

Vienna Study on Inclusive Innovation for Growth and Cohesion: Modelling and demonstrating the impact of eInclusion

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●●● Executive Report



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The main report of the study can be downloaded at
http://ec.europa.eu/information_society/activities/einclusion/library/studies/eco_impact/index_en.htm

The opinions expressed in this document are those of the authors
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PREMISE

Vienna Study on the impact of eInclusion...

This is the Executive Report of the monograph “Inclusive Innovation for Growth and Cohesion: modelling and demonstrating the impact of eInclusion” also known as “Vienna Study”, as it was launched by Unit ICT for Inclusion of DG Information Society and Media with the aim of providing input to the Ministerial Debate on eInclusion that took place in occasion of the Ministerial Conference on eInclusion held in Vienna (30 November- 2 December 2008).

... whose breadth and depth makes it a ground breaking contribution to the field ...

The Vienna Study, primarily focussed on the social and economic impact of eInclusion, also analysed the root causes behind processes of digital inclusion or exclusion and derived from it important implications for policy. In order to do so: a) some 300 hundreds theoretical and empirical sources have been reviewed; b) 1000 cases of eInclusion support initiatives were screened and 125 of them analysed in depth; c) a wide ranging review of the economic literature on the impact of ICT was conducted; d) an econometric model to assess the impact of possessing or lacking digital skills on employability and wage differentials was designed and run. In addition to this, the Vienna Study also leveraged and analysed the empirical evidence from another project funded by DG Information Society and Media on ICT potential for the economic and social inclusion of immigrants and ethnic minorities (realised by the Joint Research Centre of the European Commission Institute of Prospective Technological Studies, IPTS)³. The sheer breadth and depth of the theoretical and empirical evidence gathered and analysed in this study is unique and makes it a ground breaking contribution to the field.

...and responds to the i2010 call to show evidence of impacts

The Commission **i2010**⁴ policy framework, by calling for an inclusive Information Society and by stressing the importance of demonstrating tangible impacts, has set in motion an important process in the domain of eInclusion. A landmark in this process was the 2006 **Riga Declaration**⁵ where the European governments committed themselves to clear, bold, and measurable targets. The 2007 Communication **on eInclusion**⁶ stressed the potential tangible and quantifiable benefits estimated in its supporting **Impact Assessment**⁷. The Vienna Study, firmly rooted in these policy antecedents, represents an important progress toward evidence based eInclusion policy making and impact measurement.

The ‘open volley’, but much remains to be done

It provides robust evidence on some of the areas of eInclusion impacts, proposes a practical checklist of measurement indicators for practitioners, and in general makes a strong case in highlighting the potential tangible benefits of eInclusion. Yet, it also shows that currently limited awareness about the need of demonstrating tangible benefits and measurement capacities characterise the practice of eInclusion support initiatives. Much, thus, remains, to be done to produce the systematic and robust evidence of impacts needed to convince policy makers and all stakeholders that eInclusion is worth it.

3 The preliminary overview of the study on ICT for immigrant and ethnic minorities (Codagnone, ed. 2008) can be downloaded at: ftp://ftp.jrc.es/pub/users/kluzeit/Codagnone_ed_2008.pdf.

4 Available online at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2005:0229:FIN:EN:PDF>.

5 Ministerial Declaration, Approved unanimously on 11 June 2006, Riga, Latvia, available online at: http://ec.europa.eu/information_society/activities/einclusion/docs/brochures/riga_dec.pdf.

6 Available online at: http://ec.europa.eu/information_society/activities/einclusion/docs/i2010_initiative/comm_native_com_2007_0694_f_en_acte.pdf.

7 Available online at: http://ec.europa.eu/information_society/activities/einclusion/docs/i2010_initiative/comm_native_com_2007_0694_1_en_divers1.pdf.

**A high level
synthesis of full
evidence
provided in the
Main Report**

This Executive Report, meant for wide dissemination and effective communication of the key messages to policy makers and stakeholders, synthetically and selectively re-elaborates the vast amount of evidence and analyses of the Vienna Study, which are presented in detail its **Main Report**⁸. All the sources used are cited and referenced throughout the Main Report, where the interested reader can find full illustration of methodological technicalities and dataset used, especially for what concern the econometric application. Additionally a Compendium⁹ to the Main Report contains details on the 125 cases of eInclusion initiatives analysed, some of which are briefly illustrated in § 6 of this document.

In the rest of this Executive Report the key relevant contents and findings of the Study are presented, without entering into technicalities and indication of the sources. All the bibliographic references used are annexed to this document, but not referenced in the text except in a few cases.

⁸ The Main report of the Vienna Study (Codagnone et al 2009) can be downloaded at:

http://ec.europa.eu/information_society/activities/einclusion/library/studies/docs/eco_report.doc

⁹ Also downloadable at: http://ec.europa.eu/information_society/activities/einclusion/library/studies/docs/eco_compendium.pdf

1. INTRODUCTION

Inclusion is the only way to broad based and durable growth and prosperity

When in the Spring of 2000 EU leaders proclaimed in Lisbon the goal of turning the ‘Old Continent’ into a competitive knowledge economy preserving social cohesion, many observers on both shores of the Atlantic sceptically looked at it as the unrealistic and rhetoric attempt to preserve an old European compromise ‘between growth and the preservation of the so called ‘social model’. Almost a decade later the context has changed and the idea that ‘broad based growth’ is the only way to real and solid prosperity is now much more widely accepted. The expression ‘broad-based growth’ resonates in many of the writings and speeches of new US President Barack Obama, where it is often associated also to the need of increasing digital inclusion in society. Including more individuals is no longer exclusively seen as a moral imperative, a remedial policy, or a matter of showing the ‘charitable face’ of market economies, rather it is pragmatically recognised as being an economic opportunity tightly connected to sustainable and durable economic growth¹⁰. These views are at the core of the *Renewed Social Agenda*, a Communication the Commission released already in July of 2008 well before the full dimension and dire consequences of the ensuing financial, economic and social crisis were fully acknowledge internationally, which stresses the needs for social innovation as one of the strategic avenues out of the current crisis by increasing opportunities, access and solidarity (European Commission 2008a)¹¹.

The I² paradigm: Inclusive technological Innovation and Innovative Inclusive policies...

...cutting spending on Inclusive technology due to current budget pressures would be a strategic mistake

There are probably few fields where Inclusion and Innovation are so entwined and can in principle virtuously feed each other as that of inclusive services supported by ICT. Technology driven innovation in service provision has an impact on economy and society and finds market sustainability only inasmuch as the adoption and appropriation of such services in everyday life activities are wide and expanding among citizens and across all value chains. The market potential of Independent Living applications for older people, for instance, is huge and their implementation can considerably reduce current spending for long term care and improve the lives of the elderly and their relatives by keeping them in their home (see **Figure 14** , p. 26). Yet this potential will not be unlocked until innovative policies and regulatory solutions, as well as investments by industry, expand their adoption. The promises of eGovernment have not fully materialised because use remains limited and, thus, efficiency gains for administrations are marginal while the social groups most in need of government services are cut out. eInclusion means both inclusive ICT and the use of ICT to achieve broader social inclusion objectives and, thus, it is about both inclusive technological innovation and innovative ways to deliver inclusive policies by using ICT. Under conditions of financial turmoil and socio-economic crisis governments are going to face increasing budget constraints and they may lean toward cutting their budget for ICT investments. This would be a strategic mistake for investing in Inclusive ICT could contribute to ease those same financial pressures currently putting public budget at strains.

Digital exclusion is the quintessential form of social exclusion today

It is the contention of this study that digital exclusion/inclusion is the quintessential form of social exclusion/inclusion today¹². As our everyday work lives are increasingly entangled in activities and relations enabled by ICT, being digitally excluded is a new source of inequalities as it can result into exclusion from relevant networks and social relations, jobs and leisure opportunities, and from informed participation to the public debate.

¹⁰ Obama’s vision rests on a new research and policy agenda that has emerged in US academic and policy circles since at least 2005. For recent economic arguments in favour of broad based growth coming from US academia and think tank see for instance Sperling (2005) and the Brooking Institution ‘Hamilton Project’ where ‘broad-based growth’ is considered as the key pillar for the future of American society and one of the lines of research in the project (see for instance Altman et al, 2006.)

¹¹ Available online at: <http://ec.europa.eu/social/BlobServlet?docId=453&langId=en>.

¹² For the theoretical foundations of this claim see for instance the concepts of ‘informationalism’ or ‘informational capitalism’ and of ‘networked individualism’ ad discussed in Castels (1996).

Digital means are shaped by and shape individuals' "functionings" and can help achieve important outcomes

The inclusion or exclusion of individuals and groups within society is shaped by their relative 'functionings', namely their relative capability to function and achieve desirable outcomes such as for instance finding a job¹³. These relative "functionings", depending on individuals' possession of resources and on their social relations, at the same time shape and are shaped by the digital means possessed by them. If one is in a condition of poor functionings this will reduce digital means, which in turn will result in missed opportunities compared to others. Natalia, a recent immigrant to Germany, recounted how when first interviewing for a job she was asked for an e-mail address and was given a web address where to fill an online application form, which hampered her search until she acquired these digital means thanks to a local level initiative providing digital skills finalised to finding a job¹⁴. During the Ministerial Debate on eInclusion in Vienna it was stressed how a large majority of jobs today requires an online application and by default exclude those lacking digital means, as well as the disabled due to lack of eAccessibility. It is, thus, evident how eInclusion support initiatives can help achieve important benefits for individuals, which can add up to societal outcomes.

eInclusion not yet a priority in many countries

Today, also as a result of the catalyst role played by the European Commission, the importance of digital inclusion support initiatives is widely acknowledged. Yet, the development of eInclusion policies in Europe is uneven and not yet a clear priority in many countries, while existing initiatives are still fragmented and in need of better coordination.

Showing the benefits could help raise awareness and secure funding...

The unprecedented opportunities offered by new technologies require co-ordination and partnership to ensure that potential benefits are enhanced and shared by all citizens. These opportunities are not yet fully understood by many stakeholders. One way of tackling this challenge is by highlighting the economic and non-economic benefits of digital inclusion, since this should act as a catalyst for eInclusion awareness and action amongst those in either the public or private sector not yet aware or convinced of the importance of eInclusion policies and related support initiatives. Sceptics might be persuaded to place greater emphasis on eInclusion if they believe economic as well as social and equity benefits will arise from increasing the pool of digitally active citizens.

...but currently measurement is little pursued in eInclusion

In the course of this study 1000 cases of eInclusion initiatives were screened but despite the sheer size of this sample only a few were found that reported reliable and good quality information on their tangible economic benefits. So the first and very important empirical finding is that measurement awareness and activities among practitioners in the field of eInclusion initiatives are very modest and need to be further developed.

In the following six sections the main findings of the Vienna Study are presented

In § 2, as a background to the proposed measurement model and tool, the nature of digital inclusion/exclusion processes and its implications for policy are briefly discussed. § 3 define the object of measurement in the domain of eInclusion, discusses methods and data issues and highlights current limitations. § 4 presents the general theory informed measurement model (henceforth simply General Model). In § 5 evidence on the relation between digital skills and labour market outcomes from the economic literature reviewed and from the *ad hoc* econometric application run by the Study is reported. In § 6 the proposed practical oriented measurement framework and indicators are presented, together with illustrative evidence from cases. Finally the main conclusions and some recommendations are contained in § 7.

13 See Sen (1999, 2000).

14 In depth interview reported in Codagnone, ed. (2008).

**Terminological
note on outputs,
outcomes, and
impacts**

Before proceeding any further, a brief note on the terminology used for what concern the key concepts in measurement and evaluation of policies and public service provision is needed. **Inputs** are the support initiatives with their costs. By **Outputs** it is meant the final product of such initiatives, whose production is mostly within the control of those implementing them. **Outcomes** are the direct and intermediate changes produced for specific constituencies as a result of the initiatives, whose occurrence depends also on some intervening variables¹⁵. The term **Impacts** is used to indicate broader and longer term changes for economy and society as a whole, to which policy initiatives contribute together with several other intervening variables¹⁶. To make this more concrete in the educational field, for instance: the input is the overall budget for the educational system; the output could be “number of students taught”; a possible outcome “educational attainment level reached”; and the impacts an “educated labour force” and “increased system productivity and competitiveness”. When discussing the issue at hand in a general and generic way, however, the simple term ‘impact’ will be used.

**eInclusion,
digital inclusion,
digital
inequalities**

It is also important to clarify that the term “**eInclusion**” refers to policies and supporting initiatives and measures. On the contrary the expression “Digital Inclusion” is used when discussing and describing the existing situation and the various socio-economic causes and processes shaping whether individuals or social groups have access to, or make use of, ICT. In this context, alongside digital inclusion, its opposite “digital exclusion” is also used, as well as the expression “digital inequalities”

¹⁵ For the sake of brevity we use the term outcomes to refer to both direct and intermediate ones, although they could be distinguished according to their distance from the output in terms of the number of possible intervening variables

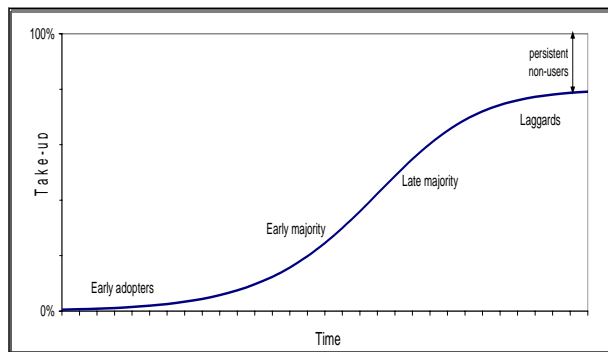
¹⁶ In this sense they are synonymous with the expression ‘end outcomes’.

2. BEYOND ACCESS AND IMPLICATIONS FOR POLICIES

What matters for achieving impact is appropriation of, and not just access to, ICT

The concept of the digital divide and the underlying view of digital inclusion simply as a matter of access are outdated and inadequate to grasp processes of inclusion / exclusion and to design appropriate policies and initiatives. Outcomes and impacts are the result of appropriation, that is *the process by which individuals strongly and permanently incorporate ICT in their daily practices of working, dealing with government, learning, staying in contact with friends, entertaining themselves, buying goods and services, getting information and joining in the public sphere, etc*

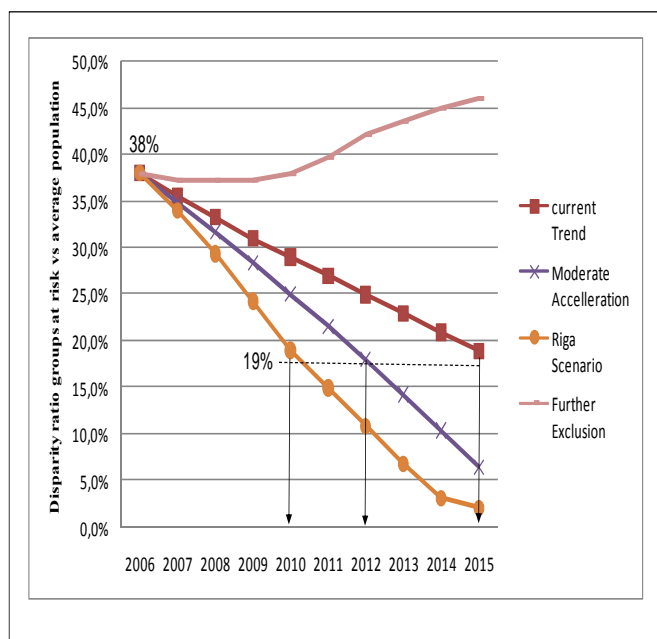
Figure 1 S-Shaped innovation diffusion curve



Access has increased but real digital inclusion is not occurring as fast as optimistic views expected

Progress toward the policy targets agreed in Riga Ministerial Declaration has been slow¹⁷ and there are no signs corroborating the optimistic S-Shaped view that, as the functioning of market mechanisms increases access, the laggards will catch up.

Figure 2 Riga targets: alternative paths



If the current trend continues the Riga target may be met only in 2015...

... actually the pace of technological developments might also lead to further exclusion

What we see in reality is that if the current trends persist the Riga target of halving disparities in Internet use will be met only in 2015, and possibly exclusionary processes may increase as a result of the pace of change in technologies. Access is a necessary but insufficient condition to ensure digital inclusion the desirable individual benefits and societal outcomes that can derive from it. These strictly depend on use and appropriation of ICT. Lack of appropriation and purposeful use of ICT is at the core of digital inequalities¹⁸.

¹⁷ See the Riga Ministerial Declaration (http://ec.europa.eu/information_society/activities/einclusion/docs/brochures/riga_dec.pdf) and 2007 Riga Dashboard European Commission report providing evidence on the progress toward the targets set in Riga and to be reached by 2010 (http://ec.europa.eu/information_society/activities/einclusion/docs/i2010_initiative/rigadashboard.pdf).

¹⁸ See for instance Bonfadelli (2002), Di Maggio et al (2004), DiMaggio and Hargittai (2004), Kaplan (2005), Liff and Shepherd (2004), Loader and Keeble (2004), Norris (2001), van Dijk (2005).

Box 1 New Digital Media as ‘Cultural Goods’¹⁹

As access to ICT increase so does the likelihood of social differentiation in how effectively they are used

The view that market mechanisms, by increasing access, will solve the problem is wrongly based on the analogy with, for instance, television. Yet ICT and the new digital media capabilities associated to them are radically different from mass media. They are appropriated in a much more diverse and multi-contextual manner. They can be conducive to inclusion if individuals are capable of using and appropriate them to improve their functioning in society and participation to social relation. If this does not happen, then a further mechanism of social exclusion occurs. In this respect they may replicate the processes of differentiation leading to the inequalities characterising fruition of ‘cultural goods’ and information. The past teaches us that as access to education, culture and information increased, social differentiation emerged in the use that different social groups could make of these ‘cultural goods’. The relatively privileged are capable of using such goods and digital media more effectively and are more likely to extract from them desirable benefits. New digital media require both operational skills (switching on PC and using basic software and browser, namely basic digital literacy) and the strategic possibilities with the aim of improving one’s position in terms of desirable benefits and outcomes. Evidently as we move from the operational to the strategic competence social inequalities are likely to become relevant.

Box 2 Evidence from field work²⁰

Effective initiatives tie ICT to purposeful activities...
... measures to merely help individuals use ICT fail in situations of dire social disadvantages

Statistics show that immigrants in some key European countries have the same or even higher level of access to ICT than the host society population. Yet, in-depth explanatory field work has highlighted how barriers and source of inequalities emerge when considering the process of ICT appropriation and its social context, where multi-faceted social exclusion factors are at work. Against this background in-depth interviews and case studies found that generic digital literacy initiatives or Public Internet Access Points (PIAPs) do not produce meaningful results for those they are developed for, unless they are linked to purposeful and substantive interest and needs (i.e. digital literacy as way of learning the language of the host country or PIAPs providing job finalised skills are impactful). Furthermore, it has been shown that under dire conditions of social disadvantage, such as in a culturally isolated and socio-economically deprived neighbourhood, support measures to help individuals use ICT do not produce any remarkable outcome and are actually resisted.

Integrated measures are needed

“Use ICT to help” as important as “Help use ICT”

As digital inequalities concern use and appropriation patterns and the mere support to individuals to use ICT hardly achieve any result in conditions of dire social disadvantages, two implications for eInclusion policies and support measures emerge. First, support measures aimed at removing barriers and enable access are needed but will not have any major impact *per se*, unless they are part of a holistic and integrated policy together with measures linking ICT to purposeful and targeted needs and interests. It is only when use of ICT acquires a clear purpose that it will endure and lead to regular and effective usage. Providing basic digital literacy *per se* may trigger initial use but may as well end up in dis-adoption if the purpose for using ICT is unclear. Moreover, using digital literacy, for instance, as a way of teaching a language or providing job finalised skills, not only favour the incorporation of ICT into substantive activities and ensure regular usage, but it also directly tackle social inclusion issues. Second, policies should also aim at those individuals who, given their condition of deprivation, will probably never become users of ICT but should at least benefit indirectly from them. In other words initiative should not simply strive to “**Help individuals us ICT**” but should also move more swiftly and consistently to “**Use ICT to help them**” by way of multi-channel delivery, eEnabled front-liners and social workers, and of integration of intervention across different policy domains (for eInclusion and neighbourhood regeneration policies). This can ultimately lay the foundation for social inclusion and new forms of ICT enabled entrepreneurship.

¹⁹ See Di Maggio (2001) and Di Maggio et al (2004).

²⁰ The findings summarised in the box are from the mentioned IPTS study on ICT and immigrants and are reported in full in Codagnone, ed. (2008).

Box 3 Empirically informed typology of eInclusion support initiatives

As a result of the 1000 digital initiative cases screened the following typology of support measures is proposed. The bullet points are only exemplificative and not exhaustive of the possible outputs of the three types of measure:

1. Enabling Measures, for instance:

- Tax relief schemes to purchase a PC and/or subscribe for connectivity;
- Provision of Public Internet Access Points (PIAPs);
- Basic digital literacy training;
- eAccessibility and “design for all” measures;
- Broadband coverage per se;

2. Inclusive public service measures, for instance:

- ICT supported measures to increase access to welfare entitlements;
- ICT supported measures for access to Health;
- ICT for independent living;
- Multi-channel delivery and eIntermediation across all policy relevant domains;

3. Skills and opportunities measures, for instance:

- Purposeful digital literacy and training (i.e. digital skills finalised to game-oriented learning for marginalised youth or to acquire job skills);
- Job seeking and matching measures (i.e. online jobs marketplaces with off and online CVs building tools and assistance);

4. Community/territorial measures, for instance:

- ICT supported community building;
- Broadband supported regional growth strategies.

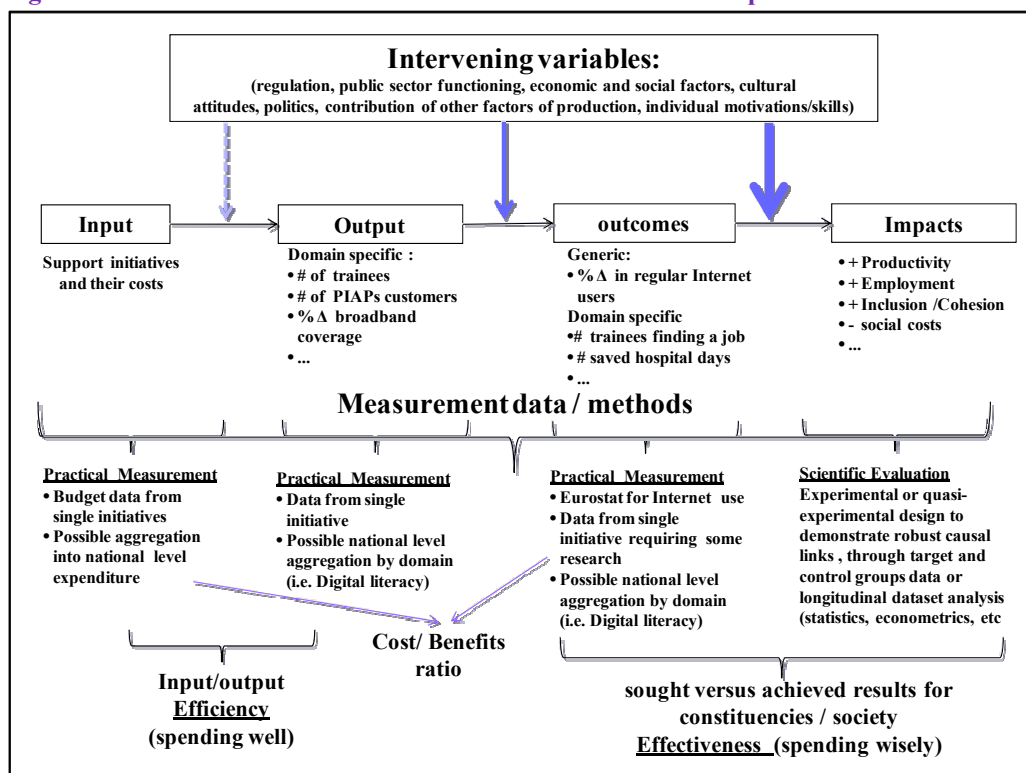
Four types of eInclusion support initiatives were identified as a result of the screening of 1000 cases

3. WHAT TO MEASURE AND HOW

The figure below provides the conceptual framework for public sector measurement and evaluation adapted to the eInclusion domain, integrated with an exemplification of possible outputs, outcomes, impacts and with a sketchy indication of data and methodological requirements.

Figure 3 What to measure and how in the eInclusion domain: snapshot

Conceptual framework for public sector measurement and evaluation adapted to the eInclusion domain



Lack of data on costs characterises the eInclusion domain

Inputs are the various types of initiatives (see **Box 3**) and their monetary and non-monetary costs. While this is the important cost side of the equation, it has been shown how frequently in the evaluation of public programmes a full quantification of costs is lacking²¹. The eInclusion domain is no exception to this, as out of the 1000 cases screened for this study, very few reported meaningful data on costs. Data need to be gathered at the level of single initiatives and could be possibly aggregated at national level, although the fragmentation of eInclusion policies and measures across government layers and verticals (and the involvement and contribution from the third and private sectors) can make an aggregate assessment of the costs of eInclusion policies difficult.

eInclusion output data are available at the micro level of initiatives

The outputs in the various specific domains of eInclusion initiatives (see **Box 3**) may include the number of marginalised young individuals trained in digital literacy courses, the number of regular customers of PIAPs, and the number of homes with assistive and monitoring technologies for the impaired elderly, etc. These are data easy to collect at the level of single initiatives and are fairly available from the screened cases. National level aggregation, however, is lacking.

Efficiency, a secondary priority for eInclusion

With data on input and output one can measure the efficiency of the initiatives as the output/input ratio and monitor over time input efficiency (doing the same with less) and output efficiency (doing more with the same)²². While certainly important, it is the contention of this study that efficient delivery comes after effectiveness (see *infra*) in the eInclusion domain. Provided more efforts are made to account for costs, at the micro-level this is a fairly feasible indicator to build and to measure systematically.

21 See for instance Johnstone et al. (2005).

22 For general analysis of public sector efficiency see Afonso et al (2005 and 2006); Mandl et al (2008)

Survey data on Internet usage are available but need more granularities.

Somewhere in between an output or outcome is the increase in digital inclusion measured as a proxy by the percentage changes in the number of regular Internet users. National and Eurostat survey provide plenty of data aggregated at national level, although more granular break down of data by various parameters is needed. These data can mostly be used to measure the overall progress in a given country, but it would be difficult to identify the contribution of single initiatives to changes in the number of regular Internet usage. As several of the cases analysed show, individual initiative should try to gather data on their clients by following their progresses either while they are still benefiting from an initiative or afterwards through follow up questionnaire and interviews. They should also use, if available, locally based statistics on Internet usage

Effectiveness, the priority of eInclusion, is more difficult to measure.

Effectiveness is the core priority of eInclusion, defined as the capacity to achieve sought changes for the constituencies and for economy and society as a whole, in terms of individual capabilities and aggregate inclusive results. This entails moving from output to outcomes and impacts, which brings into the picture a gradually increasing number of intervening factors and makes measurement and evaluation more challenging. Attributing a result to the original inputs and outputs it is more troublesome as one should control for intervening variables.

Outcomes can be measured at the level of initiatives

At the level of single initiatives, however, outcomes can be measured, as shown with two examples. The Irish initiative Fast Track to IT (FIT)²³, providing IT training and job matching services for marginalised youth, has kept track between 1999 and 2008 of both the numbers of trained individuals and of those who found a job requiring the skills provided by the courses (respectively 6500 and 3500). UK Online Centres, a multi-purpose and networked eInclusion initiative to socially disadvantaged individuals²⁴, have documented the outcomes in various domain (jobs, educational achievements, etc) its users obtained by longitudinally following them through survey and interviews²⁵. With this sort of data no generalisation would be possible but a practical oriented cost/benefit ratio for the single initiatives could certainly be calculated. In practice, though, very few eInclusion initiatives among those screened self-reported anything close to an outcomes and many improperly presented as outcome or even impact what in practice were either output or declared target rather than achieved outcomes. This fact, although not functional to the objective of the study, it represents an important empirical finding: the eInclusion domain is characterised by little measurement awareness and capacities.

... yet, with noticeable exceptions in the UK and Ireland, few initiatives provide evidence of outcomes

Distinction between scientific and practical oriented approaches

As the distance between the eInclusion initiatives and the object of measurement increase, so does the number of intervening factors, which is especially the case when the focus is on intermediate outcomes and impacts. This explains the distinction between practical measurement and scientific evaluation contained in **Figure 3**. Associating the input/output to impacts require control for intervening variables, which is possible only using scientific approaches establishing robust causal relation through experimental (when one can compare the effect on a “treated group” and on a “non treated control group”) or quasi-experimental (longitudinal analysis of a dataset of observations) design and data. These approaches must be distinguished by the practical oriented measurement that can be performed by practitioners at the level of single initiatives up to direct outcomes

Causal links between digital inclusion and several impacts can be derived from theory,

With respect to the dimensions of digital inclusion and their relations with several outcomes and impacts a fair amount of theoretical support is available in the scientific literature, especially in economics. Yet, with the exception of the relation between digital skills and labour market outcomes, there is still a dearth of proven empirical evidence due to lack of data. For quite some time economists studying ICT have mostly focussed on macro-economic models and data where variables reflecting digital inclusion end up in the traditional black box²⁶. Micro-economic model using

23 See <http://www.fit.ie>

24 See <http://www.ukonlinecentres.com/consumer/> .

25 Documented in several reports (see for instance Goodison et al 2004; UK Online Centre 2007)

26 In this case the box is that of Total Factor Productivity. Moreover, it has been shown that growth accounting models and data cannot provide direct evidence of causal relationships and are hence of limited scope if one is interested in policy questions (see Codagnone et al 2009, § 8.1).

but available datasets enable to empirically test only labour market outcomes

longitudinal dataset capturing digital inclusion dimensions can test and prove robust causal relations. Such dataset, however, need to be constructed to include all of the eInclusion relevant variables. Those available mostly enable to test only the relation between digital skills and labour market outcomes: probability of being employed and wage differentials reflecting different labour productivity levels. Such datasets are available for some key Member States but are not readily comparable to be used into a single comparative econometric model, unless substantial efforts are invested into making them compatible.

Preliminary conclusions on digital inclusion and labour market outcomes

Within the Vienna Study it was not feasible to carry out the work needed to render several national longitudinal datasets comparable to enter them into a single econometric model. A longitudinal datasets with observations from 2000 until 2006 on Italian workers employment situation and digital skills was used to run an *ad hoc* econometric model and its results have been compared to similar findings from other countries to provide some general and preliminary conclusions. New national and comparative studies of this kind are needed to further strengthen this evidence.

The Bigger Picture still needed

These findings are presented in § 5, whereas the practical oriented measurement tool partially informed by the gathered case level evidence is illustrated in § 6. Apart from the needed distinction between scientific evaluation and practical oriented measurement and despite the cited data limitations preventing robust empirical test, it is important to still have the **Bigger Picture** in mind, to which we turn in next section.

4. THE BIGGER PICTURE

The one illustrated in its simplified version below (only the main outputs and outcomes are included)²⁷, is to date the most comprehensive model of broadly defined eInclusion outcomes and impacts available. While for the sake of visual clarity they are not included in the graph, the model in its full version capture all of the reciprocal interactions between inputs, outputs, outcomes, and impacts.

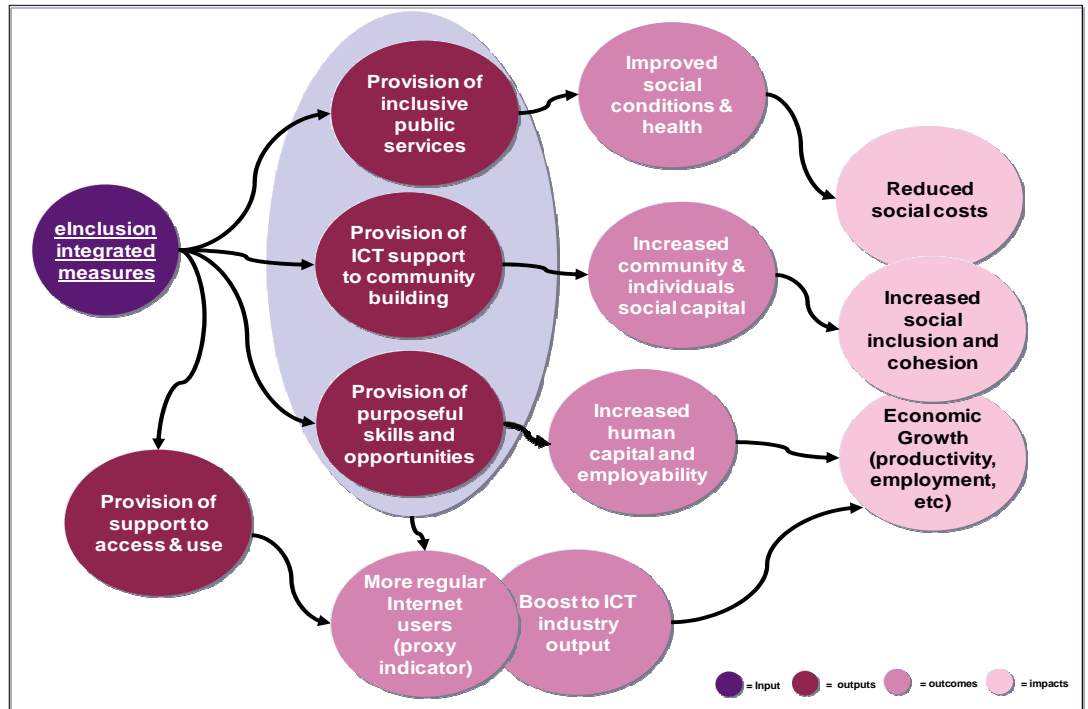


Figure 4 General Model of eInclusion Impacts Snapshot

The model can be used in several ways: set targets, define measurement activities, build business cases and policy scenarios

The model assumes that integrated eInclusion policies include “enabling” measures tackling barriers, measures linking ICT to substantive and purposeful needs and activities and to community and territorial renewal and growth strategies, all of which are delivered in a multi-channel fashion and with the support of eEnabled front-liners and care givers. Its potential contributions are many-fold. It maps all the potentialities of eInclusion and can be used to set policy targets. It provides several directions and hypotheses for the development of empirical measurement and evaluation. It can be used *ex ante* to structure business cases and construct estimates or to develop macro level scenarios using various policies modelling techniques (i.e. system dynamics) and supporting software packages.

While the labour market outcomes are discussed in next section, the boxes reported in the following pages briefly illustrate a few of the causal links in the model (including some not visible in the figure above).

²⁷ See Main Report (Codagnone et al 2009) § 3.2 (Figure 9) and § 3.3 for the in depth illustration of the theoretical and empirical underpinning of the identified causal links.

Box 4 ICT and welfare entitlements

Improved access to welfare entitlements through ICT increases the disposable income and reduce extreme poverty

Often individuals eligible for public assistance through welfare programs and services do not actually apply for them, mainly for two reasons. First, given their social condition of isolation, potential beneficiaries simply do not know about the benefits they are entitled to. Second, as a result of perceived or experienced ‘social stigma’ they refrain from applying. ICT supported measures can have an impact on both aspects. On the one hand they make information about the program more easily accessible, hence increasing the take-up rate among the eligible individuals and family. Moreover, they reduce the stigma effect, since the whole procedure becomes more anonymous. One could imagine an integrated set of measures including: eEnabled front-liners who visit people in their homes, benefit buses, and online benefits calculators, online enabled smart cards to enable socially excluded groups to receive school meals or attend leisure centres without stigma, online advice and support to the unemployed, eMentors. Increased access to such welfare provisions raise income and reduce poverty, namely they tackle one of the components of capacity deprivations and relatively improve individual’s functionings.

Box 5 ICT for ageing and health

Inclusive eHealth can reduce costs and increase quality of life & productivity

Appropriate measures supported by ICT improve health awareness and assistance positively impacting individuals’ health conditions. ICT supported healthcare can reduce healthcare costs. More importantly improved health conditions have been improved to positively influence both productivity and educational investments, thus impacting on economic growth. A particular case is that of ICT supported services at home for the impaired elderly, which reduce the cost of long term care and improve their quality of life (see later the West Lothian case, **Figure 14**).

Box 6 ICT matching functions and network effects

ICT matching effect enhance access to jobs opportunities

Recent research has shown that ICT have an important matching function in the labour market, as it lowers information asymmetry. Well known is also the literature on the importance of social networks as a way to access resources and opportunities, which lately has recognised the role ICT can play to enhance such networks. Both job matching initiatives for the socially disadvantaged and more holistic ICT supported neighbourhood renewal measures can increase the chances of getting a job.

Box 7 ICT and consumer welfare

Becoming regular Internet users increase consumer welfare and quality of life

Despite grand narrative about the free flowing of information, economists and marketing specialists know well that consumers cannot maximise their welfare due to various mechanisms (search costs, transaction costs, switching costs). If this is true in general, it is even more cogent for digital excluded individuals not benefiting from the compare options and low costs opportunities offered by the Internet. Becoming regular and effective Internet users can increase consumer welfare and improve quality of life (needed services at more affordable prices, increased leisure opportunities).

Box 8 ICT supported community building

ICT can help build social capital and reduce isolation and apathy in deprived communities

Social capital can be intended as the characteristic of a community as a whole and in this sense it measures systemic trust, social connectivity, civic spirit and participation at large. In its micro meaning it refers to ‘the ability of actors to secure benefits by virtues of membership in social networks and other social structures’. Leaving aside its instrumental measure (i.e. finding a job), social capital in both its form is conducive to social inclusion and cohesion for it provides a context opposite to isolation and apathy. The availability of community centres supported by ICT can greatly enhance social capital and reduce social isolation in deprived communities. Individuals can learn to use ICT to have access to culture, leisure and entertainment, to connect with old and new friends. This also results in acquiring skills that reverberate on all other output and outcomes, although this was not rendered graphically in **Figure 4**.

Box 9 Broadband driven regional growth strategies²⁸

**Holistic
broadband
coverage
initiatives boost
regional growth**

Measures aimed at spreading broadband coverage and reducing geographic divides can be of two kinds. First, they can consist only in bringing broadband in a given region without other connected initiatives, which reduces access barriers but does not ensure sustainable usage and other outcomes/impacts. Second, they can be part of a more comprehensive regional growth strategy with accompanying measures to stimulate demand and trigger new activities. This is, for instance, the case of Cornwall ACTNOW initiative presented later. This approach to broadband diffusion, besides better ensuring regular usage can also produce important socio-economic impacts, including growth of regional GDP.

Box 10 ICT industry output effect

**More users
mean more ICT
output and GDP
growth**

It is evident that if the number of digitally active citizens increases, so does their consumption of products and services provided by the ICT industry. This results into a market driven increase of the ICT industry, which has a well known and documented effect on GDP growth.

²⁸ Although not yet consolidated and fully robust in terms of the causal links identified, given the novelty of broadband, there are some studies especially in the US that, comparing in a cross-sectional fashion different localities have shown that broadband has a positive impact at the local level increasing employment, number of business created, on value of residential property, and eventually on local economic growth (see for instance Gillet et al 2006; Ford and Koutsky 2006). For Europe some exploratory evidence can be found in a recently published report by DG Information Society where the cited ACTNOW Cornwall initiative and the case of the Italian Piedmont Region are studied in depth and some estimates of the overall impact of broadband presented. (http://ec.europa.eu/information_society/eeurope/i2010/docs/benchmarking/broadband_impact_2008.pdf).

5. DIGITAL SKILLS AND LABOUR MARKET OUTCOMES

Focus of economic studies so far does not provide readymade evidence for eInclusion and dataset building is required...

The wide and exhaustive review of the economic literature conducted in this Study shows that there is still some way to go before most of the impact of digital inclusion impacts identified in our general model can be tested using econometric models. A large majority of economic analysis of ICT has concentrated in demonstrating its overall effects on productivity and economic growth using macro-economic models (i.e. growth accounting), whose utility from the perspective of eInclusion policies is dubious. Stated simply, such models only tell that more investments in ICT may increase productivity and spur growth without explaining how and through which more specific effects. Micro-economic approaches have challenged such model and unequivocally shown that they do not identify robust causal relations. Yet, simplifying in a short sentence a large body of literature, it can be stated that these new micro-economic approaches has mainly concentrated in challenging the impact of ICT *per se* on productivity and in showing that this impact is complementary to organisational restructuring.

...yet, from a combined labour market and productivity perspective, three effects of ICT with implications for eInclusion emerge

Basically none of these micro-economic studies has explicitly and directly tested the effects of variables reflecting digital means (or inequalities), nonetheless looking at this literature from the combined perspective of ICT relation to productivity, wage and employment, it is possible to identify three effects with implications for eInclusion policies. In the context of the ICT revolution possessing digital skills: 1) avoids human capital depreciation and increase broadly defined employability²⁹; 2) can be the sources of wage differentials reflecting different productivity levels; 3) it is a multiplier of the effect of ICT capital investment and contributes to increase firms productivity³⁰. Accordingly the econometric application of this study tested these three effects. The findings are presented below contextualised in view of the relevant literature and of existing evidence, and are followed at the end of the section with their policy implications.

Digital skills and employment.

ICT rise the demand of skilled workers and reduced that for unskilled ones affecting employability

The reviewed literature clearly shows that the adoption of ICT increases the demand for skilled workers and reduces that for unskilled workers. Wage trajectories, employment and labour supply decisions along the life-cycle tend to be affected by the level of digital skills possessed by individuals. Access and ability to use technology affects employability, by shaping the decision to enter the labour market (the labour participation decision) and of investing in training, and the likelihood of obtaining job offers. Empirical studies have focussed in particular on individuals aged between 45 and 65 as they are more likely to possess less digital skills, which eventually can lead to early exit from employment exacerbating financial pressures on the pension system.

Lack of digital skills shapes the probability of being unemployed...

The most statistically significant findings of the econometric test for the Italian labour market, controlling for age and education and following individuals across time³¹, are two: a) in the group aged 35-49 and possessing a low level of formal education workers with no digital skills have a 5% higher probability of being unemployed than those possessing digital skills; b) in the group aged 50-64 and possessing a high level of formal education workers with no digital skills have a 20% higher probability of being unemployed than those possessing digital skills (see figure below).

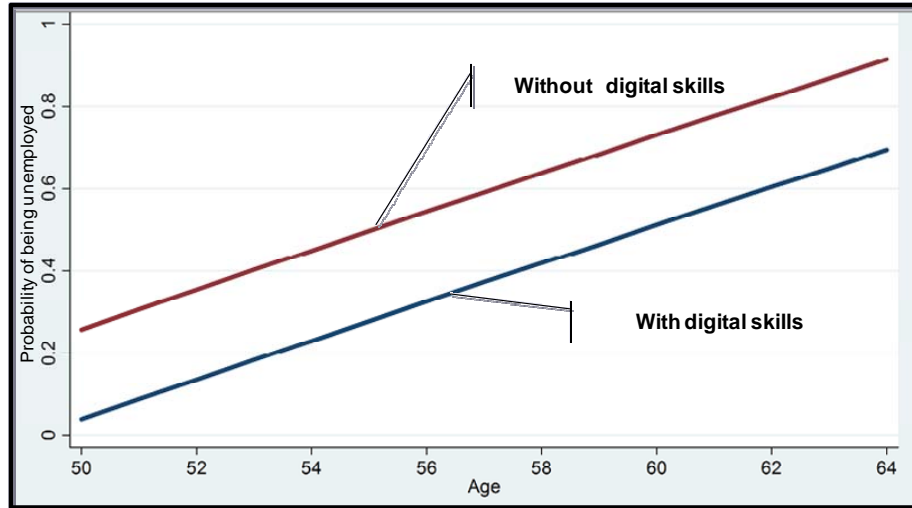
²⁹ ICT tend to increase the substitution of labour with capital, though in different ways for different groups of workers. Given capital-skills complementarity, technological revolutions tend to favour educated/skilled labour at the expenses of uneducated/unskilled labour, hence decreasing the relative demand for workers with low education and poor skills. So it is possible that workers without digital skills are more likely to lose their job. Looked from a different perspectives unemployed searching for a job have greater chances to find it if they possess digital skills (except evidently for low level tasks and/or for traditional industries little affected by the ICT revolution)

³⁰ ICT has an impact on both capital and labour productivity, which implies that workers with digital skills can leverage the ICT investments made by firms, perform their task better, and increase output per capita

³¹ The dataset used provides four different waves of data (2000, 2002, 2004, and 2006). For the illustration of the dataset see Main Report (Codagnone et al 2009), § 8.2.

Figure 5 Unemployment probability for workers aged 50-64 with high education

These findings are confirmed by other studies



The coefficients found for other countries vary in the specifics but the direction and order of magnitude confirm these findings. While technically the data provide the probability of being unemployed as a result of lacking digital skills, it is possible to read the findings from the opposite side, namely that possessing such skills increase employability. Evidently ICT pervasiveness in the work place reduce the employability of less skilled workers aged 35-49 and has a very strong human capital depreciation effect on older workers with high education, for their position in the work process makes such skills a must.

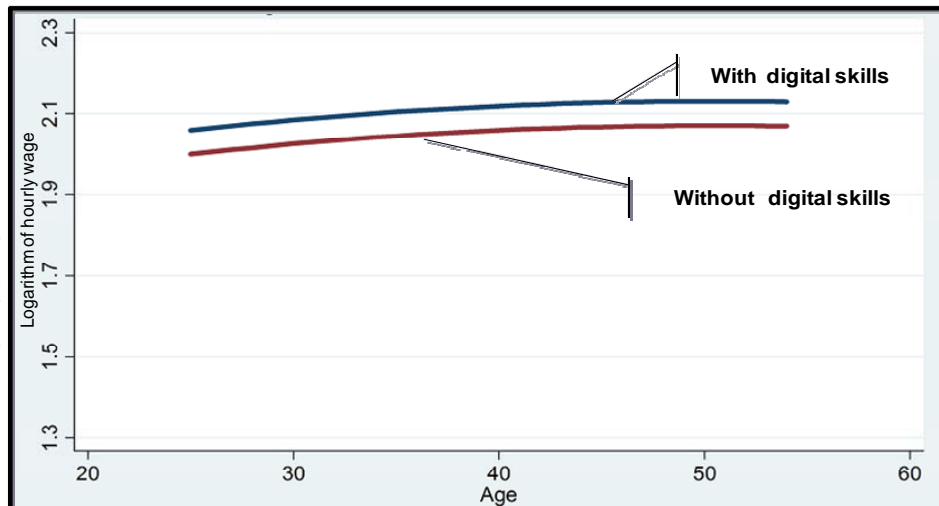
Digital skills and wages differentials

Various studies document a wage premium for digital skills

In the US already in the 1980s the first studies showed that PC use accounted for a wage premium ranging from 13% to 17%. Similar two-digit findings (from 10% to 15%) later appeared for France, Germany, and the UK. These studies were criticized on technical grounds, whose illustration is beyond our scope here³². Later studies, taking into account these critiques, produced lower but still sizeable findings in the order of magnitude between 5% and 7% higher wages for workers with digital skills. The econometric test on the Italian labour market confirms these findings and analysing data across times produces highly significant and robust wage differentials for digital skills between 5% and 6%. What is more important is that, digital skills significantly increase the wage levels especially of workers with low (6%) or middle level of education (5%).

Figure 6 Wage premium for workers with low education but with digital skills

Digital skills account for 6% to 5% wage premium for workers with, respectively, low and middle level education



32 In brief they refer to “unobserved heterogeneity bias”, which in layman terms means that important unobserved variables were not accounted for. For the discussion of this issue see Main Report (Codagnone et al 2009), § 8.1.3.

Firms productivity and workers skills

Workers digital skills is a multiplier of ICT supported organisational innovation

The micro-economic literature shows that investment in ICT and firms' characteristics (human capital, workplace organization, frequency and level of product and process innovation, management etc) are very much interrelated. This has at least two consequences. First, not all firms experience the same productivity change for an identical investment in ICT. Second, some lags are usually observed between the timing of the investment in ICT and the timing of the increase in productivity, due to the need of organisational restructuring of the firm and of introduction of new skills in its labour force. Using a longitudinal dataset of Italian firms it has been shown that ICT investments *per se* do not have any significant impact on productivity. On the contrary organizational innovation is shown to have an impact on labour productivity, when implemented using the appropriate human and technological capital. The analysis clearly shows that the skill composition of the work force (and investment in training) combined with the presence of investments in ICT are among the factors that mostly affect the probability of adoption of some organizational innovation, which in turns result in productivity gains. The level of workers' digital skills, thus, significantly contribute to foster firms' productivity.

Policy implications

Findings from econometric analysis must be used cautiously...

It is important to stress that the evidence from the reviewed literature and the findings of the econometric application do not absolutely mean that, if more ICT tools and digital skills are provided to workers and to the unemployed as a result of eInclusion policies, automatically they will maintain their job or find one, increase their productivity and their wage. The evidence illustrated only shows that there are, when controlling for other variables and using longitudinal data, robust causal relation between the **observable** level of workers digital skills on the one hand, and **observable** labour market and productivity outcomes on the other. Due to lack of data responding to the technical requirements of econometric models, they do not include any variable reflecting policy interventions.

...but they make a strong case for policy intervention

Having said that, nonetheless the existence of empirically robust relations between the observable level of digital skills and some key and fundamental outcomes for the growth and prosperity of economy and society makes a strong case for policy intervention supporting the acquisition and/or deepening of such skills.

Inclusion can offset human capital depreciation for low skilled and older workers

At a very general level it is clear how the ICT revolution improves the position of highly skilled workers and worsens the one of low skilled workers, which represents the main labour market effects of digital inequalities. Accordingly, policies should help low skill and low-education employed and unemployed individuals increase their digital skills to offset human capital depreciation so that they can retain or find jobs and possibly also increase their wages. If policies achieve this goal, not only they address a social problem, but at the same time produce a positive externality for firms by increasing the skill set of the labour force.

Older workers as a target of policy should receive more attention

A particular and noteworthy finding, concerning a group not scoring high so far within eInclusion policy agenda, is that the ICT revolution is making life much harder for older workers as it produces a fast depreciation of their human capital, even for those possessing high level education. They find it more difficult to retain their job and to find a new one if they lose it, which can often lead to early retirement decisions and negatively impact financially on the already strained European social security systems (less revenues and more costs). It is important, thus, that eInclusion policies designed ad hoc for this target group are implemented to contain this trend.

**Potential
aggregate
impact of
eInclusion are
considerable**

As a conclusive consideration it must be pointed out that, even if the recommended policy interventions manage to determine positive outcomes only for a small proportion of the identified target groups, the sheer size of such groups ensures at an aggregate level outcome of sizeable monetary value such as GDP growth (more employment and productivity), less costs for unemployment subsidies, more revenues and less costs for pension systems, increased tax revenues (more individuals working and/or earning higher wages). It is probably pleonastic to also remind the social value for individuals and for society as a whole of larger and more secure employment.

6. PRACTICAL MEASUREMENT INDICATORS

Case level evidence used to simplify general model and propose framework and indicators for practical oriented measurement

Following the distinction made earlier between scientific evaluation and practical measurement, from the elaboration of the “Bigger Picture” the work then proceeded into two directions. One being that discussed in the previous section, the other consisting in mapping the general model against the practical cases existing out there in order to: a) simplify the model and define a practical measurement framework for those domains of initiatives most recurrent in the field; b) find from existing eInclusion initiatives across EU27 (and covering all of the most important domains) evidence of outputs produced and outcomes achieved for the constituencies. For this purpose 1000 cases of eInclusion initiatives were screened that cover in a fairly balanced ways all of the EU27 Member States, of which 125 were analysed in more depth and are reported in Compendium to the final Full Report of the study. This data gathering and analysis of cases helped define the simplified conceptual framework illustrated in the figure below but, as anticipated, yielded only very limited evidence on measured outputs and, especially benefits. It must be stressed that the majority of cases with some good enough, although not perfect, evidence of outcomes come mainly from the UK and Ireland.

Eleven domains of eInclusion initiatives most recurrent in the field

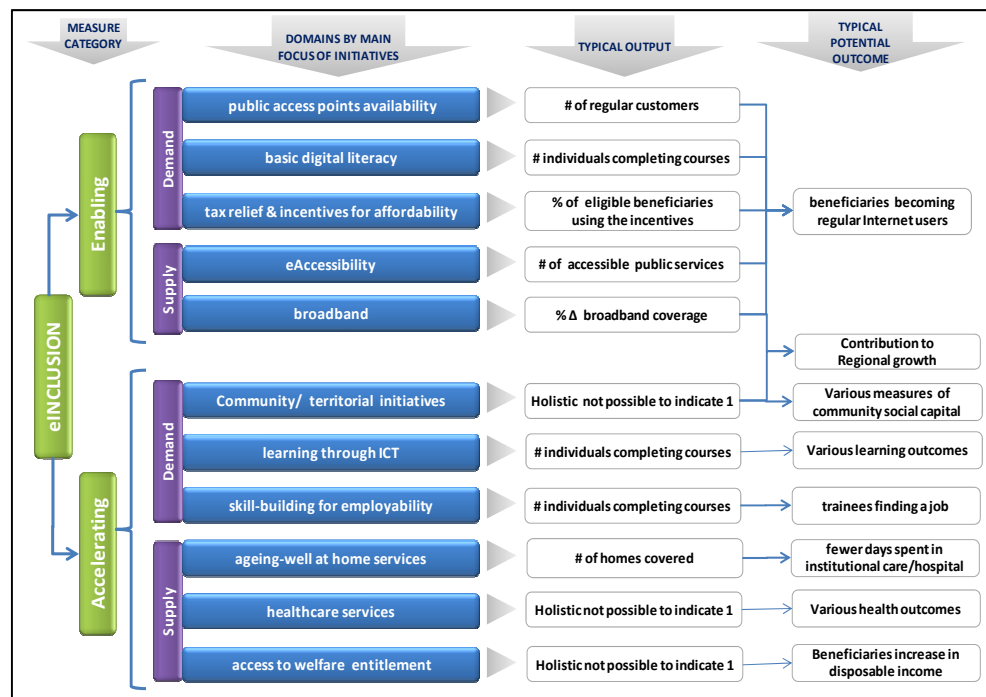


Figure 7 Simplified and prioritised practical measurement conceptual framework

A general framework flexibly adaptable to the context of the Initiatives object of measurement

Main sources of data already preliminarily indicated

As it is usually the case, empirical reality is always more complex, nuanced and granular than even the best conceptual simplification could capture and, thus, the cases of eInclusion initiatives found at times overlaps more than one domain and their inclusion into only one it is a selective choice. Initiatives cutting across one or more of the identified domains can apply indicators proposed for several of them. The checklist of indicators has been drafted in a general and flexible way so that can be adapted to the peculiarities of each concrete initiative. In this respect further detailed operationalisation in terms of indication of data sources and the calculation methodology will be needed, which is highly dependent on the specific context of each initiative and could not have been done *ex ante* in this study. Nonetheless, at a preliminary level three main sources of data needed for measurement have been identified: 1) internal records within reach of those managing the initiatives; 2) follow up surveys with beneficiaries to obtain information on a number of results achieved during and after benefiting from the initiatives; 3) various general and sectoral statistics (mostly to estimate monetary value of outcome, or to weight some the output and outcome metrics).

Some domains of Initiatives require separate treatment, in particular eAccessibility

Measurement indicators are presented in the following pages for eight of the eleven identified domains. Indeed indicators are not proposed separately for community building initiatives, for they are holistic and can apply indicators identified for other domains. No indicator is proposed for initiatives in the domain of healthcare services for they span to widely and each specific service requires its indicator. eAccessibility requires a separate treatment in its own right partially already presented by the European Commission funded MeAC Study³³ and it is not treated in this report.

The indicators and some examples from the case studies are reported below in fairly straightforward fashion requiring no other considerations, except some notations. When possible, most metrics should be broken down by target groups (the notation used below is SES standing for socio-economic status). In most cases the indicators are expressed in absolute values as if they were the zero measurement. Evidently as measurement become systematic they will have to be expressed also in terms of percentage change with respect to the previous time unit considered.

Figure 8 Measurement Indicators: Public Internet Access Points

Primary Output	Secondary Output/ or Outcome
# of regular users by SES (monthly or yearly) ¹	% of users progressing to take ICT courses ³
average length of use of facilities per user ¹	% of users progressing to regular Internet usage ³
% coverage by PIAPs of deprived communities ²	% increase in Internet usage in the area ⁴
PIAP /inhabitants ratio in deprived communities ²	
<p><u>Notes on data sources</u></p> <ol style="list-style-type: none"> 1. Data from, and elaboration of, initiative internal records; 2. For initiatives managing a network of PIAPs and at national level (requires local area statistics); 3. Data from field observation and/or users surveys; 4. Local area statistics on Internet usage. 	
<p><u>Illustrative evidence</u></p> <p>Although UK Online Centres is much more than a network of PIAPs and more of a holistic and integrated ICT supported community building initiative, nonetheless some of its results have illustrative value also in this domain. In the period 2007-2008 76,000 people took their first steps on the Internet through UK Online Centres, whose users in 70% of cases are individuals affected by at least one indicator of social exclusion. Its network covers 78% of the most deprived communities in England. On average 40% of initial users from simply accessing progress to take up information, advice and guidance, further education or employment. A survey found that in the course of one year period 8% of UK Online Centres found a job and all of them were actively searching one, when only 66% was looking for a job before using the centres.</p>	

Example: UK Online Centre (<http://www.ukonlinecentres.com/consumer/>) using surveys to capture tangible outcomes for its users

Figure 9 Measurement Indicators: Basic Digital Literacy

Everybody online
(www.citizenonline.org.uk/everybody_online)
measuring contribution to increase in regular Internet usage

Primary Output	Secondary Output/ or Outcome
# of regular users by SES (monthly or yearly) ¹	% of graduates who takes on advanced courses ³
Trainees as a % of potential target ²	% of users progressing to regular Internet usage ³
	% increase in Internet usage in the area ⁴
<p><u>Notes on data sources</u></p> <ol style="list-style-type: none"> 1. Data from initiative internal records; 2. Data from internal records complemented by local area statistics on # of digitally excluded individuals; 3. Data from field observation and/or users surveys; 4. Local area statistics on Internet usage. <p><u>Illustrative evidence</u></p> <p>Everybody Online (EOL) a UK initiatives providing digital literacy courses in several communities, in its 2007-2008 report show that in the local areas serviced Internet usage went up on average 11%, when for the same period the Office of National Statistics (ONS) reported a 3% decrease for England as a whole. This initiative also reports helping 76 users getting a job which has been valued at £670,000 in terms of state subsidies savings. This outcome is considered under a different domain, but this data calculated by EOL provides a good hint.</p>	

Figure 10 Measurement Indicators: Tax Relief & Incentives for Affordability

“Un computer in famiglia”
(http://www.regione.vda.it/uncomputerinfamiglia/default_i.asp)
distributed incentives and boosted the local economy

Primary Output	Secondary Output/ or Outcome
% of eligible beneficiaries using the incentives ¹	% increase in Internet usage ²
# of beneficiaries over by SES ¹	Estimated € value of increased ICT consumption ³
<p><u>Notes on data sources:</u></p> <ol style="list-style-type: none"> 1. Data from initiative internal records; 2. National or local areas statistics; 3. Estimates using market prices and, possibly, retail industry statistics. <p><u>Illustrative evidence</u></p> <p>Un Computer in Famiglia, an initiative of the Regional Administration of Valle D’Aosta a grant of 700€ to any family legally resident in Valle d’Aosta with a child aged between 11 and 17 years old, for the purchase of a computer with Internet capability. 100% of the targeted beneficiaries were reached before the conclusion of the project. A survey found that 61% of the beneficiaries either had subscribe or planned to subscribe to an Internet ADSL connection service. It was estimated that the initiatives boosted the local economy by increasing sales of personal computers and related products.</p>	

Figure 11 Measurement Indicators: Broadband coverage

Primary Output	Secondary Output/ or Outcome
% Δ in broadband coverage in the area ¹	% penetration of broadband (households & firms) ¹
% Δ in average connection speed ¹	% increase in Internet usage in the area ²
# of new providers offering broadband in the area ¹	# of new businesses / jobs ³ % Δ revenues for local businesses ³
Subscription price in the area/average national price ¹	Estimates of impacts on area GDP ³
<p>If measure is part of an integrated approach and provides complementary initiatives, indicators proposed for other domains apply (see discussion in Box 9)</p> <p><u>Notes on data sources</u></p> <ol style="list-style-type: none"> 1. Local area statistics, national statistics, data from providers active in the area, general Telco statistics; 2. Local area statistics; 	

**“ACTNOW
Cornwall:
(www.actnowcornwall.co.uk)
Broadband
based regional
growth**

3. As trickle down effects will be felt with some lag, these indicators will need to be constructed over time with longitudinal gathering and elaboration of related statistics. Moreover, a comparison with similar data in areas still underserved and with those served by broadband for a longer time would strengthen the attribution of such outcomes to broadband.

Illustrative evidence

The ACTNOW Cornwall initiative provides important insights into broadband driven strategies to spur regional growth and its outcomes. ACTNOW is dedicated to accelerating economic growth and social inclusion in Cornwall through the use of the Internet and ICT. The initiative drove the development of ADSL broadband infrastructure in the county and set out to promote the take-up of broadband and ICT by businesses. Broadband coverage, thus, was integrated by countless initiatives to stimulate demand on the side of businesses and citizens, as to make coverage worth for the providers and for the community by boosting business activity and jobs creation. The Initiative has achieved outstanding outputs, achieving its targets more than twice over and assisting a total of 10,000 businesses, which is well more than half of all businesses in the county. A further 2,000 businesses have received grants towards ICT investments, while, out of the 1,500 farms in Cornwall, 800 have now been helped to connect. In total (including residential users) Cornwall has an ADSL broadband penetration of 46% compared to the national average of 31.2% and the South West average of 37.9%. The economic impact is clear - it has been estimated that nearly 4,300 jobs have been secured and Cornwall's gross domestic product has benefited by more than £99 million per year since 2002. ACTNOW reports that four year after the launch of the project 10% additional yearly growth and 7% additional productivity increase per year in the business services sector can be observed in Cornwall as compared to the rest of the country.

Figure 12 Measurement Indicators: Learning through ICT

Primary Output	Outcome
# of trainees completing course by SES and by LPT ¹	% of trainees achieving evidence of skills progression ²
# Trainees who are school teachers ³	€ value of avoided extra costs ⁴
<u>Explanatory comments and notes on data sources</u>	
1. Data from initiative internal records. LPT= Learning problems tackled;	
2. These initiatives use ICT tools to tackle a broad range of learning problems, ranging from basic literacy and numeracy, language problems for immigrants, up to the practice of learning as such. Accordingly the evidence of skills progression will vary depending of the specific learning problem tackled and so will the sources of data needed;	
3. For initiatives targeting teacher;	
4. In the case of initiatives targeting school pupils and students with problems, if successful they can save school the cost of support teachers and/or parents the costs of private lessons. Data for the estimates can come from school system pay scale and from hourly market rates for private lessons.	
<u>Illustrative evidence</u>	
Personalisation by Pieces (PbyP9), another British initiative, is an online service helping users structure their way of learning and record their learning progress. In addition, users can become part of a community of practice in which they can be experts themselves and help others. The initiative also brings together people with common goals, allowing for example parents to fully engage in the learning process of their children. In 2003, through a large scale trials in one school, PbyP services achieved acceleration in competencies of 3 years over in the 11-16 age range. In the last trial began in April 2007 500 of the 3000 involved have demonstrated progression as documented by exams performances.	

**Personalisation
by Pieces:
(www.camb-ed.net) robust
schools trials
evidence of
improved
learning**

Figure 13 Measurement Indicators: Skill building for employability

Primary Output	Outcome
# of trainees completing course by SES ¹	% of trainees who found a job ²
# of job interviews secured for trainees by initiative ³	€ value of increased employment ⁴
<p><u>Explanatory comments and notes on data sources</u></p> <p>1. Data from initiative internal records. Within SES employment status and history should be detailed;</p> <p>2. Data from directly from trainees after job interviews and/or follow up trainees surveys</p> <p>3. For initiatives also offering an off and/or online job matching function (data from web metrics and/or internal records)</p> <p>4. The easiest and more robust valorisation is the saving to the public budget in unemployment subsidies per trainee getting employed (data easily obtained from regulation and official labour and/or welfare statistics, issue to solve is on the basis of what time scale to calculate this value). It is also possible to calculate the tax revenue increase per new employee (data easily obtained from regulation and official tax revenue statistics).</p> <p><u>Illustrative evidence</u></p> <p>In the domain of initiatives aimed at enhancing skill-building for employability, the Irish Fast Track to IT (FIT) is a leading case. FIT is a unique industry initiative involving major local and international companies that are actively committed to the integration of marginalised job seekers into the workforce through the acquisition or marketable ICT skills (web masters, IT experts, etc). It also provides a job matching services for both graduates and employers FIT provides back-up advice, support and mentoring to FIT graduates for a period of up to 3 years after completion of their training course. Over the period 1999-2008 FIT has trained 6500 young unemployed, of whom a staggering 3500 found a job requiring the exact skills acquired through its courses (thus justifying the attribution of the outcome to it output). This amount to an impressive 54% outcome over output ration, which is estimated to have produced 10 million pounds worth of saving for the public budget.</p>	

Fast Track to IT (www.fit.ie): evidence of a 54% outcome to output ration: 3600 marginalised young people into employment worth millions of saved subsidies money through ICT

Figure 14 Measurement Indicators: Ageing well at home services

Primary Output	Outcome
# of homes covered by ICT supported remote assistive and monitoring services in the area ¹	Relative increase of # of days at home for impaired elderly benefiting from the services ²
# of visits by eEnabled care givers ³	€ value of saving from reduced institutionalised care/ hospitalisation ⁴
Number of calls managed by initiative call centre ³	€ value of saving to the elderly or their relatives from reduced hours of paid caregivers ⁵
<p><u>Explanatory comments and notes on data sources</u></p> <p>1. Data from initiative internal records. Such services have not yet reached a national level coverage in any of the EU27 Member States, so the initiative and the data will most likely concern a specific local areas;</p> <p>2. Given uneven spread of such services, in practice these initiatives have data on a wide control group. For any given long term care problem and/or chronic disease standard clinical evidence provides statistics on average length of stay in institutionalised care or hospital. These statistics can be compared to the actual data generated by the initiative for the beneficiaries to extract the relative increase of days spent at home by them;</p> <p>3. Assuming multi-channel and eIntermediation based service delivery (data from initiative internal records);</p> <p>4. Same data as discussed under 2) above valorise using standard statistics about the daily cost of institutionalised care and/or hospitalisation (net of the cost of technology and its maintenance, of call centre operation, and of involved care givers);</p> <p>5. Market price for one day of private care giver multiplied by the number of estimated days needed before family was provided the service.</p> <p><u>Illustrative evidence</u></p> <p>The new possibilities and tangible outcomes that technology has opened up in the field of monitoring the elderly at home are well illustrated by the Dementia Care initiative implemented by the West Lothian Council, in Scotland. The initiative reduces social isolation for older people and the disabled people through technological devices installed in peoples home (bed occupancy sensor, a smoke detector, a wandering client sensor, a flood detector,</p>	

West Lothian Council Dementia Care Initiatives (http://www.tunstallgroup.com/home.aspx): keeping the elderly at home and saving £ 42,000 per users

and a temperature extremes sensor that work in conjunction with a Lifeline 4000 home unit to raise an alert to the West Lothian Care line as soon as any problems occur and trigger visits by care givers). The total yearly cost of the services (including technology, maintenance, call centre and the time of support team) for any given serviced home (usually consisting of two older people) is £ 7000 to be compared to the £91,000 yearly cost for two people in a retired home, that is a net yearly saving of £ 84,000 (for NHS or for citizens out of pocket expenditure).

Figure 15 Measurement Indicators: Access to Welfare Entitlements

Primary Output	Outcome
# of off and/or online eligibility checks delivered to potential beneficiaries	% of reached beneficiaries who obtained new benefits or backdated benefits
# of home visits by eEnabled social workers	€ value of additional benefits per beneficiary
# of claims filled in at home or online by potential beneficiaries	% of reached beneficiaries who are in condition of extreme poverty
<p><u>Notes on data sources</u> All data should come from the initiative internal records from and should be complemented by statistics on the total pool of eligible beneficiaries.</p> <p><u>Illustrative evidence</u> Advice NI is a Northern Ireland Social Security Agency initiatives providing consultation through experts and through a website portal to ease access to social welfare, to enhance the effectiveness of social and advice workers and to assist those receiving social benefits such as tax credits. A total of 3,283 eligible beneficiaries have been reached and 1,837 of them (56%) managed to obtain a holistic Benefit Entitlement Check. Of these 44% further obtained the benefits they were entitled too. On average £700k of new benefits and £80k of backdated benefit per reached beneficiaries were disbursed on an annual basis. It has been estimated that for every £1 invested in the initiative £21 of benefits were generated for beneficiaries.</p> <p>The Benefit Express Service Team (BEST) is a team of eEnabled officers from the UK Benefits Division at Halton Borough Council, who uses newly-developed Information and Communication Technologies (ICT) to deliver real-time, online access to benefit claim records that can be updated from citizens' homes. The general concept is based on sending a team of mobile operatives on to a housing estate or shopping centre with a highly mobile, visual presence (Benefits Express Bus) - equipped with laptops, linked in real-time (by GPRS) with the benefits processing section at head office. The initiative has been so well received both by young and old people that 98% of customer expressed satisfaction in the survey that has been carried out. Furthermore, it has been estimated that benefits claim turnaround times have been reduced to 48 hours and there has been reduction of over 80% in the paperwork sent to the claimant.</p>	

**Advice NI
(<http://www.adviceni.net/>):
generating £ 21
of additional
benefits for
entitled
individuals out
of every £
invested**

7. CONCLUSIONS AND RECOMMENDATIONS

eInclusion will play a key role in the new agenda of social innovation recently envisaged by EU President Barroso

The recession we have entered at the time of writing (early 2009) will cause less revenue from taxation, increasing spending for unemployment benefits and other welfare measures, to which one must add the resources already deployed to offset the banking crisis and those that are currently being allocated to support strategic industries. As EU President Barroso has recently affirmed during a workshop of the Bureau of European Policy Advisers (BEPA)³⁴, social innovation to design and implement creative ways of meeting social needs is the positive way to cope with these challenges. Among these new ways, Barroso listed topics clearly falling within the eInclusion domain such as web-based social networks, delivery of healthcare at home and many more.

A long way from simplified approaches to digital divide as a matter of mere access

Countless outstanding initiatives can be found across Europe that help people get started with the Internet, find a job, improve learning performance, enjoy ageing at home, establish new businesses, getting what they are entitled to, and much more. The Riga Declaration was a watershed landmark in the eInclusion policy process and subsequent initiatives by the Commission further worked as a catalyser. Some national governments have also placed great emphasis and invested much efforts and resources. A long way has been walked since all discussions were about digital divides and access, expected to be solved easily and speedily by the mere functioning of the market.

Policy and investments needed to turn risks into opportunities

Despite existing limitations on both practical oriented measurement and scientific evaluation, this report has provided plenty of evidence on the potential benefits that increasing digital inclusion could yield and on the risks that leaving large numbers of individuals 'digitally behind' can further exacerbate inequalities and social exclusion at large. As digital skills are a source of either opportunities or inequalities, innovative policies efforts and industry investment to turn the tide toward the former are strongly needed.

ICT can relatively worsen the condition of low skilled workers and can push older workers out of employment

In particular important policy implications can be drawn from the evidence of the economic literature and econometric analysis regarding labour market outcomes and productivity. Looking in a combined way at the impact of ICT on productivity, wages and employment, it emerged clearly how this is a fundamental economic, social and policy question, with clear implications from an eInclusion perspective. The ICT revolution improves the position of highly skilled and highly educated workers and worsens that of low skill and low education workers, which represents the main labour market effect of digital inequalities. Accordingly, policies should help low skill / low-education workers and unemployed increase their digital skills to offset human capital depreciation so that they can retain or find jobs and possibly also increase their wages. If policies achieve this goal, not only they address a social problem, but at the same time produce a positive externality for firms by increasing the skill set of the labour force. A particular and noteworthy finding, concerning a group not scoring high so far within eInclusion policies agenda, is that the ICT revolution is making life much harder for older workers as it produces a fast depreciation of their human capital, even for those possessing high level education. They find it more difficult to retain their job and to find a new one if they lose it, which can often lead to early retirement decisions and negatively impact financially on the already strained European social security systems (less revenues and more costs). It is important, thus, that eInclusion policies designed ad hoc for this target group are implemented to offset this trend.

eInclusion should offset these trends and give more attention as a target of policy to older workers

³⁴ On January 20, 2009, EU President Barroso met social innovation experts and stakeholders in Brussels, following a workshop organised by the Bureau of European Policy Advisers (BEPA) on social innovation. A summary of Barroso declaration is available at: <http://ec.europa.eu/social/main.jsp?langId=en&catId=89&newsId=445&furtherNews=yes> .

The scenarios plotted in the figure below leads toward the very final considerations.

Future scenarios shaped by the Policy/Industry matrix

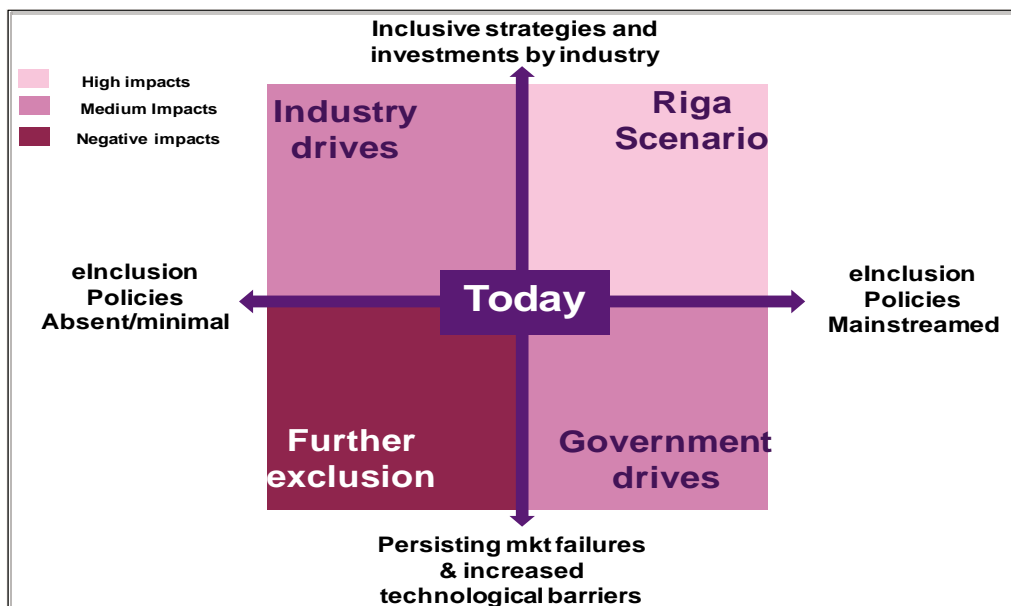


Figure 16 Possible Future Scenarios: Policy and Industry Commitment

Most likely government will initially drive and gradually bring along industry

The axes reflect two possible extremes for the way public policies and industry behaviour may change with respect to eInclusion, which results in four alternative scenarios, whereas the centre represent the situation today. The Riga Scenario with full commitment and optimised action on the side of both the public sector and industry is naturally the most desirable one, which would achieve the highest level of impact. While today we are still far from this Riga Scenario and its future realisation it is high uncertain, it can also be ruled out that developments will lead in the direction of the “Further Exclusion” scenario. The actual future will depend on the interaction between government and industry, which will determine to what extent we can move somehow in the direction of the Riga Scenarios. While interest and commitment from industry is noteworthy, it is considered likely that government will have to initially drive and gradually bring along industry. This will be a matter for each national government and its lower tiers to decide and act upon, a matter on which it is beyond the scope of this report to advance recommendations.

Commission traditional support to continue

In this context the Commission, in line with the subsidiarity principle, should continue to play a catalyst and coordination role and support cross national deployment pilots and applied research through traditional instruments such as the Framework Programme and the Competitiveness and Innovation Programme (CIP)

The Commission could bring on board key global industry players into a European eInclusion Compact

Yet, there is also an innovative initiative the Commission can undertake by adapting to the eInclusion field the model of the **UN Global Compact**³⁵, which is the world’s largest voluntary corporate responsibility initiative involving countless numbers of corporation. The Commission could engage major industry players (many already active such as eBay, Microsoft, Hewlet Packards and many more) into a European eInclusion Compact. This would bring together business committed to aligning their operations and strategies with key principles and actions, such as for instance in the domain of eAccessibility, Employment Long ICT Learning especially for older workers, support to ICT driven community building initiatives and the various other areas reviewed in this report. This would provide key industry players with a common channel to ensure that markets, technology, and government advance in ways that benefit economies and societies and achieve the broad based growth, from which also their revenue and profit depends. This would also become a platform for a better coordination and mainstreaming of currently scattered initiative.

Further raise awareness and bring the sceptics on board the eInclusion ‘ship’

As seen, progresses toward the targets set in Riga are lagging behind schedule and uneven both across countries and within countries as geographic divides persist. It has been shown that eInclusion is not a priority in many countries, and efforts remain fragmented. There is, thus, a clear need of further raising awareness on the benefits that expanding the pool of the digitally included can bring to economy and society to bring on board the sceptics still numerous among decision makers in both the public sector and in industry.

Build measurement capacities among eInclusion practitioners

It has been shown, however, that lack of measurement capacities among eInclusion practitioners has produced so far, except for a few countries (most notably the UK and Ireland), little demonstration of tangible outcomes and cost/benefits monetised analysis. Out of the 1000 cases of eInclusion initiatives screened only 52 report some information on what can be broadly interpreted as output/impact and of these the overwhelming majority comes from the UK and Ireland. If we restrict the definition and consider outcomes *strictu sensu* and especially their expression in monetary value, the total does not reach 10 (excluding the UK and Ireland). It can be safely stated that in the practice of eInclusion measurement and evaluation activity is considerably lagging behind similar fields such as eGovernment and eHealth.

Commission to support capacity building through Benchlearning and ePractice.eu

This study has produced some input to this process by elaborating a conceptual measurement framework and several measurement indicators that could be further disseminated among practitioners to increase their measurement capabilities, so that they can publish the hard evidence needed to raise awareness and convince policy makers and industry stakeholders to invest in eInclusion. This could be supported by the European Commission within existing instruments such as the Benchlearning Activities and the good practice exchange portal (www.epractice.eu).

**“eInclusion economics” promising...
... research efforts and funding should focus on micro-economic models**

Turning to what can be termed “eInclusion Economics”, both promising trends and bottlenecks have been identified. A General Model has been proposed that identifies several causal links between eInclusion support initiatives and socio-economic impacts, which is strongly supported by the relevant theoretical literature. Yet, robust empirical evidence can be produced only for what concerns labour market outcomes, whereas there is still some way to go for other domain due to constraints on availability and international comparability of needed micro-level longitudinal datasets (the comparability problems applies also to the analysis of labour market outcomes). This is so because for a long time economists studying the impact of ICT have mainly used aggregate data in growth accounting model to estimate the relation with productivity and GDP, which do not take into account variables reflecting digital inclusion. Future national and international funding of economic research aimed at assessing the impact of eInclusion should, thus, support projects using micro-economic model and building longitudinal datasets.

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