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Information Society Technologies



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Benchmarking and Fostering
Transformative Use of ICT in EU Regions

WP3: Validation and Exploitation
– D3.4 TRANSFORM Indicator Manual –

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Administrative information**Project Number:** 022780**Project Title:** TRANSFORM – Benchmarking and Fostering Transformative Use of ICT in EU Regions**Dissemination Level (PU/RE/CO)*:** PU**Deliverable Number:** D3.4**Contractual Date of Delivery:** February 2008**Actual Date of Delivery:** 30 June 2008**Title of Deliverable:** D3.4 TRANSFORM Indicator Manual**Work-Package contributing to the Deliverable:** WP 3**Nature of the Deliverable: (R/P/D/O)**:** R**Author(s):** Karsten Gareis and Jorge Assis**Abstract:**

The document describes each measure included in the TRANSFORM list of benchmarking indicators, giving information on its definition (What exactly is being measured?), the unit of observation (What is the subject about which data are collected?), the reporting unit (From whom should data be collected?), its operationalisation (i.e. the suggested methodology for data collection) as well as, where relevant, complementary indicators, the relation to established indicators, and other methodological issues. The document has been converted into html and placed online on the TRANSFORM website in order to give interested parties easy access to the information.

Keyword List:

Information society, knowledge economy, transformative change, statistical indicators, measurement, regional development, regional disparities, innovation, social capital, networks.

***Type: PU-public, RE-restricted, CO-limited to Commission Services,**

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1 Introduction

This report presents a set of indicators, the so-called TRANSFORM benchmarking indicators, the purpose of which is to allow better benchmarking of transformative uses of ICT in EU regions. The indicators have been presented to the Indicator Development Expert Group (INDEG) and to practitioners in the case study regions in order to receive comments, and have subsequently been revised.

The set of indicators presented here uses statistical measures, as much as possible, of existing indicators and benchmarking frameworks, as regions when setting up Information Society observatories should seek for compatibility with Eurostat, OECD and other established indicator systems. This will enable them to compare their own data with existing data from other sources.

In some cases, new indicators have been suggested and subsequently piloted within the context of the TRANSFORM Regional Internet User Survey.

The indicator descriptions presented in the present report contain information on:

- ÿ **Definition** – What exactly is being measured, and subsequently compared across regions, points in time, sub-groups of the universe etc.?
- ÿ **Unit of observation** – What is the subject about which data are collected?
- ÿ **Reporting unit** – From whom should data be collected?
- ÿ **Operationalisation** – Suggested methodology for data collection and – in the case questionnaire surveys – the suggested wording to be used, including response items/scales (where relevant).
- ÿ **Complementary indicators** – Additional suggested indicators which increase the level of information collected on the phenomenon.
- ÿ **Relation to existing indicators** – Which existing (preferably well-established) measurement systems include indicators which are related to the one described here? What are the differences?
- ÿ **Methodological issues concerning application of the indicator** – Information on critical issues and limits to the feasibility and validity of the indicator described.
- ÿ **Links** – Hyperlinks to Internet sources which are related to the indicator described here, such as questionnaires and reports of surveys that have used similar indicators.

2 Indicators Suggested for Measuring Transformative Use of ICTs

The suggested indicators are presented individually. Descriptions can be accessed by clicking on the Indicator name in the list below.

INFRASTRUCTURE, SECURITY AND BASIC TAKE-UP

Broadband access (firms)
Broadband access (households)
Mobile broadband access (firms)
Mobile broadband access (individuals)
Public sector investment in ICT
Venture capital invested in ICT-related areas

ICT-ENABLED NETWORKING AND SOCIAL CAPITAL BUILDING

Inter-firm collaboration
ICT-based inter-firm collaboration
Supply chain integration – Integration with suppliers and/or customers
Membership in (work-related) virtual communities
ICT-based personal networks
Networking intensity of public sector institutions

LIFELONG AND COLLECTIVE LEARNING AND INNOVATION

ICT-enabled lifelong learning
Digital skills
Updating of digital skills
Collaboration & communication skills
Self-management skills
Workplaces enabling experiential learning
Collaboration's effects on capacity to change
Individual effects of innovation-related collaboration on firm performance
Barriers that have negatively affected firms' innovation-related collaboration

E-PARTICIPATION AND ICT-ENABLED EMPOWERMENT

Job autonomy index
ICT use for collaborative work in teams or projects
ICT-enabled access to resources (individuals)
ICT applications perceived as of major importance for the life of citizens
Availability of tools for eParticipation
Perceived effect of Internet on general living conditions in the region

3 Detailed Description of Indicators

3.1 Broadband access (firms)

Definition

Share of organisations (or: enterprises, or: establishments) having broadband access to the Internet, in percentage of all organisations (or: enterprises, or: establishments)

Unit of observation

Organisations or enterprises or establishments (recommended)

Reporting unit

IT managers (in smaller organisations: owners or general managers) or person with IT responsibility

Operationalisation

Survey question (from Eurostat model survey): "Did your enterprise have the following types of external connection to the Internet, during the reference period?"

- ÿ a) Traditional Modem (dial-up access over normal telephone line)
- ÿ b) ISDN connection
- ÿ c) DSL (xDSL, ADSL, SDSL etc) connection
- ÿ d) Other fixed internet connection (e.g. cable, leased line (e.g. E1 or E3 at level 1 and ATM at level 2), Frame Relay, Metro-Ethernet, PLC - Powerline communication, etc.)
- ÿ e) Mobile connection (e.g. e.g. analogue mobile phone, GSM, GPRS, UMTS, EDGE, CDMA2000, 1xEVDO)"

Definition 'broadband': "No generally accepted definition of broadband can be given. Common definitions refer to either: a) the connection speeds measured in kbps or mbps (in at least the downstream direction) or bandwidth measured by the amount of digital bits that one can transmit per second, measured in kbps or mbps; b) the type of connection, of which the following provide broadband access: xDSL (ADSL, SDSL, etc), Cable TV network (cable modem), UMTS (mobile phone), or other (e.g. satellite, fixed wireless); c) the content that is provided with the examples of high definition movie trailers, short films, flash animation, three dimensional video games, video on demand, internet radio, streaming video, video conferencing and so on." Source: CEC 2007b.

Complementary indicators

- ÿ Share of staff having broadband access to the Internet at their workplace
- ÿ Prices for broadband access basket (enterprises)

Relation to existing indicators

This is a well-established indicator, as included in the OECD and Eurostat model surveys for enterprise surveys on ICT.

Methodological issues concerning application of the indicator

The definition of broadband needs continuously to be re-assessed, and adapted in time. Consistency with the latest version of the annual Eurostat model household survey instrument is recommended.

Links

- ÿ Eurostat Model Questionnaire for Community Survey on ICT Usage and e-Commerce in Enterprises (2008)
http://europa.eu.int/estatref/info/sdds/en/isoc/isoc_entr_ict_usage_2008_questionnaire.pdf
- ÿ OECD Guide to Measuring the Information Society 2007:
http://www.oecd.org/document/22/0,3343,en_2649_34449_34508886_1_1_1_1,00.html

3.2 Broadband access (households)

Definition

Share of private households having broadband access to the Internet

Unit of observation

Private households

Reporting unit

Individuals in private households

Operationalisation

Survey question (from Eurostat model survey): "What types of Internet connection are used [in your household]?"

- ÿ a) Modem (dial-up access over normal telephone line) or ISDN
- ÿ b) DSL (e.g. ADSL, SHDSL, etc.)
- ÿ c) Other broadband connection (e.g. cable, UMTS, etc)
- ÿ d) Mobile phone over narrowband (GPRS, etc.)"

Complementary indicators

- ÿ Prices for broadband access basket (households)
- ÿ Stationary broadband availability (Percentage of population reached by switches equipped for DSL and/or living in houses passed by an upgraded cable)

Relation to existing indicators

This is a well-established indicator, as included in the OECD and Eurostat model surveys for household surveys on ICT.

Methodological issues concerning application of the indicator

The definition of broadband needs continuously to be re-assessed, and adapted in time. Consistency with the latest version of the annual Eurostat model household survey instrument is recommended.

Links

- ÿ Eurostat Model Questionnaire for Community survey on ICT usage in households and by individuals (2008)
http://europa.eu.int/estatref/info/sdds/en/isoc/isoc_hh_model_questionnaire_2008.pdf
- ÿ OECD Guide to Measuring the Information Society 2007:
http://www.oecd.org/document/22/0,3343,en_2649_34449_34508886_1_1_1_1,00.html

3.3 Mobile broadband access (firms)

Definition

Share of organisations (or: enterprises, or: establishments) having mobile broadband access to the Internet

Unit of observation

Organisations or enterprises or establishments (recommended)

Reporting unit

IT managers (in smaller organisations: owners or general managers) or person with IT responsibility

Operationalisation

Survey question (adapted from Eurostat model survey): "Did your enterprise have the following types of external connection to the Internet, in the reference period?"

- ÿ Narrowband mobile connection (e.g. analogue mobile phone, GSM)
- ÿ Broadband mobile connection (GPRS, UMTS, EDGE, CDMA2000, 1xEVDO)"

Complementary indicators

- ÿ Share of staff having mobile broadband access to the Internet for work purposes
- ÿ Prices for mobile services basket

Relation to existing indicators

The Eurostat model survey captures whether enterprises have mobile access to the Internet, but does not (yet) distinguish between narrowband and broadband access.

Methodological issues concerning application of the indicator

The real value from mobile broadband access is likely to emerge when (mobile) workers are given mobile access to broadband Internet whenever and wherever they are located. This needs to be captured as well.

Links

- ÿ Eurostat Model Questionnaire for Community Survey on ICT Usage and e-Commerce in Enterprises (2008)
http://europa.eu.int/estatref/info/sdds/en/isoc/isoc_entr_ict_usage_2008_questionnaire.pdf
- ÿ OECD Guide to Measuring the Information Society 2007:
http://www.oecd.org/document/22/0,3343,en_2649_34449_34508886_1_1_1_1,00.html
- ÿ eBusiness W@tch www.ebusiness-watch.org

3.4 Mobile broadband access (individuals)

Definition

Share of private households (or: individuals in private households) having mobile broadband access to the Internet

Unit of observation

Private households (or: individuals in private households)

Reporting unit

Individuals in private households

Operationalisation

Survey question (adapted from Eurostat model survey): “Do you use a mobile connection to the Internet?”

- ÿ Yes, broadband connection (e.g. UMTS [*list brand names dominating on domestic market*])
- ÿ Yes, narrowband connection (GPRS, etc.)”

Complementary indicators

- ÿ Share of individuals using mobile broadband for certain activities (using list of items).
- ÿ Mobile broadband availability (Share of total population who live in areas which are covered by 3G networks or WiFis)
- ÿ Prices for mobile broadband access basket

Relation to existing indicators

The Eurostat model survey does not (yet) capture whether individuals have mobile access to the Internet. A number of national surveys have started to ask in depth about mobile phone usage, including mobile Internet access. The Oxford Internet Survey (Dutton & Helsper 2007) includes a question on usage of mobile phone features, including as an item “accessing e-mail or the Internet”. A distinction between narrowband and broadband access is not made in most surveys.

Methodological issues concerning application of the indicator

Most technology roadmaps and foresight scenarios seem to agree that ubiquitous computing, (partly) based on mobile broadband access, will soon open up manifold possibilities for transformative change in the business as well as in the private/civil sphere (OECD 2006; Srivastava et al. 2006). For this reason we suggest to include mobile broadband access – as the next step toward eventual “always & everywhere on” connectivity – in future benchmarking frameworks.

Links

- ÿ Eurostat Model Questionnaire for Community survey on ICT usage in households and by individuals (2008)
http://europa.eu.int/estatref/info/sdds/en/isoc/isoc_hh_model_questionnaire_2008.pdf
- ÿ OECD Guide to Measuring the Information Society 2007:
http://www.oecd.org/document/22/0,3343,en_2649_34449_34508886_1_1_1_1,00.html

3.5 Public investment in ICT

Definition

Total public investment in ICTs per head

Unit of observation

Administrative unit (e.g. municipality, region or country)

Reporting unit

Regional government

Operationalisation

To be explored

Complementary indicators

Y Broken down in hardware, software, services, R&D

Relation to existing indicators

While data for this indicator exist in some Member States, they are not harmonised yet, and not included in Eurostat's REGIO database.

Methodological issues concerning application of the indicator

Data on public investments in ICT are not available currently, and no common method for accounting has been agreed upon yet. For the time being, proxy indicators would have to be used.

Links

n.a.

3.6 Venture capital investment in ICT

Definition

Total venture capital investment in ICT-related fields, per head

Unit of observation

n.a

Reporting unit

n.a.

Operationalisation

n.a.

Complementary indicators

n.a.

Relation to existing indicators

n.a.

Methodological issues concerning application of the indicator

Capital investment in physical and intangible assets is necessary to transform the technological potential of ICTs into commercial applications both in the ICT sector and in ICT-related investments to improve performance in other sectors.

Links

n.a.

3.7 Inter-firm collaboration

Definition

Share of firms involved in collaboration in innovation related activities

Unit of observation

Enterprises, or: organisations

Reporting unit

Senior managers responsible for R&D (in smaller organisations: owners or general managers)

Operationalisation

Survey question (from Community Innovation Survey): “During the reference period, did your enterprise co-operate on any of your innovation activities with other enterprises or institutions?”

[IF YES] Please indicate the type of co-operation partner and location (Your country; other Europe; United States; all other countries)

- ÿ Other enterprises within your enterprise group
- ÿ Suppliers of equipment, materials, components, or software
- ÿ Clients or customers
- ÿ Competitors or other enterprises in your sector
- ÿ consultants, commercial labs, or private R&D institutes
- ÿ universities or other higher education institutions
- ÿ Government or public research institutes

Definition of “collaboration” adapted from Community Innovation Survey (CIS): “Collaboration means active participation in joint R&D and other innovation projects with other organisations (with other enterprises or non-commercial institutions). It does not necessarily imply that both partners derive immediate commercial benefit from the venture. Pure contracting out of work, where there is no active working together towards the same goal, is not regarded as collaboration.”

Complementary indicators

- ÿ Share of firms involved in collaboration in other activities (not related to innovation)

Relation to existing indicators

Collaboration for innovation related activities is covered by the ECIS. A similar variable is included in the Special Eurobarometer “Innobarometer”.

Methodological issues concerning application of the indicator

The value of this indicator is limited by the fact that only firms that have confirmed innovative activities in the reference period are asked whether they have collaborated in this context.

Links

- ÿ Community Innovation Survey indicators are described in Eurostat’s report on “Science, Technology and Innovation in Europe” http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-EM-08-001/EN/KS-EM-08-001-EN.PDF
- ÿ Community Innovation Survey IV questionnaire <http://www.oecd.org/dataoecd/52/35/40140021.pdf>

Y Innobarometer website <http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=250&parentID=51>

3.8 ICT-based inter-firm collaboration

Definition

Share of firms involved in (online) collaboration in innovation related activities with partners from (a) inside the NUTS region (b) from other NUTS regions (c) from abroad.

Unit of observation

Enterprises, or: organisations

Reporting unit

Senior managers responsible for R&D (in smaller organisations: owners or general managers)

Operationalisation

Survey question (from Community Innovation Survey; list of communication channels from NewGlobal): "During the reference period, did your enterprise co-operate on any of your innovation activities with other enterprises or institutions?"

[IF YES] Please indicate in which ways you communicate with these enterprises or institutions when co-operating on innovation activity:

- ÿ (a) Scheduled face-to-face meetings
- ÿ (b) Informal face-to-face conversations
- ÿ (c) Telephone calls
- ÿ (d) Telephone conferences
- ÿ (e) e-mail
- ÿ (f) Lotus Notes, Microsoft Exchange, BSCW or other groupware systems
- ÿ (g) Special websites for collaboration in a team or project
- ÿ (h) Video conferencing
- ÿ (i) Skype or other voice over IP applications
- ÿ (j) Net-Meeting, Groupboard or other Whiteboard applications
- ÿ (k) Wikis or knowledge blogs
- ÿ (l) LinkedIn, Xing or other Web-based platforms for the management of business contacts
- ÿ (m) Industry-specific online collaboration tools

Complementary indicators

- ÿ Share of firms involved in online collaboration in other activities (not related to innovation)

Relation to existing indicators

This indicator is not existing yet, but it is related to the indicator on innovation related collaboration in the Community Innovation Survey.

For capturing collaboration activities which are not limited to innovation activities, a different approach is required. The eBusinessW@tch module on collaboration puts the focus on collaboration in the form of ICT-enabled process integration across companies.

Methodological issues concerning application of the indicator

For capturing collaboration activities which are not limited to innovation activities, a different approach is required. The eBusinessW@tch module on collaboration puts the focus on the ICTs employed for process integration across companies. It asks about:

- ÿ a) customer relationship management systems,
- ÿ b) supply chain management systems,
- ÿ c) collaboration with business partners to forecast product demand, to manage capacity or inventories.

Links

- ÿ Community Innovation Survey indicators are described in Eurostat's report on "Science, Technology and Innovation in Europe" http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-EM-08-001/EN/KS-EM-08-001-EN.PDF
- ÿ Community Innovation Survey IV questionnaire <http://www.oecd.org/dataoecd/52/35/40140021.pdf>
- ÿ NewGlobal project website http://www.ami-communities.eu/wiki/New_Global
- ÿ eBusiness W@tch www.ebusiness-watch.org

3.9 Supply chain integration – Integration with suppliers and/or customers

Definition

Share of enterprises whose business processes are automatically linked to those of their suppliers or their customers.

Unit of observation

Enterprises or establishments (recommended)

Reporting unit

IT managers (in smaller organisations: owners or general managers) or person with IT responsibility

Operationalisation

Survey question (adapted from Eurostat model survey): “In the reference period, was your enterprise regularly sharing electronically information on the supply chain management with your suppliers or customers?”

[IF YES] Was your enterprise regularly sharing electronically the following information with its suppliers?

- Y a) Inventory levels, production plans or demand forecasts
 - o a1) Demand forecasts
 - o a2) Inventory levels
 - o a3) Production plans
- Y b) Progress of deliveries (i.e. distribution of raw materials or finished products)

[IF YES] Was your enterprise regularly sharing electronically the following information with its customers, in the reference period?

- Y a) Inventory levels, production plans or demand forecasts
 - o a1) Demand forecasts
 - o a2) Inventory levels
 - o a3) Production plans
- Y b) Progress of deliveries (i.e. distribution of raw materials or finished products)

[IF YES] Were the following methods used for the electronic exchange of this information, in the reference period?

- Y a) Websites (yours, those of your business partners or web portals)
- Y b) Automated data exchange (XML, EDIFACT, etc.)

Definition of SCM as supplied in the Eurostat model questionnaire: “Sharing electronically information on the supply chain management means:

- Y exchanging all types of information with suppliers and/or customers in order to coordinate the availability and delivery of products or services to the final consumer;
- Y including information on demand forecasts, inventories, production, distribution or product development;
- Y via computer networks, not only the Internet but also other connections between computers of different enterprises.
- Y it can be from you to your suppliers/customers or the other way around.

This information may be exchanged via websites or via automated data exchange, but it excludes normal e-mail messages manually written.

Complementary indicators

- ÿ Supply-chain integration involving partners from (a) inside the NUTS region (b) from other NUTS regions in the same country (c) from abroad.

Relation to existing indicators

This is a well-established indicator, as included in the Eurostat model surveys for enterprise surveys on ICT.

Methodological issues concerning application of the indicator

As is discussed in the OECD's "Guide to Measuring the Information Society", the quality of the data collected using the methodology described above is open to debate. Efforts to develop better data collection methods for capturing integrated e-Business processes are still ongoing.

Links

- ÿ Eurostat Model Questionnaire for Community Survey on ICT Usage and e-Commerce in Enterprises (2008)
http://europa.eu.int/estatref/info/sdds/en/isoc/isoc_entr_ict_usage_2008_questionnaire.pdf
- ÿ OECD Guide to Measuring the Information Society 2007:
http://www.oecd.org/document/22/0,3343,en_2649_34449_34508886_1_1_1_1.00.html
- ÿ eBusiness W@tch www.ebusiness-watch.org

3.10 Membership in (work-related) virtual communities

Definition

Share of persons in paid work who are active members in virtual communities which are (at least partly) related to their work.

Unit of observation

Total population in paid work

Reporting unit

Total population in paid work

Operationalisation

Survey question (adapted from Ofcom): "Have you used the Internet in the reference period for visiting sites where you can discuss work-related topics online?"

[IF SO] Have you, when using these sites, discussed with people you have not met before?"

Complementary indicators

ÿ Membership in leisure related virtual communities

Relation to existing indicators

A similar indicator was piloted by UK regulator Ofcom for a survey on communication behaviour.

Methodological issues concerning application of the indicator

Virtual communities are conceptualised as follows: A virtual community is a group of people who communicate exclusively or mainly via the Internet on specific topics which are of interest to them. For data collection, a simplified operationalisation needs to be used.

Because of the ad-hoc nature of many virtual communities, it needs to be explored whether the indicator can produce valid data.

Links

ÿ OFCOM (2006) study " The International Communications Market 2006"
<http://www.ofcom.org.uk/research/cm/icmr06/>

3.11 ICT-based personal networks

Definition

Share of Internet users who actively participate on social networking platforms (incl. chat sites, newsgroups, online discussion forums, own weblog, creating a profile on a social networking site).

Unit of observation

Total adult population

Reporting unit

Internet users

Operationalisation

Survey question (as piloted in TRANSFORM): "Have you use the Internet in the past 3 months (for private or work purposes) for the following communication activities:

- ÿ (c) Posting messages to chat sites, newsgroups or on-line discussion forum
- ÿ (e) Creating or maintaining own weblog or blog
- ÿ (g) Uploading self-created content (text, images, photos, videos, music etc.) to any website to be shared
- ÿ (h) Creating a profile on a social networking site such as MySpace, Facebook, LinkedIn [...]
- ÿ (i) Designing or maintained a website

Complementary indicators

- ÿ Share of Internet users who upload self-created content to the Internet (incl. own weblog; uploading text, images, photos, videos, music, etc.; designing or maintaining a website)
- ÿ Use of social networking sites, differentiated by main purpose (work-related; leisure-related; civic-related)
- ÿ Heterogeneity of ICT-based personal networks (An index which measures the degree to which the ICT-based personal networks of individual members of the population comprise different types of people (geographical location, ethnicity, occupation, socio-economic status))

Relation to existing indicators

A number of recent surveys have piloted similar indicators, for example the Oxford Internet Survey. A 2007 report by the OECD gives a good overview of the issues involved in measurement.

Methodological issues concerning application of the indicator

These indicators are informed by the findings of recent empirical research into the importance of social capital and network creation for regional development. The additional indicators take account of the vital distinction being made between different types of social capital, namely bonding, bridging and linking social capital, all of which need to be sufficiently developed to foster growth and innovation in the knowledge-based economy.

The indicator definition needs to be regularly checked and, if necessary, updated in order to keep track with technological and market developments

Links

- ÿ OECD study on "Participative Web and User-Created Content"

http://www.oecd.org/document/40/0,3343,en_2649_34223_39428648_1_1_1_1,00.html

- Ÿ OECD report on “Measuring User-Created Content: Implications for the ICT Access and Use by Households and Individuals Surveys” <http://www.oecd.org/dataoecd/44/58/40003289.pdf>
- Ÿ Oxford Internet Surveys site <http://www.oii.ox.ac.uk/microsites/oxis/>

3.12 Networking intensity of public sector institutions

Definition

Network-analysis derived indicator measuring the extent to which a region's public sector institutions (including universities) are participating in (a) intra-region (b) cross-region (c) international collaborative research and/or deployment activities.

Unit of observation

Administrative unit (region)/

Reporting unit

Depending on availability: Databases on participation in R&D programmes

Operationalisation

To be explored in application case.

Complementary indicators

n.a.

Relation to existing indicators

This approach was piloted by Malerba et al. (2007) based on data on participation in EU-funded research and deployment projects

Methodological issues concerning application of the indicator

Network analysis could provide valuable data for feeding indicators on interconnections within and between regions. This possibility has not yet been much explored. In particular, it would be highly interesting to establish an indicator on cross-sector interconnectedness, as a low level of such networking has been shown to be one of the core factors for explaining insufficient progress in effective use of ICT.

Links

ÿ "Networks of Innovation in Information Society: Development and Deployment in Europe" – Final Report <http://www.lu.lv/materiali/biblioteka/e-Eiropa/e-biblioteka/pilnieteksti/ekonomika/Networks%20of%20innovation%20-%20in%20Information%20Society%20Development%20and%20Deployment%20in%20Europe.pdf>

3.13 ICT-enabled lifelong learning

Definition

Percentage of persons engaged in an online eLearning course who state that they would not have engaged in a training course if it had not been possible online.

Unit of observation

Total adult population

Reporting unit

Total adult population

Operationalisation

Survey questions (adapted from eUSER survey): "In the last 12 months, have you used the Internet, to do an online course over the Internet. This means that a significant part of the learning content is being received via the Internet.

[IF YES] If that training course had not been available online, do you think

- ÿ you would have taken a comparable course in a traditional way, that means through classroom instruction only?
- ÿ you would have taken a comparable course as a traditional correspondence course, that means with learning content and assignments being sent to you through the post?

Complementary indicators

n.a.

Relation to existing indicators

The indicator was piloted in the eUSER study, see Gareis(2006).

Methodological issues concerning application of the indicator

Hypothetical questions are generally hard to answer. For that reason, results need to be treated with care, and internal validation by means of other questions in the same survey should be sought.

Links

- ÿ eUSER project website www.euser-eu.org

3.14 Digital skills

Definition

Share of Internet users who report high/low confidence in:

- ÿ using a search engine to find information on the Internet,
- ÿ using e-mail to communicate with others,
- ÿ downloading and installing software onto a computer,
- ÿ identifying the cause for computer problems,
- ÿ understanding text written in English.

Unit of observation

Total adult population.

Reporting unit

Internet users.

Operationalisation

Survey question (adapted from eUSER): "How confident would you feel if you had to carry out the following tasks. (Scale 1 to 5 where 1 means "I am not at all confident" and 5 means "I am very confident"). How about...

- ÿ (a) using a search engine to find information on the Internet
- ÿ (b) using e-mail to communicate with others
- ÿ (c) downloading and installing software onto a computer
- ÿ (d) identifying the cause for computer problems
- ÿ (e) understanding text written in English

Complementary indicators

n.a.

Relation to existing indicators

A similar indicator was piloted in the eUSER study, see Gareis(2006).

Methodological issues concerning application of the indicator

For the working population, this indicator should be broken down by sector of employment to produce a synthesized indicator on the situation of public sector employees only.

Links

- ÿ eUSER project website www.euser-eu.org

3.15 Updating of digital skills

Definition

Share of the population who have a favourable perception of their personal opportunities to learn about new ICT applications and uses through:

- ÿ formalised educational institution (school, college, university, etc.)
- ÿ training courses and adult education centres, on own initiative
- ÿ training courses and adult education centres, on demand of employer
- ÿ through self-study using books, Internet, CD-Roms, mobile services, etc.
- ÿ through learning by doing
- ÿ informal assistance from colleagues, relatives in friends and some other ways

Unit of observation

Total adult population.

Reporting unit

Total adult population.

Operationalisation

Survey question: "How would you rate the opportunities you have, personally, to learn about new ICT applications and uses through:

- ÿ formalised educational institution (school, college, university, etc.),
- ÿ training courses and adult education centres, on own initiative,
- ÿ training courses and adult education centres, on demand of employer,
- ÿ through self-study using books, Internet, CD-Roms, mobile services, etc.,
- ÿ through learning by doing,
- ÿ informal assistance from colleagues, relatives in friends and some other ways.

(5-point scale, "very good" to "very poor".

Complementary indicators

n.a.

Relation to existing indicators

While the items are derived from the Eurostat model questionnaire, the indicator itself has not been collected yet, as the focus until now has been placed on the place where skills have been obtained in the past.

Methodological issues concerning application of the indicator

For the working population, this indicator should be broken down by sector of employment to produce a synthesized indicator on the situation of public sector employees only.

Links

n.a.

3.16 Collaboration & communication skills

Definition

Compound indicator on self-reported skills in:

- Y Working with a team of people;
- Y Listening carefully to colleagues;
- Y Selling a product or service;
- Y Counselling, advising or caring for customers or clients
- Y Persuading or influencing others;
- Y Instructing, training or teaching people, individually or in groups
- Y Making speeches or presentations;
- Y Writing long reports.

Unit of observation

Total population in paid work.

Reporting unit

Total population in paid work.

Operationalisation

Survey question from UK Skills Survey: "You will be asked about different activities which may or may not be part of your job. We are interested in finding out what activities your job involves and how important these are. [...]"

- Y Working with a team of people;
- Y Listening carefully to colleagues;
- Y Selling a product or service;
- Y Counselling, advising or caring for customers or clients
- Y Persuading or influencing others;
- Y Instructing, training or teaching people, individually or in groups
- Y Making speeches or presentations;
- Y Writing long reports.

[For each of these skills] Would it make a significant difference to your job performance if you possessed additional problem-solving skills? If so, how much?"

Compound indicator to be calculated as arithmetic mean across all items.

Complementary indicators

n.a.

Relation to existing indicators

This indicator was used in the 2001 Skills Survey of the Employed British Workforce. A revised version was included in the 2006 version of the same survey.

Methodological issues concerning application of the indicator

A cross-country skills survey has not yet been attempted. Exploratory research will be necessary in order to avoid that cultural issues (see Harkness et al. 2003) distort the findings from a benchmarking exercise.

Links

- ÿ 2001 Skills Survey of the Employed British Workforce
<http://www.cardiff.ac.uk/socsi/contactsandpeople/alanfelstead/Guide%20to%202006%20Skills%20Survey.pdf>

3.17 Self-management skills

Definition

Compound indicator on self-reported skills in:

- Y Planning activities;
- Y Organising one's own time;
- Y Thinking ahead;
- Y Detecting, diagnosing, analysing and resolving problems;
- Y Noticing and checking for errors.

Unit of observation

Total population in paid work.

Reporting unit

Total population in paid work.

Operationalisation

Survey question from UK Skills Survey: "You will be asked about different activities which may or may not be part of your job. We are interested in finding out what activities your job involves and how important these are. [...]"

- Y Planning activities;
- Y Organising one's own time;
- Y Thinking ahead;
- Y Detecting, diagnosing, analysing and resolving problems;
- Y Noticing and checking for errors.

[For each of these skills] Would it make a significant difference to your job performance if you possessed additional problem-solving skills? If so, how much?"

Compound indicator to be calculated as arithmetic mean across all items.

Complementary indicators

n.a.

Relation to existing indicators

This indicator was used in the 2001 Skills Survey of the Employed British Workforce. A revised version was included in the 2006 version of the same survey.

Methodological issues concerning application of the indicator

A cross-country skills survey has not yet been attempted. Exploratory research will be necessary in order to avoid that cultural issues (see Harkness et al. 2003) distort the findings from a benchmarking exercise.

Links

- Y 2001 Skills Survey of the Employed British Workforce
<http://www.cardiff.ac.uk/socsi/contactsandpeople/alanfelstead/Guide%20to%202006%20Skills%2>

[0Survey.pdf](#)

3.18 Workplaces enabling experiential learning

Definition

Share of persons in paid work who have a workplace in a knowledge-intensive environment.

Unit of observation

Total population in paid work.

Reporting unit

Total population in paid work.

Operationalisation

Survey question: "Not all learning takes place intentionally or via learning-by-doing. One can also learn new things by observing what people around oneself are doing and talking about. Would you say that at your workplace it is easy to learn from observing what people around you are doing and talking about?"

Complementary indicators

ÿ Percentage of persons employed using Internet in normal work routine.

Relation to existing indicators

While the indicator has not been piloted yet, it is related to question items used in the European Working Conditions Survey (EWCS), which asks respondents whether:

- ÿ they can get assistance from colleagues if they ask for it
- ÿ they can get assistance from superiors if they ask for it
- ÿ they can get external assistance if they ask for it
- ÿ At work, they have opportunities to learn and grow

Methodological issues concerning application of the indicator

For the working population, this indicator should be broken down by sector of employment to produce a synthesized indicator on the situation of public sector employees only.

Links

- ÿ European Working Conditions Surveys (EWCS)
<http://www.eurofound.europa.eu/ewco/surveys/index.htm>

3.19 Collaboration's effects on capacity to change

Definition

Share of enterprises using virtual collaboration which report a positive impact on the capacity to change in the reference period.

Unit of observation

All enterprises, or: organisations, or: establishments.

Reporting unit

HRM managers (in smaller organisations: owners or general managers) or person with IT responsibility

Operationalisation

Survey question: "Thinking of the collaboration you have engaged in in the reference period, how do you perceive the effect of collaboration on your organisation's ability to adapt quickly:

- ÿ to fluctuations in demand,
- ÿ to unexpected changes in the market environment (if applicable),
- ÿ to lack of available skills on the labour market (if applicable),
- ÿ to new market opportunities.

(5-point scale: very positive to very negative).

Compound indicator to be calculated as sum over all items.

Complementary indicators

n.a.

Relation to existing indicators

A related indicator was piloted in the 2008 NewGlobal survey.

Methodological issues concerning application of the indicator

n.a.

Links

- ÿ NewGlobal project website http://www.ami-communities.eu/wiki/New_Global

3.20 Individual effects of innovation-related collaboration on firm performance

Definition

Perceived importance of a number of hypothetical effects of collaboration for innovation, relating to a period of three years prior to the survey. Items include the following:

- ÿ Increased range of goods and services
- ÿ Entered new markets or increased market share
- ÿ Improved quality in goods or services
- ÿ Improved flexibility of production or service provision
- ÿ Increased capacity of production or service provision
- ÿ Reduced labour costs per unit output
- ÿ Reduced materials and energy per unit output
- ÿ Reduced environmental impacts or improved health and safety
- ÿ Met regulation requirements

Unit of observation

All enterprises, or: organisations, or: establishments.

Reporting unit

R&D managers (in smaller organisations: owners or general managers) or person with responsibility for innovation related activities.

Operationalisation

Survey question (from CIS): "How important were each of the following effects of your product (good or service) and process innovations introduced during the reference period?"

- ÿ Increased range of goods and services
- ÿ Entered new markets or increased market share
- ÿ Improved quality in goods or services
- ÿ Improved flexibility of production or service provision
- ÿ Increased capacity of production or service provision
- ÿ Reduced labour costs per unit output
- ÿ Reduced materials and energy per unit output
- ÿ Reduced environmental impacts or improved health and safety
- ÿ Met regulation requirements"

Complementary indicators

n.a.

Relation to existing indicators

This is an existing indicator from the European Community Innovation Survey.

Methodological issues concerning application of the indicator

The value of this indicator is limited by the fact that only firms that have confirmed innovative activities in the reference period are asked whether they have collaborated in this context.

Links

• Community Innovation Survey IV questionnaire <http://www.oecd.org/dataoecd/52/35/40140021.pdf>

3.21 Barriers that have negatively affected firms' innovation-related collaboration

Definition

Perceived barriers which have been negatively affecting innovation-related collaboration in the reference period (three years prior to the survey). Items include the following:

- ÿ Lack of funds within your enterprise/group;
- ÿ Lack of finance from external sources;
- ÿ Innovation costs too high;
- ÿ Lack of qualified personnel;
- ÿ Lack of information on technology;
- ÿ Lack of information on markets;
- ÿ Difficulty in finding cooperation partners;
- ÿ Markets dominated by established enterprises;
- ÿ Uncertain demand for innovative products;
- ÿ No need to innovate.

Unit of observation

All enterprises, or: organisations, or: establishments.

Reporting unit

R&D managers (in smaller organisations: owners or general managers) or person with responsibility for innovation related activities.

Operationalisation

Survey question (from CIS): "During the reference period, how important were the following factors for hampering your innovation activities or projects or influencing a decision not to innovate?"

- ÿ Lack of funds within your enterprise/group;
- ÿ Lack of finance from external sources;
- ÿ Innovation costs too high;
- ÿ Lack of qualified personnel;
- ÿ Lack of information on technology;
- ÿ Lack of information on markets;
- ÿ Difficulty in finding cooperation partners;
- ÿ Markets dominated by established enterprises;
- ÿ Uncertain demand for innovative products;
- ÿ No need to innovate."

Complementary indicators

n.a.

Relation to existing indicators

This is an existing indicator from the European Community Innovation Survey.

Methodological issues concerning application of the indicator

The value of this indicator is limited by the fact that only firms that have confirmed innovative activities in the reference period are asked whether they have collaborated in this context.

Links

ÿ Community Innovation Survey IV questionnaire <http://www.oecd.org/dataoecd/52/35/40140021.pdf>

3.22 Job autonomy index

Definition

Share of the employed labour force who have control over the way they work. Based on three items:

- ÿ Order of tasks
- ÿ Methods of work
- ÿ Speed or rate of work.

Unit of observation

Total population with contract of employment.

Reporting unit

Total population with contract of employment.

Operationalisation

Survey question, from European Working Conditions Survey "In your main job, are you able, or not, to choose or change:

- ÿ Your order of tasks
- ÿ Your methods of work
- ÿ Your speed or rate of work"

Complementary indicators

- ÿ Share of the employed labour force who can participate in key decisions about the organisation of their work. Index based on ESWC questions:
- ÿ "Within your workplace, are you able to discuss...?
 - o Your working conditions in general
 - o The organisation of your work when changes take place
- ÿ If 'YES', do these exchanges of views take place...?
 - o With your colleagues
 - o With your superiors
 - o With staff representatives
 - o With outside experts
 - o On a regular basis
 - o On a formal basis"

Relation to existing indicators

While the compound indicator is not used outside of academic research, the component variables are well established as part of the European Working Conditions Survey.

Methodological issues concerning application of the indicator

Use of a Likud scale for response (rather than binominal responses) might be able to increase validity of the indicator for cross-country research.

Links

- Y European Working Conditions Surveys (EWCS)
<http://www.eurofound.europa.eu/ewco/surveys/index.htm>

3.23 ICT use for collaborative work in teams or projects

Definition

Share of people in work who state that the Internet is important to them for working together in teams or projects with people based in (a) same region, (b) outside of the region, but same country, (c) a foreign country

Unit of observation

Total population in paid work.

Reporting unit

Total population in paid work.

Operationalisation

Survey question, as piloted in TRANSFORM: “How important would you say are the following uses of the Internet for your ability to carry out your job?”

- ÿ (a) To communicate (via e-mails, chat or instant message) with people located in the same region.
- ÿ (b) To communicate (via e-mails, chat or instant message) with people located outside of the region.
- ÿ (c) To communicate (via e-mails, chat or instant message) with people located abroad.
- ÿ (d) To look for work related information in general.
- ÿ (e) To look for work related information from your region, city or neighbourhood.
- ÿ (f) To work together in teams or projects with people located in the same region.
- ÿ (g) To work together in teams or projects with people located outside of the region but within your country.
- ÿ (h) To work together in teams or projects with people located abroad.

(10-point scale with 1 = essential, and 10 = not important at all)

Complementary indicators

n.a.

Relation to existing indicators

n.a.

Methodological issues concerning application of the indicator

The questionnaire modules a number of possibilities for analysing communication and collaboration activities according to location of the work partners.

Links

n.a.

3.24 ICT-enabled access to resources (individuals)

Definition

Percentage of individuals who have experienced ICT-enabled improved access to vital resources.

Unit of observation

Total population.

Reporting unit

All Internet users

Operationalisation

Survey question as piloted in TRANSFORM (adapted from Pew Internet): "This question is about some important decisions or changes that may have occurred in your life. In the last three years have you...?"

- Y (a) Made a major investment or financial decision
- Y (b) Gotten additional education or training for your career
- Y (c) Chosen a school or college for yourself or your child
- Y (d) Helped another person deal with a major illness or health condition
- Y (e) Moved into a new place to live
- Y (f) Changed jobs

[IF YES] Thinking about the process you went through as you made this decision or dealt with this event, how important was the role of the Internet? (10-point scale with 1 = essential to 10 = not important at all.)

Complementary indicators

- Y Specific role the Internet played in vital decisions or events, as perceived by users ("Help find advice or support from other people", "Help find information or compare options", "Help find professional or expert services", "Something else". [From Pew Internet survey])
- Y Problems experienced when using the Internet for dealing with vital decisions or events ("At any point during this process, did you get BAD information or advice on the internet that made your experience more difficult, or wasn't this a problem for you?") [From Pew Internet survey])
- Y Relative importance of the Internet vis-à-vis other information sources for dealing with vital decisions or events ("Thinking about all of the different sources of information you used as you went through this process, was the most important source something you found on the Internet or something you found offline?") [From Pew Internet survey])

Relation to existing indicators

Established indicator in the regular Pew Internet survey on Life's Major Moments, conducted in the USA only.

Methodological issues concerning application of the indicator

The module piloted in the TRANSFORM survey was a slightly modified version of the Pew Internet module. The changes were: A 10-point scale was used for replies (instead of the 4-point scale used in the Pew study) and two items were dropped as they appeared to be less applicable in European contexts.

Links

- Pew Internet Report “The Internet’s Growing Role in Life’s Major Moments”
http://www.pewinternet.org/PPF/r/181/report_display.asp
- Pew Internet Report “Strength of Internet Ties”
http://www.pewinternet.org/PPF/r/172/report_display.asp

3.25 ICT applications perceived as of major importance for the life of citizens

Definition

Applications of ICTs which are perceived by users as being of major importance for their life. Items sorted according to the following seven spheres of ICT applications:

- ÿ Communicate (social interaction);
- ÿ Perceive information (one-to-many);
- ÿ Find information;
- ÿ Take care of personal business, transactions and requests for assistance;
- ÿ Entertainment;
- ÿ Generate and distribute own content;
- ÿ Participate in policy-making and public life;
- ÿ Employment-related activities

Unit of observation

Total population.

Reporting unit

All Internet users

Operationalisation

Survey question, as piloted in TRANSFORM: "How important would you say are the different possible uses of the Internet for your private life?"

- ÿ (a) To communicate (via e-mails, chat or instant message) with people located in the same region
- ÿ (b) To communicate (via e-mails, chat or instant message) with people located outside of the region but inside your country.
- ÿ (c) To communicate (via e-mails, chat or instant message) with people located abroad.
- ÿ (d) To play online games.
- ÿ (e) To buy or order goods and services – in general.
- ÿ (f) To find information about goods or services which you consider buying at shops in your region: or city.
- ÿ (g) To use your bank's online services.
- ÿ (h) For educational and learning purposes.
- ÿ (i) To look for news about your region, city or neighbourhood.
- ÿ (k) To obtain information about events in your region, city or neighbourhood.
- ÿ (l) To find information about health issues in general.
- ÿ (m) To find information about health and medical care services in your region, city or neighbourhood.
- ÿ (n) To look for career related information (jobs, information related to your work) in general.
- ÿ (o) To look for career related information from your region, city or neighbourhood.
- ÿ (p) To work at home.

(10-point scale with 1 = essential, and 10 = not important at all)

Complementary indicators

- ÿ Applications of ICTs which are perceived by workers as being of major importance for their ability to carry out their job

Relation to existing indicators

The Eurostat model questionnaire include a long list of online activities, about which it asks respondents whether they have done them in the reference period. The present indicator differs in that it asks for the perceived importance of an online activity for private/work life.

Methodological issues concerning application of the indicator

More research is needed in order to explore cross-cultural issues in benchmarking perceived importance of activities.

Links

n.a.

3.26 Availability of tools for eParticipation

Definition

Index calculated from the extent to which online engagement is enabled, differentiated by the five stages in the policy-making cycle:

- ÿ Agenda-setting
- ÿ Analysis
- ÿ Formulation
- ÿ Implementation
- ÿ Monitoring

Unit of observation

Unit of observation is dependent on the administrative structure of the region in question.

Reporting unit

Regional/local government officials, or web measurement (website content analysis)

Operationalisation

To be explored.

Complementary indicators

To be explored.

Relation to existing indicators

A supply-side e-participation index has been established by the Division for Public Administration and Development Management of the United Nations, and country rankings reported based on a web measurement carried out for the purpose. The UN survey distinguishes between three levels:

- ÿ Infrastructure: Creating an information infrastructure both within the public sector and across society at large, one based upon reliable and affordable Internet connectivity for citizens, businesses and all stakeholders in a given jurisdiction;
- ÿ Integration: Leveraging this new infrastructure within the public sector in order to better share information (internally and externally) and bundle, integrate, and deliver services through more efficient and citizen-centric governance models encompassing multiple delivery channels; and
- ÿ Transformation: Pursuing service innovation and e-government across a broader prism of community and democratic development through more networked governance patterns within government, across various government levels, and amongst all sectors in a particular jurisdiction.

Methodological issues concerning application of the indicator

To be explored.

Links

- ÿ United Nations e-Government Survey 2008 "From e-Government to Connected Governance"
<http://unpan1.un.org/intradoc/groups/public/documents/UN/UNPAN028607.pdf>

3.27 Perceived effect of Internet on general living conditions in the region

Definition

Share of persons who perceive a significantly positive effect of the Internet on the conditions within the region with regard to:

- ÿ Finding a good job;
- ÿ Getting education and training;
- ÿ Engaging in lifelong learning;
- ÿ Setting up a business;
- ÿ Making voice heard in regional politics & public life;
- ÿ Enjoying leisure time;
- ÿ Enjoying a high quality of life

Unit of observation

Total population.

Reporting unit

All Internet users

Operationalisation

Survey question, as piloted in TRANSFORM: "Some people think that the Internet has an influence on the living and working conditions in Europe's regions, others think that this is not the case. In the reference period, what kind of influence would you say the Internet has had on the general conditions in your region regarding:

- ÿ (a) Finding a good job
- ÿ (b) Getting education and training
- ÿ (c) Engaging in adult/further education and lifelong learning
- ÿ (d) Setting up an own business
- ÿ (e) Making your voice heard in regional politics and public life
- ÿ (f) Enjoying leisure time
- ÿ (g) Enjoying a high quality of life"

(5-point scale with 1 = very positive influence, and 5 = very negative influence)

Complementary indicators

- ÿ Share of persons who perceive the living conditions within the region as very good or good, with regard to the conditions for (a) Finding a good job; (b) Getting education and training; (c) Engaging in adult/further education and lifelong learning; (d) Setting up an own business; (e) Making your voice heard in regional politics and public life; (f) Enjoying leisure time; (g) Enjoying a high quality of life.

Relation to existing indicators

Within the context of the Urban Audit, a perceptions survey was carried out in 31 major EU cities, containing a long list of variables on living and working conditions.

Methodological issues concerning application of the indicator

n.a.

Links

- Ÿ Urban Audit website <http://www.urbanaudit.org/index.aspx>
- Ÿ Urban Audit Perception Survey results http://ec.europa.eu/public_opinion/flash/fl_156_en.pdf

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