that the quality and the diffusion of broadband networks are not strictly a direct function of the capital inputs unleashed. The analysis, carried out

considering broadband network performances between 2007 and 2012, suggests that those countries promoting entry and competition in the provision of internet access services are typically associated with higher quality broadband networks, therefore improving the value for the money invested in the implementation of the service.

- **CRITERION 2: Increase of the quality and/or speed of public services**

Several works confirm the importance of digital development in order to increase the quality and speed of public services. In a 2011 work, Troulos and Maglaris point out that *“a growing number of municipal fiber projects are underway or planned and that current EU provisions for public involvement in broadband development stimulate municipal plans for large scale arrangements”*. A few years later, to quote a national example, results of this commitment were evident as *“the European Union (EU) legislative support to broadband has matched the expectations of a growing number of Italian local governments”* (Nucciarelli et al, 2013). Indeed, over the last ten years, several regional broadband projects have been initiated by public stakeholders with the aim of reducing digital divide or supporting economic development as well as the quality and speed of public services, in particular as a way for supporting the efficiency and reliability of eGovernment and eProcurement procedures.

- **CRITERION 4: Reducing the costs of public or private services**

The work carried out by Capgemini et al (2010) aimed at assessing the impact of European policies related with eGovernance, such as the i2010 eGovernment Action Plan, on the performance, Europe-wide, of national and local authorities. The results showed that the basic public services had been made available online in the majority of the countries considered. Furthermore, the “online sophistication” (estimated considering information availability, one-way interaction, two-way interaction, transaction and targetisation / automation) had increased by 7% since 2009, reaching 90% on average, with Italy, Malta, Austria, Portugal and Sweden having reached 100% availability of the services considered. The most advanced service cluster remains the one related with government income generation (e.g. taxation), with an average score of 98%. Nevertheless, this situation is not homogeneous at the various administrative levels and, indeed, most services at the local level show a lower level of sophistication. For instance, the local level only reached 39%, on average, for “communication of change of address/residence”, “building permission”, “certificates” and “public libraries”. Furthermore, data suggest that the largest cities performed significantly better than rural administrations, even when municipalities of comparable size were considered.

Dunleavy and Margetts (2010) investigated the changes introduced by the so-called Digital-Era Governance with respect to the New Public Management Approach. In particular, they stressed how “reintegration”, one of the key aspects of the new approach emerged in the last decade, had significantly benefited from the opportunities provided by digital technologies, reducing the duplication of governance efforts, and radically simplifying services’ organisation. Among the reasons which prompted the spread of eGovernment, are the increasing pressure on budgets, and the necessity for governments to provide the same services with reduced resources. By automating processes, public organisations have intended to eliminate the highly expensive workflows caused by paper-based processes. As indicated in Cavallini et al (2013), public administration services such as eProcurement, VAT declarations, income tax declarations, and eVoting are those that would largely benefit from the application of standard procedures in eSignature at the European level.

## **2.5 Hypothesis 4: Relevant territorial effects on environment, fundamental rights, and security**

This hypothesis groups the ‘side effects’ of ICT penetration in diverse domains.

- **CRITERION 10: Achieving higher levels of energy efficiency**

On the basis of evidence built on case studies at company and sector levels, a work carried out by Bios Intelligence Service et al (2008) reports on the contribution of ICTs towards the improvement of energy efficiency. Improvements are recognised to be due to: (i) savings made in the ICT sector itself (despite the development of energy efficient and miniaturized components, the carbon footprint of the sector may increase due to the increased stock of ICT appliances and network infrastructures); (ii) ICT-based applications in a number of areas (e.g. residential buildings, industrial production, and primary energy consumption); and (iii) dematerialization through ICT application (e.g. audio and video conferencing in eGovernment, eWork, or dematerialization of private services such as eTicketing).

- **CRITERION 7: Increased effects on telecom and copyright rules**

A recent work produced by the European Telecommunication Network Operators’ Association (ETNO, 2014) shows how digital reforms and initiatives are perceived as of extreme added value from the Telecom and IT operators. Using the words of ETNO Executive Board Chairman, Mr Gambardella,

*“The objective [...] should be to update telecoms regulatory framework, help the single market through an ambitious spectrum reform and address regulatory imbalances in the digital value chain. These were tested [...] repeatedly confirming that reform would result in fresh investments and new growth opportunities”*. Value will be added both through the opening of new markets and by means of the implicitly requested changes to be implemented while doing business.

As for the telecom network operators, digitalization has imposed an update of the regulatory framework to protect providers of information and knowledge. Increased access to multimedia contents through the internet has raised issues related to copyright law and ownership regulation. Copyright and ownership of some professional activities such as musicians, artists and writers are under threat. Although online networks have allowed such professional categories to spread their products at low budget, their expertise might suffer from exposure to the entire world. Adding to the difficulties to harmonise copyright rules across the European internal market (Guibault et al, 2007), the complexity of the regulations applying to online products may have the effect to discourage consumption of such products and to push alternative markets, goods and services.

- **CRITERION 9: Achieving higher protection level against cyber-attacks**

Think-tank publications (Kox and Straathof, 2013; Usanov and Chivot, 2013) provide ground supporting the need of policy indication concerning minimum security requirements for cybersecurity. They also underline the fact that increased digital access to services might offer opportunities to potential attackers and that internet providers and telecom operators might not be able to fully understand the *“benefits of their investments in cyber security, for example because part of the potential benefits are for costumers”* (Kox and Straathof, 2013). Authorities at all levels have the opportunity to make a strong impact on the level of security by imposing minimum security standards to internet providers and telecom operators, which in turn will have relevant aftermaths in increasing end-users awareness about the security of their online operations and, more in general, in building consumer trust in the online word.



## Part 3: Case Studies

<b>1. The SHARP Project – UK’s most innovative workspace</b>	
Hypothesis 2	<i>Relevant effects on local and regional economic development, including on the EU budget, SMEs and micros</i>
Addressed criteria	<i>Increase of employment; increase of competitiveness; increased number and efficiency of initiatives supporting entrepreneurship; increased number of innovative start-ups</i>
Authorities	Manchester City Council (MCC)
<i>Implementation period: 2008 – 2013</i>	
<i>Financing: Total project budget: GBP 10,719,200 out of which 25% contributed by the ERDF, 44% by the MCC, and 31% by the North West Regional Development Agency.</i>	
<i>Target categories: Businesses (start-ups, micro and SMEs) of the creative and digital industry.</i>	
<i>Description: The project aimed at supporting the development of the city’s growing digital sector through the provision of appropriate accommodation and facilities in East Manchester. These include some 18.500 m2 within a long-term vacant building, equipped with connectivity, power supply and technical infrastructure such as studio, production and workshop space. The idea behind was to create a hub offering large scale and cost effective opportunities to complementary businesses while facilitating cooperation, innovation and cost-sharing. The project concept was developed in 2008 and included a business plan for which public funding was secured. The refurbishment and redevelopment of the building began in 2009 and was completed in June 2011. From 2012 onwards, the project expanded its space offer, opened its social places to non-tenants, and set up a social enterprise, the SharpFutures, in charge of nurturing talent and skills through education and apprenticeship. In October 2014, The Sharp Project won a national innovation award and was named ‘the UK’s most innovative workspace’.</i>	
<i>Implementation procedures: The project was overseen and managed by the MCC. Specialist consultants and apprentices from the SharpFutures contributed to management activities.</i>	
<i>Evaluation: Evaluated in 2013, the project’s performance was considered successful as it delivered on time and against the objectives. On its economic impact, by the end of March 2013, the project hosted 54 businesses, accommodating 962 jobs (equivalent to 375 full time jobs) with the generation of an estimated annual GVA of GBP 21,4 million. A survey outlined a clear impact of the project on entrepreneurship, with 92% of the respondents having increased their turnover; 89% having increased their productivity; 85% having developed new products and/or services; and 75% having created new jobs (with at least 56 jobs created since businesses were located at The Sharp Project). In its first year of operation, the SharpFutures developed and managed an apprentice scheme, with five Manchester residents employed as apprentices for 12 – 18 months. Apart from the cost and design of the space made available, the attractiveness of the project was in the networking opportunities offered to the tenants. This also led to the creation of a new brand for Manchester – The Sharp Project (TSP), which has now a commercial value. Finally, the project was found to contribute to the ‘Digital Strategy for Manchester’ approved in 2012.</i>	

*Sustainability:* There are plans for expanding further the mass and volume of the sector, including the support to freelance and new talent to meet an expected growing need. In this sense, ERDF support matched with MCC funding was secured in 2013 for the development of a new demand-driven facility, the Drama Hub.

**References:** Ekosgen (2013), [Evaluating the Economic Impact of The Sharp Project](#); The Sharp Project [website](#); SharpFutures [website](#).

## 2. Stockholm's STOKAB: a Swedish model for infrastructure sharing

Hypotheses 1 & 3	<i>Relevant effects on local and regional social development &amp; Relevant effects on access, administrative and transaction costs, and efficiency at the local and regional level</i>
Addressed criteria	<i>Increase of the number of high-speed internet users in a city or region; reducing the cost of internet access; reducing the cost of public or private services</i>
Authorities	Stockholm City Council

*Implementation period:* 1994 – 2012

*Financing:* Start up and initial operations of the company were financed through loans guaranteed by the City. Since 2008, the operation started generating profit. Hence, overall, Stokab has been financed by means of loans and revenues.

*Target categories:* Public and business locations since the project's inception. Since 2007, a broad residential deployment started.

*Description:* Stokab is a company owned by the Stockholm City Council. It was launched in 1994 to fill the gap of fibre capacity provision and to rollout a fibre network throughout the city and to the surrounding municipalities. Of the over 170 municipal networks in Sweden, Stokab is considered a model also because of its significant scale. Among its success factors are: the existence of a political consensus and of a long-term vision at the municipal level; the consideration of the network as a public infrastructure to benefit the whole of the society; the gradual deployment of the network with a focus on the generation of revenue and hence the prioritisation of businesses' needs; a relationship of trust with customers based on neutrality and non-competition; and a transparent pricing policy. The network connects almost all multi-dwelling units and commercial properties in the municipality, as well as industrial areas, all major healthcare facilities and urban centres in the region.

*Implementation procedures:* Stokab is competitively neutral, operates and maintains the network in the Stockholm region, and makes it open to all service providers on equal terms. The approach is based on the principle that the fibre network shall be a public infrastructure available to all while the provision of services is left to the telecommunication companies that lease the fibre optic connections.

*Evaluation:* By the end of 2011, main achievements included: about 100 people employed by Stokab (increasing to some 1.000 persons if sub-contractors are considered); a turnover of EUR 71,5 million in 2011; a portfolio of 800 customers, including 100 telecom operators; some 1.25 million km of fibre and 5.500 km of cable, with 600 nodes. An evaluation in 2013, has estimated in EUR 1,9 billion the socio-economic return of Stokab's overall investment of some EUR 600 million. This quantifies the impact in terms of the company's financial result, of the cost savings for the municipality and the county administration,

as well as of the benefits for businesses and end users. In particular: (i) Fibre leasing in Stockholm is cheaper than in many other capitals worldwide; this implies lower costs for operators and for end users down the value chain, quantified in some SEK 75 million per year (SEK 1 = EUR 0,10452) if compared, for example, to Copenhagen. (ii) Residential housing connected to the network has increased its value, quantified in some SEK 1,85 billion in terms of property value and in some SEK 30 million in terms of increased rental revenues per year. (iii) Stokab procurement and investment has generated an economic activity of over SEK 5 billion in the supplier industry. (iv) Cost savings for local governments (the city and the county) equal some SEK 2 billion over the period 1996 - 2012. (v) Employment gains are quantified in some SEK 7,7 billion 'job value'.

**References:** Acreo (2013), [Stokab, a socio-economic analysis](#); ITU [web description](#); Felten B. (2012), Stockholm's Stokab: A Blueprint for Ubiquitous Fiber Connectivity?

### 3. Minus 3% : ICT-enabled energy management in Maribor, Slovenia

Hypotheses 1, 3 & 4	<i>Relevant effects on local and regional social development &amp; Relevant effects on access, administrative and transaction costs, and efficiency at the local and regional level &amp; Relevant territorial effects on environment, fundamental rights, and security</i>
Addressed criteria	<i>Changes of consumer behaviour; reducing the costs of public or private services; achieving higher levels of energy efficiency</i>
Authorities	Energy Agency of Podravje (EnergaP) & Municipality of Maribor

Implementation period: 2008 – 2011

Financing: Total budget: EUR 250,000, 75% of which was contributed by the municipality of Maribor and 25% by the EU through the Intelligent Energy Europe Programme.

Target categories: Utilities, local and regional authorities, schools and universities.

Description: The Minus 3% project aimed at establishing in the partners' sites good examples of energy reduction - with a minimum reduction target of 3% per year -, towards the implementation of Directive 2006/32/EC on energy end-use efficiency and energy services. In Maribor, Slovenia, within the project frame, this led to the development of a good practice for the reduction of energy consumption in municipal buildings, with a focus on kindergartens and schools. Energy savings were achieved through the installation of a Central Energy Management System (CEMS) accompanied by awareness raising and training on the basic of energy efficiency and energy efficient behaviour among users. The CEMS is a software-based tool developed by a local IT company. It computes different information on building characteristics, weather conditions, fuel prices, or specific energy delivery agreements, all of which are used to perform an energy audit. This information is then analysed and used for changing users' behaviour, identifying energy saving measures, budgetary planning by the municipality, or identifying the need for retrofitting or insulation interventions. ManagEnergy.net classifies this case as a good practice. The practice was one of the three final nominees for the European ManagEnergy Award and won the Slovene National Award 2010 for the most energy efficient project.

Implementation procedures: The management of the system is done by the local energy agency of Podravje, EnergaP. EnergaP was established in 2006 with the EU support and covers the municipality of Maribor and 15 smaller municipalities in the region. The agency coordinates and implements the local energy strategy of Maribor, adopted in early 2009.

It also provides education and assistance to the users and is actively involved in the search of collaboration and funding opportunities at the national and EU level.

*Evaluation:* The project introduced a set of indicators to measure the impact in terms of energy consumption, yearly cost of energy services, and return of investment. Some 117 public buildings in Maribor and in the neighbouring municipalities were integrated into the ICT-based system, which brought to overall energy savings in excess of 10%. In fact, the system allows for around 2-3% energy saving simply as a consequence of proper monitoring; and for 8% cost saving within the first year of installation as a consequence of detection of mistakes in the billing or in the metering systems. Annual energy cost savings are mentioned to range between EUR 80,000 and EUR 160,000.

*Sustainability:* The pivotal role played by EnergaP and the educational component of the approach, with training considered as an integral part of the process of implementing the technology, facilitate the potential application of CEMS to residential buildings (whose energy consumption share is some 40% of the total consumption).

**References:** ICLEI *et al* (2011), The Contribution of ICT to Energy Efficiency: Local and Regional Initiatives – Implementing energy efficiency initiatives harnessing ICT: a toolkit for local and regional authorities; ManagEnergy [Case Study 19](#); MINUS 3% project [website](#).

#### 4. INNOVATIC Navarra Programme, Spain

Hypothesis 2	<i>Relevant effects on local and regional economic development including on EU budget, SMEs and micros</i>
Addressed criteria	<i>Increased number and efficiency of projects supporting entrepreneurship; increase of competitiveness</i>
Authorities	The Regional Government of Navarre

*Implementation period:* January 2006 – December 2008

*Financing:* Total budget: EUR 565,891 out of which EUR 204,886 was contributed by the ERDF and EUR 156,119 by the private sector.

*Target categories:* SMEs, research and technological institutes, universities, public bodies of the regional government dealing with innovation.

*Description:* The main objectives of the programme were the promotion of the ICT sector in the Navarre region, and the boosting of ICT as a catalyst of research, technological, development and innovation initiatives, with a focus on the (emerging) fields of biotechnology, nanotechnology and renewable energies. The programme implied (i) the mobilization of the ICT sector, (ii) the provision of cross-sectoral support to projects deploying ICTs, and (iii) co-operation and integration actions seeking the inclusion of the ICT sector in networks and projects. The rationale behind the programme was the evidence, provided by a Sectoral Study and Strategic Plan of the ICT Sector carried out in 2005, of the lack of cooperation across the ICT knowledge pools available and/or produced within the region.

*Implementation procedures:* The programme was managed by regional authorities and coordinated by The Innovation and Technology Agency of Navarre, with important contributions from The Association of Industries of Navarre and The Business Innovation Centre of Navarre. Implementation involved more than 90 businesses, technology centres,

and university departments with a rate of participation that exceeded expectations. A specific methodology for the identification, development and execution of integrated projects (MEUPOLE.tic) favoured collaboration, learning, knowledge exchange, and open dialogue.

**Evaluation:** Participants to the programme identified a total of 62 project ideas, out of which 18 were developed further by means of working groups, to end up with 11 proposals of collaborative RTDI projects. Out of these, the regional government approved six projects (selected according to their level of innovation, the cross-sectoral nature of the partnership, and the expected benefits, including in terms of transferability) bringing together a total of 13 ICT companies, 11 companies from the three target sectors, and seven research bodies. The average investment on integrated projects was of EUR 388,319. In addition, five dissemination actions of the ICT cluster were implemented. Although successful, the evaluation identified a few difficulties, namely: the limited experience of participants in taking part in similar projects created misunderstandings within the working partnerships; the lack of involvement of big ICT companies limited the ICT knowledge that was actually brought into the programme; the monitoring and evaluation procedures were perceived too complicated and generating an unnecessary administrative burden for participants.

**Sustainability:** The programme's transferability was high. The overall approach was replicated by the ICT Cluster for collaborative RTDI projects with other sectors (e.g. agri-food) and it was promoted within the Third Technology Plan of Navarra by means of collaborative projects schemes and clustering initiatives.

**References:** ICT value network: [good practice factsheet](#); programme's description at the 'iniciativas-innovadoras' [website](#); [case study](#) developed on behalf of the EC within the 2010 study 'Policy lessons from experimentation with regional programmes of innovative actions'.

## 5. iSAC6+ Project

Hypothesis 3	<i>Relevant effects on access, administrative and transaction costs, and efficiency at the local and regional level</i>
Addressed criteria	<i>Increase of the quality and/or speed of public services; reducing the costs of public or private services</i>
Authorities	Among other partners, the project involved the municipal authorities of Terrassa (ES), Bremerhaven (DE), Prato (IT), and Saint Médard en Jalles (FR)

**Implementation period:** September 2009 – August 2012

**Financing:** Total cost: EUR 2,7 million out of which EUR 1,35 million contributed by the EU through the ICT Policy Support Programme, work programme 2008, Objective 1.2 'Reducing administrative burdens'.

**Target categories:** Civil servants, citizens, and to a lesser extent businesses.

**Description:** The project aimed at delivering smarter administration through innovation and following a citizen-centred and inclusive approach. In particular, it promoted the use of a semantic web technology to enhance the capacity of public authorities to respond to citizens' information requirements through existing Citizens' Information and Assessment Services (SAC). The project's objectives included: improve the efficiency and capacity of responses from SACs (availability, accessibility and usability of information); achieve savings by both citizens and businesses in terms of time, money, stress and administrative burden; and apply

innovation strategically towards a client-oriented and professional service by the public administration. Among the acknowledgements received, Saint Medard en Jalles participation in iSAC 6+ was rewarded by le Conseil général de la Gironde within the 6<sup>th</sup> edition of Les Trophées Agenda 21, in the category of local administrations.

**Implementation procedures:** iSAC is a tool developed using open source software. It is modular, multilingual, and can be integrated into any information system. The tool may understand colloquial or administrative terms, as well as localisms, and is capable to answer questions based on an underlying semantic search engine. The iSAC application is downloadable from the Joinup collaborative platform established by the EC to share interoperability solutions for the public administrations.

**Evaluation:** Savings for the local administrations further to the services' modification enabled by iSAC 6+ ranged from some EUR 145,000 to less than EUR 39,000, depending on the municipality. Administrative burden reduction was achieved by both citizens and public administrations and averaged EUR 0,78 per capita. Impact varied greatly across the project's participants but, overall, it was related to: costs reduction; improved administrative efficiency; improved service quality (as evidenced by the results of a satisfaction survey); digitalization of service delivery; and uptake of new working methods.

**Sustainability:** The Universitat de Girona, one of the project's partners, was pivotal in extending the use of the tool to other Catalan municipalities. To meet a growing demand, a university spin-off in charge of the tool's marketing, installation and maintenance was created. On the other hand, the University of Girona and the Municipality of Terrassa continued to focus on development and innovation aspects that led to the release of a new version of the tool, iSAC 2.0.

**References:** Europe's Information Society's thematic portal [project's factsheet](#); iSAC6+ project [website](#); Keefe et al. (2013), A [Case Study Analysis](#) of Factors determining Success or Failure for Participants in Collaborative Innovation Projects in E-Government; ISA [project's overview](#); [iSAC 2.0](#) website.

#### 6. 4CNW programme - Creative Challenge Celtic Crescent North West, Ireland

Hypothesis 2	<i>Relevant effects on local and regional economic development including on EU budget, SMEs and micros</i>
Addressed criteria	<i>Increase of competitiveness; increased number and efficiency of initiatives supporting entrepreneurship</i>
Authorities	Sligo County Council and other local governments

**Implementation period:** January 2012 – December 2013

**Financing:** Total budget: EUR 329,076 out of which EUR 243,486 contributed by the EU through the Competitiveness and Innovation Framework Programme. The remaining share was contributed by the Sligo County Council.

**Target categories:** Small and micro enterprises within the life science, tourism, technology and agri-food sectors; and creative supply companies.

**Description:** The programme was a pilot aimed to demonstrate the capacity of public authorities to stimulate business innovation take-up and enterprise competitiveness through the use of creative services in business. Main components of the programme included:

organisation of information and awareness events; cataloguing of creative knowledge/service providers; brokering matching services between enterprises and creative suppliers; and set up of a talent voucher fund. Successful applicants to the voucher scheme '*received a voucher worth between €1,000 and €5,000 to help innovate their products, services, processes or business model through adoption of creative techniques and technologies supplied by creative professionals. The voucher scheme was operated on a matched funding basis*'. The rationale of the pilot laid in the 2010 – 2012 Sligo County's strategy where creativity was adopted as a growth driver for economic, social and cultural development. The project is included among the examples of vouchers for innovation schemes in the Commission Staff Working Document 'SMEs Going Digital - A Blueprint for ICT Innovation Vouchers' (SWD(2013) 408).

***Implementation procedures:*** Funded through the European Creative Industries Alliance, the programme was implemented in the North West Ireland, Northern Ireland and Scotland and operated as a public-private-partnership (the Creative State North West) led by the Sligo County Council. Experts' panels were involved to review applications and assess voucher awards, with panels' members coming from the local, regional, national and transnational level.

***Evaluation:*** Results exceeded set targets and included: (i) Engagement of 340 creative enterprises and 170 industry companies by means of awareness raising sessions and 'discovery' events; and of more than 500 businesses through transnational events. (ii) Marketing and promotion: development of a dedicated web-platform, delivery of 20 electronic promotional drivers; social networking (LinkedIn, Twitter, Facebook, YouTube); media coverage. (iii) Talent Vouchers: allocation of EUR 200,000 to a voucher fund; 146 applications received; vouchers awarded to 38 companies; successful completion of 20 creative challenge projects; 190 micro enterprises selected, out of 336 applications, for inclusion in an interactive creative directory associated to a mobile app. Overall, the project was assessed as a good support measure by the business community and the voucher system was considered as a good incentive for businesses to include creative aspects and new way of thinking in their activities. New markets and opportunities were created. Further, the evaluation recommended continuing and strengthening the use of technologies in future programmes.

***Sustainability:*** The programme provided the evidence of a latent demand from businesses to access creative services and of a '*large untapped potential of creative competencies which will require programmes like 4CNW to steer the economy towards the use of this knowledge*'. On the basis of this evidence and of the success achieved by the pilot, the evaluation concluded that '*there is strong merit in continuation and expansion of 4CNW actions*'. The development of a successor programme with a national scope is under consideration.

**References:** [4CNW webpage](#) within the website of the European Creative Industries Alliance, from where both the [Final Project Report](#) and the [Evaluation Report](#) are accessible; the Creative State North West [project fact-sheet](#).

## 7. DLA - Common methodology for the implementation of Digital Local Agenda and its impact on regional digital policies

Hypothesis 3	<i>Relevant effects on access, administrative and transaction costs, and efficiency at the local and regional level</i>
Addressed criteria	<i>Increase of the quality and/or speed of public services; reducing the costs of public or private services</i>
Authorities	Project partners are from nine MS, including: one national authority (EE), two regional authorities (PT, IE), two associations of municipalities (ES, LV), three development and innovation agencies (IT, HU, DE), and three universities (EE, EL)

Implementation period: January 2010 – March 2013

Financing: Total budget: EUR 1,491,457 out of which ERDF contribution is EUR 1,202,671.

Target categories: Public authorities, citizens, businesses.

Description: The overarching objective of this Interreg IVC Project was ‘to improve regional policies in the fields of DLA for developing new actions related to the application of the IS to public services’. More specifically, this ‘Regional Initiative’ aimed at developing a common (i.e. transferable to every region) strategy for the development of the Information Society, able to take into account local socio-economic, cultural and institutional factors. This ‘digital local agenda’ (DLA) was developed through the involvement of all relevant actors, from public authorities to citizens and businesses, and was meant to focus on the application of ICT to the services delivered by the public administrations. The starting point of the development of the common DLA was the identification, dissemination and transfer of good practices among participating regions. The following practices were identified: (i) Online Municipal Services in Porto (PT), a platform based on a citizen-centric view and displaying information according to the needs and profiles of the users; (ii) CityWiki Karlsruhe (DE), an online regional information portal for citizens, tourists and businesses, contributed by the users with posts, articles and knowledge in general; (iii) Gesundheitsnetz Ostalbkreis – a health web offering health-related information for citizens in the province of Ostwürttemberg (DE); and (iv) the Web Portal of the municipality of Patras (EL), considered as a project’s testimonial, and providing an advanced electronic government system, citizen-centred and developed in line with the national ‘E-Government Interoperability Framework’.

Implementation procedures: The project was coordinated by the North Regional Development and Coordination Commission of Porto and operated through a partnership agreement.

Evaluation: The project developed a tool for the definition of the Digital Local Agenda. As at the end of 2013, project’s indicators on outputs and results were: number of regional / local policies and instruments addressed: 9; number of good practices identified: 7; number of regional/local policies and instruments improved or developed: 1; number of good practices successfully transferred: 1; number of staff members with increased capacity (awareness/knowledge/skills): 25. Evaluated in terms of benefits and results for the citizens, the Web Portal of the municipality of Patras was found to contribute positively to eParticipation (‘improving the quality of information; integration and interoperability; linking existing legacy systems’) and eInclusion (‘enabling local civil society groups to participate actively in decision processes’), as well as to the provision of advanced

municipal and local services (*‘ensuring that all citizens can interact with public authorities through a single access point; using models of seamless services delivery that are citizen-centred’*).

*Sustainability*: The above practices are on-going. Long-term sustainability is facilitated by the citizens’ participation to the practices, including in terms of their feedback which is built into the operationalization of the systems.

**References**: Interreg IVC Analysis Report on [E-government services](#) (2014); Interreg IVC [project fact-sheet](#).

## 8. WI-PIE programme in Piedmont Region, Italy

Hypotheses 1 & 2	<i>Relevant effects on local and regional social and economic development, including on EU budget, SMEs and micros</i>
Addressed criteria	<i>Increase of the number of high-speed internet users in a city or region; increase of the quality and/or speed of public services; increase of competitiveness</i>
Authorities	Piedmont Region, CSI-Piemonte (a public IT services provider for all public services in the region), IRES and the CSP (two publicly funded regional research institutes in economy and ICT)

*Implementation period*: 2005 – 2008

*Financing*: The programme’s total budget is about EUR 100 million out of which 64% has been spent on infrastructure. It was funded from the ERDF, public (national and regional), and private financing.

*Target categories*: Public authorities, citizens, businesses.

*Description*: The objectives of the programme were structured around seven strategic lines: (i) establishment of an ICT Observatory to systematically evaluate the results and impact; (ii) construction of the programme’s backbone (2005 – 2006) through the facilitation of access to the existing infrastructure; (iii) development of a broadband infrastructure to be made available to market operators on a competitive basis and according to the principles of technological neutrality and open access; (iv) provision of satellite and WiMAX connections to remote (in particular, mountainous) areas; (v) connection of the system to other national and European networks; (vi) promotion of research and of other initiatives related to the academic and education sectors; and (vii) development of broadband services.

*Implementation procedures*: CSI-Piemonte was in charge of the technical and administrative co-ordination of the programme. Mainstreaming in the wider ICT strategy of the region was assured by the support of the regional government as well as by the involvement of local governments and other local stakeholders, both public and private, in implementation.

*Evaluation*: The programme built on almost a decade (since 1997) of investment by the regional administration towards the region-wide development of the knowledge society and the use of ICT in public services. In addition, other relevant initiatives were implemented concurrently to the programme (such as the 2004 – 2006 regional initiative RIAP, ‘From Industrial Districts to Digital Districts’) and they certainly contributed to the overall impact of WI-PIE. Broadband coverage of the population in the region increased from 80% in 2004 to 90.2% in 2007 and from 31% to 63.3% of the municipalities over the same period.

In March 2008, the DSL infrastructure covered 77% of the municipalities. The Observatory developed a comprehensive matrix of (mostly composite) indicators to measure the socio-economic benefits of WI-PIE. Overall, the regional economic characteristics were improved by 6% to 13% between 2005 and 2006. In particular, over the same period: the indicator related to the development of innovative applications improved by 10%; the international positioning of the region, measured by means of ICT-related exports, improved by 10.4%; the competitiveness of the local industry increased by 9.6%, with more than half of the companies perceiving cost reduction and efficiency increase as a consequence of ICT usage; and the reduction in the digital divide improved by 6.8%. The success of the programme is considered to be related to its strategic and integrated approach, including the focus on both supply and demand aspects. However, the lack of a ‘broadband readiness factor’ within businesses was noted, limiting their capacity to see the opportunities brought in by the availability of broadband applications and/or their willingness to re-organise business processes or models.

*Sustainability:* [The Observatory](#) is still a focal source of evidence in support of the development of ICT-related regional policies. According to the [indicators](#) reported on its website, ICT usage has continued to improve since the completion of WI-PIE. Namely, over the period 2006 – 2010, increases related to: citizens using the internet (+21.9%); citizens purchasing online (+18.5%); citizens visiting public administrations’ websites (+16%); businesses purchasing online (+21.5%); businesses using eGovernment services (+4.7%); and municipalities offering at least one online service (+55.4%).

**References:** MICUS Management Consulting GmbH (2008), [The impact of broadband on growth and innovation](#), a study on behalf of the European Commission, DG Information Society and Media

## 9. Libraries for Innovation Project, Lithuania

Hypothesis 1	<i>Relevant effects on local and regional social development</i>
Addressed criteria	<i>Increase of the number of high-speed internet users in a city or region; increase of the ICT competence of citizens; increase of the ICT competence of civil servants; changes of consumer behaviour</i>
Authorities	Municipalities are among the partners involved in implementation as most of the libraries are publicly-owned

*Implementation period:* 2008 – 2012

*Financing:* The total project budget is about Litass 112 million (EUR 1 = Litass 3.452), contributed by the Bill and Melinda Gates Foundation and Microsoft Corporation (private funding reached jointly some 80% of the total budget), national and regional funds, and in-kind contribution from the libraries.

*Target categories:* Public libraries’ civil servants; citizens.

*Description:* Considered as the largest computer literacy development project in the country, it aimed at strengthening the capacities of public libraries to allow a better use of information technologies by the Lithuanian population. The project made internet access available in a substantial number of public libraries, strengthening and updating the service where it already existed. In addition, it enhanced the ICT competence of the libraries’ staff and encouraged their proactive behaviour in facilitating the use of ICT among communities. The citizens, the elderly in particular, were also encouraged to take advantage of the

opportunities provided by internet access and usage. The project is one of the cases whose successful impact is discussed in the 2013 EU Parliament Study on ‘Internet, digital agenda and economic development of regions’.

*Implementation procedures:* The project was the result of an agreement between the Ministry of Culture of the Republic of Lithuania, the National Library of Lithuania, and the Bill & Melinda Gates Foundation. It was coordinated by the Lithuanian National Library.

*Evaluation:* Results include: provision (installation or updating) of free public access computers and internet services in 90% of the libraries (some 1.276 urban and rural public libraries); provision of updated software, also including special applications for fragile social groups (blind or weak-eyed); over 2.000 trained librarians; training of users; e-skills training of 41.000 citizens; provision of new services and implementation of awareness campaigns. In terms of social impact, the project contributed to reduce the geographical divide within the country (with 97% of rural libraries becoming connected to the internet). Digital inclusion was explicitly targeted and ‘in 2011 72% of the digital assistance organised under the initiative was provided for residents of rural areas, 54% for the retired, 49% for the unemployed and 20% for people with disabilities’. In addition, increased digital literacy improved the take-up of online public services: ‘according to the Lithuanian National Statistical Institute, between 2008 and 2012 the share of Lithuanians who used public e-services for filling-in and sending completed official forms increased by 14%’.

*Sustainability:* The project has solved the problem of internet access across the country, in urban as well as in rural areas, for all those people not having at home a computer or a broadband connection. A core network of specialists providing digital support has been created and is maintained. Public libraries keep on contributing to reduce social exclusion and promoting the usage of internet opportunities and eServices.

**References:** Projekto Bibliotekos pažangai [webpage](#); EU Parliament Study on ‘[Internet, digital agenda and economic development of regions](#)’ (2013).

## 10. IMMODI – Implementing Digital Mountain

Hypotheses 2 & 3	<i>Relevant effects on local and regional economic development, including on EU budget, SMEs and micros &amp; Relevant effects on access, administrative and transaction costs, and efficiency at the local and regional level</i>
Addressed criteria	<i>Increase of employment; increased number and efficiency of initiatives supporting entrepreneurship; increase of the quality and/or speed of public services; reducing the costs of public or private services</i>
Authorities	Project partners are from seven MS, including the following institutional actors: Region of Basilicata (IT), Regional Council of Auvergne (FR), Region of Thessaly (EL), Region of Peloponnese (EL), Granada County Council (ES), and Badajoz Provincial Council (ES)

*Implementation period:* January 2010 – March 2012

*Financing:* Total budget: EUR 1,764,298 out of which ERDF contribution is EUR 1,337,510.

*Target categories:* Public authorities, citizens, businesses.

*Description:* This Interreg IVC project aimed at mainstreaming eGovernment and eHealth

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good practices into the Operational Programmes of the partner regions, with a focus on the delivery of services in mountain and rural areas. Examples of innovative approaches developed within the project include: Augment (eInclusion and eParticipation of disabled people in the region of Blekinge, SE); Valma (eParticipation of citizens in political decision-making in the region of Kainuu, FI); Cybercantal telecentre (entrepreneurship boosting in the Auvergne region (FR) through the set-up of a telecentre offering office space/equipment or service facilities to teleworkers); Point Visio Public (bringing public services closer to citizens in the region of Auvergne (FR) by means of a virtual reception counter allowing the communication and exchange of documents with public servants); Check-up care (home health care within regional health service systems in the region of Blekinge, SE); Nurse Gudrun (increasing accessibility to care services and providing effective community services in the region of Blekinge, SE); and Rayuela platform (providing a home-school collaboration interface and eAdministration services for staff members, parents and students in the region of Extremadura, ES).

*Implementation procedures:* As a ‘capitalization’ project, the approaches were consolidated within the partners’ regions following the preparation of action plans that included the methodological, technical, and financial modalities for the implementation of the practices. The seven action plans were signed by the managing authority of each region in 2011.

*Evaluation:* As at the end of 2013, project’s indicators on outputs and results were: number of regional/local policies and instruments addressed: 7; number of good practices identified: 13; number of regional/local policies and instruments improved or developed: 5; number of good practices successfully transferred: 7; number of staff members with increased capacity (awareness/knowledge/skills): 30. Notwithstanding these results, it was found that the transfer and adoption of the good practices across partners’ regions was constrained by the existence of different legislation, contexts, and public service provision systems across territories. Problems were also faced in involving and committing in each region and since the very early stages of the project, relevant management authorities.

*Sustainability:* Most of the above reported practices are still on-going and accessible on the web.

**References:** Interreg IVC Analysis Report on [E-government services](#) (2014); Interreg IVC [project fact-sheet](#).

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